10 MAY 2019

VOLUME - IA

Technical Conditions of Contract (TCC) "Construction of Railway Staff Quarters with Electrification of Quarters" for "Bhandai to Udi More, Agra Division, Gr 240"

FOR

RE WORKS OF BHANDAI-UDI, BIRLANAGAR-ETAWAH AND FARRUKHABAD-SHIKOHABAD INCLUDING MAINPURI-ETAWAH

OF

NORTH CENTRAL RAILWAY

BHARAT HEAVY ELECTRICALS LIMITED

BHEL Maharatna Company	**Technical Conditions Of Contract (TCC)** **PROJECT ENGINEERING & SYSTEMS DIVISION** **HYDERABAD**	Ref No: HY/ PE&SD/ Projects/ 2018-19/ Quarters / Agra Div /01, Rev. No. 00

TECHNICAL CONDITIONS OF CONTRACT (TCC)

FOR

Railway Staff Quarters with Electrification "Bhandai to Udi More, Agra Division, Gr 240"

FOR

RAILWAY ELECTRIFICATION PROJECT IN BHANDAI-UDI, BIRLANAGAR-ETAWAH AND SHIKOHABAD-FARRUKHABAD INCLUDING MAINPURI-ETAWAH, SECTION OF AGRA, JHANSI AND ALLAHABAD DIVISIONS OF NORTH CENTRAL RAILWAY UNDER RE PROJECT LUCKNOW, TOTAL RKM 386/440TKM

Revisions:	Prepared By:	Approved By:	Date
Refer to record of revisions	A. Shiva Kumar/Sr. Manager	Arif Naiyer/Sr.DGM	10.05.2019

Volume IA
Part I
Contract specific details

Chapter I- Project Information

1.0 Project Details

Bharat Heavy Electricals Limited has been awarded the "The Electrification of Railway Lines of the section Birlanagar-Etawah, Bhandai-Udi and Farrukhabad-Shikohabad including Mainpuri-Etawah of North Central Railway 386 RKM/440 TKM" project on EPC basis by Central organization for railway electrification (CORE), Allahabad.

1	Customer	:	Central organization for railway electrification (CORE), Allahabad.
2	Project Information	:	Electrification of Railway Lines of the section Birlanagar-Etawah, Bhandai-Udi and Farrukhabad-Shikohabad including Mainpuri-Etawah of North Central Railway 386 RKM/440 TKM
3	Location	:	Bah & Fatehabad, Uttar Pradesh.
4	Address Detail	:	Bah & Fatehabad, Uttar Pradesh.
5	Nearest Railway Stations	:	Agra, Etawah, Birlanagar, Shikohabad and others
6	Road Approach	:	NA
7	Nearest Air Port	:	Lucknow, Kanpur
11	Ambient Air Temperature (Average)	:	a) Maximum : 45^0 C b) Minimum : 2^0 C
12	Average Relative Humidity	:	40 %
13	Climatic Condition	:	Tropical Climate
14	MP Border		State boundary between Udi More and Phoop Station

Bidder is advised to visit the project site and appraise himself about the local conditions and infrastructure available in the area for fulfilling their commitments under the contract. BHEL will not admit any claims whatsoever on account of Contractor's non-familiarization of local conditions.

Chapter II- Scope of Work

SCOPE OF WORK

The work to be performed under the scope of this tender mainly consists of but not limited to complete scope of Construction of Railway Staff Quarters with electrification.

The Scope including:

1) Staff Quarters and its approach road
2) Boundary wall & Fencing
3) Rain water harvesting
4) Bore wells
5) Electrification of quarters and
6) Area illumination

All works shall be completed as per drawings & RDSO, CORE, ACTM & other railway standards.

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Chapter III- Facilities in the scope of BHEL/Contractor

S. No.	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
3.1	**ESTABLISHMENT**			
3.1.1	**FOR CONSTRUCTION PURPOSE**:			
a	Open space for office (as per availability)	Yes		Location will be finalized after joint survey with customer(CORE)
b	Open space for storage (as per availability)	Yes		Location will be finalized after joint survey with customer(CORE)
c	Construction of bidder's office, canteen and storage building including supply of materials and other services		Yes	
d	Bidder's all office equipment, office / store / canteen consumables		Yes	
e	Canteen facilities for the bidder's staff, supervisors and engineers etc.		Yes	
f	Firefighting equipment like buckets, extinguishers etc.		Yes	
g	Fencing of storage area, office, canteen etc. of the bidder		Yes	
3.1.2	**FOR LIVING PURPOSES OF THE BIDDER**			
a	Open space for labor colony (as per availability)	Yes		Can be provided as per availability
b	Labor Colony with internal roads, sanitation, complying with statutory requirements		Yes	
3.2.0	**ELECTRICITY**			
3.2.1	Electricity For construction purposes		Yes	
3.2.2	Electricity for the office, stores, canteen etc. of the bidder		Yes	
3.2.3	Electricity for living accommodation of the bidder's staff, engineers, supervisors etc.		Yes	
3.3.0	**WATER SUPPLY**			
3.3.1	For construction purposes		Yes	
3.3.2	Water supply for bidder's office, stores, canteen etc.		Yes	

S. No.	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
3.3.3	Water supply for Living Purpose		Yes	
3.4.0	**LIGHTING**			
a	For construction work (supply of all the necessary materials) 1. At office/storage area 2. At the preassembly area 3. At the construction site /area		Yes	
b	For construction work (execution of the lighting work/ arrangements) 1. At office/storage area 2. At the preassembly area At the construction site /area		Yes	
c	Providing the necessary consumables like bulbs, switches, etc. during the course of project work		Yes	
d	Lighting for the living purposes of the bidder at the colony / quarters		Yes	
3.5.0	**COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER**			
a	Téléphone, fax, internet, intranet, e-mail etc.		Yes	
3.6.0	**COMPRESSED AIR wherever required for the work**		Yes	
3.7.0	**Demobilization of all the above facilities**		Yes	
3.8.0	**TRANSPORTATION**			
a	For site personnel of the bidder		Yes	
b	For bidder's equipment and consumables (T&P, Consumables etc.)		Yes	

Sl. No	Description PART II 3.9.0 CONSTRUCTION FACILITIES	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
3.9.1	**Engineering works for construction:**			
a	Providing the construction drawings for all the works covered under this scope			**Not Applicable**
b	Drawings for construction methods			**Not Applicable**
c	As-built drawings – where ever deviations observed and executed and also based on the decisions taken at site- example – routing of small bore pipes		Yes	In consultation with BHEL
d	Shipping lists etc. for reference and planning the activities		Yes	In consultation with BHEL
e	Preparation of construction (Concreting B/W, etc.) schedules and other input requirements		Yes	In consultation with BHEL
f	Review of performance and revision of site construction schedules in order to achieve the end dates and other commitments	Yes	Yes	In consultation with BHEL
g	Weekly construction schedules based on S. No. e. hard copy to Construction manager, by email to HO.		Yes	In consultation with BHEL
h	Daily construction / work plan based on S. No. g. hard copy to Construction manager, by email to HO.		Yes	In consultation with BHEL
i	Periodic visit of senior official of the bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two Weeks.		Yes	
j	Arranging the materials required for Work		Yes	
k	Coordination for inspection & checking and getting clearance from customer and consultancy		Yes	
l	Preparation of formats for completion of activities		Yes	

Chapter IV- T&P's to be Deployed By Contractor

LIST OF TOOLS AND PLANT:

The following tools and equipment but not limited to, are required for the efficient execution of the civil works. The contractor shall make them available for construction purposes, including all consumables likely to be used at his own cost at the time of mobilization.

S.No.	Description	Minimum Quantity	Remarks
1	Digital Concrete Mixer 2 to 4 cum with hopper/Self-loading mobile concrete mixer (Azax)with printer	3 nos.	
2	Needle Vibrator (Needle type 40mm)	4 nos.	
3	Needle Vibrator (Needle type 25mm)	2 nos.	
4	Surface Vibrator	1 no.	
5	Concrete Pump		Need based
6	Dewatering Pump	2 nos.	
7	Earth Compactor	2 nos.	Need based
8	Reinforcement steel cutting & Bending machine	2 nos.	
9	Welding Machine	2 nos.	
10	Grinding Machine	4 nos.	
11	Excavator	5 no.	
12	Dozer	7 nos	
13	Dumper	1 nos.	
14	Water Tanker	5 nos.	
15	Theodolite with staff	2 nos.	
16	Dumpy level with staff	1 no.	
17	Compression testing machine (for concrete cubes)	1 no	
18	Cube mould (15 cm x 15 cm x 15 cm)	18 nos.	
19	Sieve analysis sieve sets for coarse & fine aggregates	1 set	
20	Jar/Beaker for Bulk density test of sand	1 no.	
21	Proctor test equipment	1 set	
22	Tractor with trolley	2 Set	
23	Tractor mounted Auger machine	2 Set	
24	Proctor test equipments	1 set	
25	All the required filed quality test equipment/instruments	1 set	

BHEL will not provide any tool, plants or any testing facility/apparatus for the work. It will be contractor's responsibility to arrange all required tools, plants and other testing apparatus, etc. at their own cost. The prices quoted & finalized are inclusive of the charges towards providing such T&P. No extra payment will be entertained on account of this.

Chapter V- Time Schedule

5.1 TIME SCHEDULE

5.1.1
The entire work of construction of Railway staff quarters with electrification as detailed elsewhere in the Tender Specification shall be completed within **12 (Twelve) Months** from the date of commencement of work at site.

5.1.2
During the total period of contract, the contractor has to carry out the activities in a phased manner as required by BHEL and the program of milestone events.

5.1.3
The work shall be commenced on the mutually agreed date between the bidder and BHEL engineer. The decision of BHEL in this regard shall be final and binding on the contractor. The scope of work under this contract is deemed to be completed only when so certified by the site Engineer.

5.2 COMMENCEMENT OF CONTRACT PERIOD

The date of commencement of contract period shall be the mutually agreed date between the bidder and BHEL engineer to start the work. In case of discrepancy the decision of BHEL engineer will be final.

5.3 MOBILISATION

5.3.1
The activities for work shall be started as per directions of Construction manager of BHEL.
5.3.2
The contractor should mobilize man power in order to complete the work in **12 (Twelve) Months**
5.3.3
Requisite Material, men and machinery should be arranged in order to complete the project within stipulated time period.
5.3.4
The contractor has to augment his resources in such a manner that to achieved major milestones of the project are achieved on specified schedules:

In order to meet above schedule in general, and any other intermediate targets set, to meet project, contractor shall arrange & augment all necessary resources from time to time on the instructions of BHEL.

5.4 CONTRACT PERIOD

For the purpose of contract, the period shall be taken as **12 (Twelve) Months.** Completion of the work shall be as per BHEL Bar Charts revised from time to time. In order to expedite the work, the contractor has to deploy manpower as per site requirement without any extra cost to BHEL.

5.5 PROTECTION OF WORK

The contractor shall have total responsibility for protecting his works till it is taken over by the Employer. No claim will be entertained by the Employer or the representative of the Employer for any damage or loss to the Contractor's works and the Contractor shall be responsible for complete restoration of the damaged works to original conditions to comply with the specification and drawings. Should any such damage to the Contractor's Works occur because of other party not being under his supervision or control, the Contractor shall make his claim directly with the party concerned.

If disagreement, conflict, or dispute develops between the Contractor and the other party or parties concerned regarding the responsibility for damage to the Contractor's Works the same shall be rectified. The Contractor shall not cause any delay in the repair of such damaged Works because of any delay in the resolution of such disputes. The Contractor shall proceed to repair the Work immediately and no cause thereof will be assigned pending resolution of such disputes.

5.6 Project Milestones

Completion of all Type of quarter at "any one location out of two" Locations in the First Five months

Chapter VII- Special Payment Conditions

1. Payment for the work shall be done as per actual measurement and certification by BHEL Engineer at site.

2. All the line items will be measured and paid as per actuals. However, payment shall be made as per work completed in all respect according to the measurement.

Chapter VII- Statutory Regulation

6.2 BUILDING & OTHER CONSTRUCTION WORKERS (REGULATION OF EMPLOYMENT AND CONDITIONS OF SERVICE) ACT, 1996 (BOCW Act) AND RULES OF 1998 READ WITH BUILDING & OTHER CONSTRUCTION WORKERS CESS Act, 1996 & CESS RULES, 1998 and

INTER-STATE MIGRANT WORKMEN ACT, 1979 (IN CASE BIDDER ENGAGE MANPOWER FROM OTHER STATE)

In case any portion of work involves execution through building or construction workers and/or inter-state migrant workmen, then compliance to the above titled Acts as applicable shall be ensured by the contractor and contractor shall obtain license and deposit the cess under the Act. In the circumstances it may be ensured as under:-

It shall be the sole responsibility of the contractor in the capacity of employer to forthwith (within a period of 15 days from the award of work) apply for a license to the Competent Authority under the BOCW Act and/or ISMW Act as applicable and obtain proper certificate thereof by specifying the scope of its work. It shall also be responsibility of the contractor to furnish a copy of such certificate of license / permission to BHEL within a period of one month from the date of award of contract.

It shall be the sole responsibility of the contractor as employer to ensure compliance of all the statutory obligations under these acts and rules including that of payment / deposit of cess as per the applicability under above referred Acts within a period of one month from the receipt of payment.

It shall be the responsibility of the sub-contractor to furnish the receipts / challans towards deposit of the cess together with the number, name and other details of beneficiaries (building/Inter-state Migrant workmen) engaged by the sub-contractor during the preceding month.

It shall be the absolute responsibility of the sub-contractor to make payment of all statutory payments & compensations to its workers including that is provided under the Workmen's Compensation Act, 1923.

Volume IA
Part II
Technical Specification

Chapter I- Detailed Scope of Work

1.0 SCOPE OF WORK

The work to be performed under the scope of this tender mainly consists of but not limited to complete scope of Quarters, approach road, Boundary wall/Fence. Electrification and area illumination.

Quarters, approach road, Boundary wall/Fence including excavation, backfilling, formwork, foundation work, super structure, boundary/fencing, retaining wall, sanitary & water fittings and other services. etc , all complete as per drawings, RDSO, Core, ACTM and other railway standards.

The scope also involves liaising with customer for approval of drawings prepared/furnished by BHEL. BHEL will provide drawings to contractor. Contractor shall take prior approval from customer before proceeding for site work.

Any temporary activities required to complete the work, making templates etc. for execution work is in contractor scope.

All approvals from statutory and local authorities etc if required, is in contractor's scope.

The plot for construction area/ fabrication yard/ field office/ construction stores has to be developed by the contractor of its own. All the infrastructure facilities which include roads, approaches, drainage system, pavements etc. shall be developed & provided by the contractor of its own.

2.0 THE WORK WILL INVOLVE.

All civil and electrical works connected with the above-mentioned structures such as earthwork, concrete work, formwork, embedment, electrification ,liaison with customer, etc

3.0 EXCUSION

All works are in contractor's scope.

4.0 CIVIL WORKS

The scope covers all civil works within the battery limits. The important works covered are as below.

Excavation of earth and backfilling including dewatering of excavations for foundations, trenches, tunnels pits, etc. till the construction of the same is completed and disposal of surplus.

Preparation and submission of detailed calculations, arrangement drawings of formwork, staging and scaffolding for all foundations as directed by the Engineer for his checking and approval.

Preparation of bar bending schedules for all foundation works with reinforcement etc and getting them approved by the BHEL Engineer.

Supply of all instruments and personnel for conducting necessary tests at site as specified/as directed by the Engineer.

Liaising with customer for approval of drawings prepared by BHEL.

5.0 GENERAL

a) The drawings enclosed with this tender are intended to give the tenderer a general idea of the type and extent of work involved. The drawings are as such only indicative and not to be considered as the exact construction drawings.
Further, this is to be noted that the drawings and the documents furnished along with this specification are the sole property of B.H.E.L. It must not be used directly or indirectly in any way detrimental to the interest of the company.

b) The scope of work will also include such other related works although they may not be specifically mentioned in the above paragraph and all such incidental items not specified but reasonably imply and necessary for completion of the job as a whole all as desired and as directed by the engineer.

c) The detail scope of work covered above is not a comprehensive list of items of work involved. The detail scope of work may vary considerably depending on the actual construction requirements.

6.0 ALSO INCLUDED IN THE SCOPE

Unless otherwise specified, the work to be provided by the contractor for the items mentioned in the "Schedule of items", shall include but not be limited to the following.

a) Furnishing all labour, materials, supervision, construction plans, equipment, supplies, transport, to and from the site, fuel, electricity, compressed air, water, transit and storage insurance and all other incidental items and temporary works not shown on specified but reasonably implied or necessary for the proper completion, maintenance and handling over the works, except in accordance with the stipulations laid down in the contract documents and additional stipulations as may be provide by the engineer during the course of works.

b) Furnishing samples of all materials required by the engineers for testing/inspection and approval for use in the works. The engineer for final incorporation in the works may retain the samples.

c) Furnishing test reports for the products used or intended to be used, if called for the specifications or if so desired by the engineer.

d) Giving all notices, paying all fees, taxes etc., in accordance with the general conditions of contract, that are required for all works including temporary works.

e) Arranging manufacturer's supervision for items of work done as per manufacturer's specifications when so specified.

f) Establishing levels and coordinates at suitable intervals from existing grid levels and coordinates/references furnished by the owner established bench marks, setting out the locations and levels of proposed structures, constructions and marking of reference pillars and other identification works etc., The contractor shall provide the owner/BHEL such a assistance, instruments, machines, labour and materials as are normally required for examining, measuring and testing any work and the quality, weight or quantity of any material used.

g) Providing all incidental items not shown or specified but reasonably implied or necessary for the successful completion of the work in accordance with contract.

h) Bidder is expected to get conversant with latest RDSO, Core, ACTM & other railway standards and drawings. All works are to be strictly executed as per railway standards and drawings. Bidder is requested to arrange railway standards and drawings on his own and no standards will be provided by BHEL.

i) Bidder to execute the work in consultation with Railway official and BHEL official. All required approvals as required to complete the work from Railway authorities shall be in bidder's scope. No extra payment shall be made for the same.

j) All works including excavation, back filling, formwork, reinforcement, concreting, curing, finishing etc shall be done as per drawings/specifications.

k) Detailed drawings shall be provided to successful bidder progressively during construction stage.

7.0 WORK BY OTHERS

No work under the specification will be provided by any agency other than the contractor unless specifically mentioned elsewhere in the contract.

8.0 ELECTRICAL WORKS

1.0 General Conditions of this Specification

Specifications and Standards

1.1.1 The Contractor shall comply with Indian Railways Manual AC Traction (Volume-II Part-I and Volume-II Part-II), Manual of Standards & Specification for Railway Electrification, Indian Railways Schedule of Dimension for construction of the Railway Electrification Project. It includes verification and validation of system installed and independent certification for maintenance and operation system during its life cycle.

1.1.2 The Railway Project shall conform to design requirements set out in the following documents:

Indian Railways Permanent Way Manual, Indian Railway Bridge Manual, Indian Railway Schedule of Dimensions & relevant IRS Specifications referred in the above said Manuals, Indian Railway Signalling Engineering Manual, Indian Railway Telecom Manual, AC Traction Manual, Rules for Opening Railways, Specifications of works of concerned zonal railway. In case of any contradiction in the various codal provisions, order of precedence shall be as follows:

a) Provisions in the above said manuals.
b) IRS codal provisions

c) IRC codal provisions
d) IS (BIS) codal provisions.

1.1.3 The contractor shall follow latest RDSO specifications as on 31.10.2018 for design, procurement and execution.
The contractor is also expected to get conversant with latest RDSO, CORE, ACTM & other railway standards/manuals/guidelines and drawings. All works shall be strictly executed as per railway standards and drawings. The Purchaser shall not provide any standard RDSO/CORE/Railways drawings/guidelines/specification/manual required for design and execution of the project, same shall be arranged by the Contractor on his own risk and cost. The contractor shall not delay any execution activity because of non-availability of any such standard documents with them.

1.1.4 Any calculations, designs, drawings, schedules, information, data, progress charts etc. required by the Authority's Engineer in connection with the contract shall be furnished by the Contractor at his own expenses.

1.1.5 In the absence of any specific provision on any particular issue in the aforesaid Manuals, Specifications, or Standards, the following standards shall apply in order of priority

- Indian Electricity Rules
- Bureau of Indian Standards (BIS)
- Euro Codes or British Standards or American Standards
- Any other specifications/standards proposed by the Contractor and reviewed by the Authority's Engineer.

1.1.6 The requirements specified in the Manuals are the minimum. The Contractor shall, however, be free to adopt international practices, alternative specifications, materials and standards to bring in innovation in the design and construction provided they are better or comparable with the standards prescribed in the Manuals. The specifications and techniques which are not included in the Indian Railway Manuals/ RDSO specifications shall be supported with authentic specifications and standards specified in 1.1.5 above. Such a proposal shall be submitted by the Contractor to the Authority/Purchaser. In case, the Authority's Engineer is of the opinion that the proposal submitted by the Contractor is not in conformity with any of the international standards or codes, then he shall record his reasons and convey the same to the Contractor for compliance.

Designing for Electrical works:

1.1.7 The contractor shall submit a document submission schedule within 10 days from the date of LOA for information/approval. The document schedule shall be consistent with the Project Milestones as defined elsewhere. Any drawings/documents which are not mentioned in the Document schedule and required by the purchaser/Authority shall be prepared and submitted by the contractor.

1.1.8 The contractor shall submit all required design drawings/documents for total Electrical works for approval of the purchaser/authority. The contractor shall also liaison for approval from the Railway authority/ State Electricity board/ any other authority for the design drawings/documents.

1.1.9 The contractor shall prepare and submit in consistent with the Project Completion Schedule as defined elsewhere in the contract, required no. of copies of the design and Drawings to the purchaser for review. Provided, however, that the purchaser may require additional drawings for its review in accordance with Good Industry Practice.

1.1.10 All designs and drawings submitted by the contractor shall be based on a thorough survey/study and shall be such that the contractor is satisfied about their suitability. The Purchaser's approval will be based on these considerations, notwithstanding the approval communicated by the Purchaser, during the progress of the contract for designs and drawings, prototype samples of components, materials and equipment after inspection of materials, after erection and adjustments to installations, the ultimate responsibility for correct design rest with the contractor unless the Purchaser insists on adoption of his own designs in spite of the contractor not being agreeable to it.

1.1.11 The contractor shall be responsible for and shall bear and pay the costs for any alteration of works arising from any discrepancies, safety point of view, errors or omissions in the designs and drawings supplied by him, whether such designs and drawings have been approved by the Purchaser or not.

1.1.12 Process of Drawing Approval

a. All the drawings and documents required for Electrical works shall be prepared by the contractor and shall be submitted to the purchaser for Review.
b. The purchaser shall review the documents and furnish observations on its own/through a consultant.
c. Upon receipt of the observations, the contractor will rectify the document and discuss with the purchaser, if required, through mutually suitable mode of communication and time.
d. The contractor will submit the documents to concerned Railway Authority and liaison for approval by the Railway Authority

1.1.13 By submitting the Drawings for review to the purchaser, the Contractor shall be deemed to have represented that it has determined and verified that the design and engineering, including field construction criteria related thereto, are in conformity with the Scope of the Project, Specifications and Standards, Applicable Laws and Good Industry Practice.

1.1.14 Within 15 (fifteen) days of the receipt of the Drawings, the Authority/purchaser shall review the same and convey its observations to the Contractor with particular reference to their conformity or otherwise with the Scope of the Project and the Specifications and Standards.

1.1.15 If the aforesaid observations of the purchaser indicate that the Drawings are not in conformity with the Scope of the Project or the Specifications and Standards, such Drawings shall be revised by the Contractor in conformity with the project requirements and resubmitted to the purchaser for review. The purchaser shall give its observations, if any, within 10 (ten) days of receipt of the revised Drawings. In the event the Contractor fails to revise and resubmit such Drawings to the purchaser for review as aforesaid, the purchaser may cause the payment for the affected works to be withheld under and in accordance with the provisions of this agreement. If the Contractor disputes any decision, direction or determination of the purchaser hereunder, the Dispute shall be resolved in accordance with mutually decided procedure;

1.1.16 No review and/or observation of the purchaser and/or its failure to review and/or convey its observations on any Drawings shall relieve the contractor of its obligations and liabilities under this Agreement in any manner nor shall the purchaser or the Authority be liable for the same in any manner; and if errors, omissions, ambiguities, inconsistencies, inadequacies or other Defects are found in the Drawings, they shall, along with the affected Works, be corrected at the Contractor's cost, notwithstanding any review;

1.1.17 The Contractor shall be responsible for delays in submitting the Drawings caused by reason of delays in surveys, and shall not be entitled to seek any relief in respect thereof from the purchaser.

1.1.18 The Contractor warrants that its designers, including any third parties engaged by it, shall have the required experience and capability in accordance with Good Industry Practice and it shall indemnify the purchaser against any damage, expense, liability, loss or claim, which the Authority might incur, sustain or be subject to arising from any breach of the Contractor's design responsibility and/or warranty as set out in this Clause.

1.1.19 If the Purchaser/Authority determines that for discharging its duties and functions under this contract, it requires any drawings other than those listed in this specification, it may by notice require the Contractor to prepare and furnish such drawings forthwith. Upon receiving a requisition to this effect, the Contractor shall promptly prepare and furnish such drawings to the purchaser/Authority.

1.1.20 The contractor shall also submit the GA/Installation drawings/approved QAP or any other drawing applicable for equipment to be supplied by the contractor for approval/information. The contractor shall also submit any other drawing as required by the Authority for approval/information.

1.1.21 The Authority shall retain at least one copy each of all Drawings and Documents received by it, including 'as-built' Drawings, and keep them in its safe custody.

1.1.22 No later than 90 (ninety) days prior to the Project Completion Date, the Contractor shall, in consultation with the purchaser, evolve an equipment specific maintenance manual for equipment based on a new technology not currently in use in the Railways (the "Maintenance Manual") for the regular operation and maintenance of such equipment in conformity with safety requirements, Good Industry Practice and manufacturer's manuals and instructions and shall provide 10 (ten) hard copies and 2 (two) compact discs thereof to the purchaser.

1.1.23 The Within 90 (ninety) days of the Project Completion Date, the Authority's Engineer/Purchaser shall obtain a complete set of as-built Drawings, in 3 (three) hard copies and in micro film form or in such other medium as may be acceptable to the Authority, reflecting the Railway Project as actually designed, engineered and constructed, including an as-built survey illustrating the layout of the Railway Project and setback lines, if any, of the buildings and structures forming part of Project Facilities; and shall hand them over to the Authority against receipt thereof.

Supply of the Material:

1.1.24 All the items supplied by the contractor shall be as per RDSO/CORE Vendor List. In case of non-availability of vendor list for any item, the contractor shall take prior approval from Purchaser/Railway. However, all the items shall be of reputed make only and as per latest Indian Standards (as applicable).

1.1.25 The contractor shall submit a material procurement plan within 10 days from the date of LOA for information. The material procurement plan shall be prepared strictly in accordance with the Project Milestones.

1.1.26 The Contractor shall proceed with the ordering of supply of material after taking due Approval from the purchaser.

1.1.27 The Contractor shall be responsible for considering basic quantities of components and materials required to make up a unit of work for complete Electrical works and other items of this contract.

Terminal Points

1.1.28 With respect to incoming power supply from Grid at substation for augmentation, the contractor's scope shall be up to connection of existing HV supply to replacement transformer to be supplied by contractor. Liaising with State Electricity board/CEA inspector for approval/obtaining electrical clearances etc for the modification in substation shall be in Contractor's scope.

Packing and Dispatch

1.1.29 Packing and Dispatch of materials shall be as per RDSO/CORE/Railway standards.

1.1.30 In case of any discrepancies in the approved documents/execution of work with respect to RDSO/CORE/Railway standards, specifications and guidelines, it shall be responsibility of the contractor to inform the same to the purchaser before executing the work in order to take up with the authority.

2.0 Explanatory Notes for Electrical works for quarter:

2.1 General

2.1.1 Explanatory notes for various Items of Electrical work mentioned in Price Format are defined here.

2.1.2 All electrical work should comply with latest Indian electricity act and latest Indian electricity Rules.

2.1.3 All minor items viz hardware items material etc. as required shall be deemed to have been included in the tender, whether such items are specially mentioned, foundation bolts, termination lugs for electrical Connection, Glands, packing in the tender documents or not.

2.1.4 The equipment and materials to be supplied by the Contractor against various items should confirm to standard RDSO's specification /drawings and wherever RDSO specifications are not available, latest IS standards shall be applicable.

2.1.5 Erection of any item of equipment, whether supplied by the Contractor or by the Purchaser will include proper connecting, testing, commissioning and bringing the equipment into operation in accordance with standards/guidelines and to the satisfaction of the Purchaser.

2.1.6 The scope of work will also include such other related works although they may not be specifically mentioned in this specification and all such incidental items not specified but reasonably imply and necessary for completion of the job as a whole all as desired and as directed by the engineer.

2.1.7 All components used in installation shall be of proper voltage, current and frequency.

2.1.8 Nuts, Bolts, Washer, Screws etc. in the entire work shall not be of MS and shall be of Stainless Steel (or Brass if mentioned in specification) only.

2.2 Electrical works Particulars

Item No.1: Supplying, installing, testing & commissioning 3 phase, 11/0.433 kV, 50 Hz., oil immersed and naturally cooled outdoor type, Copper wound transformer, delta/star connected with additional neutral brought out on load side, with standard accessories complete with test certificate with losses as per IS:1180 - 2014, energy efficiency level II, with necessary permissions of Electrical Inspector as per specification no SS- TR(enclosed) and respective state electricity board requirements.

Item No. 2: Supplying, erecting, testing and commissioning 11 KV HT metering cubical (compact type) approved by Railway authority/ respective state electricity board fabricated with 2 mm (14 SWG) M.S. sheets with supporting angle and channel, painted with powder coating / epoxy paint of required shade copper bus bar size 25 x 6 mm electronic security lock and heavy duty mechanical lock, with counter meter for measuring no of times the opening of doors, top side cover (CT, PT cover) interlock with meter doors, epoxy coated 3 nos CT having required ratio between 5/5A to 50/5A, VA10,Class0.5S, 11000/V3/110/V3 VA 50, class 0.5 epoxy terminal block suitable for provided trivector meter, and provision for incoming and outgoing cables etc. complete duly tested by licensee with necessary test certificates and erected on provided plinth/ cc foundation.

Item No. 3: Provision for payment to SEB towards supervision works mentioned at Sl.No Item-1, 2.

Item No. 4: Dismantling the existing distribution transformer of any capacity from the plinth / foundation safely without any damages

Item No. 5: Dismantling existing pole mounted distribution transformer safely without any damages

Item No. 6: Dismantling any type of unserviceable feeder pillar, switch gear panel, capacitor panel, metering panel, bus-bar panel, electronic equipment panel, etc. and remaking the site good as original complete. (approx. size (upto 200cm. x 90 cm x 45 cm and above) - big cupboard)

Item No.7 & 8: Excavation of Trench

Trenching will be done in accordance with the route plan with dimensions of 1000mm deep and 300mm wide trench for laying of two parallel cables apart 4"-6" all along the length, submitted by contractor and approved by railway and shall be in straight line as far as possible, except where there is any obstruction due to sewer pipe line, water pipe line, nallah etc. for which the route shall be decided by the supervisor at site. Where there is any change in direction, suitable curve shall be provided.

The bottom of the trench shall be level and free from stones; brickbats etc. after filling a layer of 50mm sand, the cable shall be laid and filed by river sand up to the top of cable. The layer of bricks will be laid above the cable breadth wise (9 bricks per meter) to completely cover it. Size of bricks should be as per IS 1077(1992). If size of bricks are different, then same shall be got Approved from the Purchaser before use.

After lying of cable and placing of bricks the trench shall be filled with excavated earth free from stone particles or any other sharp edges debris. After back filling the excavated earth, the upper portion shall be properly dressed up, leveled & restored to the original condition.

BHEL will not be responsible for damage/injury to the staff of the contractor during trenching of cable and it will be sole responsibility of the contractor to give compensation for any miss-happening during the execution of work.

Cable Trenching should be made carefully so as not the damage any other cable which is already in the digging portion of trench. It will be the responsibility of the contractor to make it good as per entire satisfaction of the owner at the cost of contractor. The mortal used should be of 1:3 mix and bricks used should be of class designation of grade 10 (min) as per IS.

Item No.9: -Supply & lying of HDPE pipe through trenchless method.

1. The HDPE pipe shall confirm to IS 14930 Part-II or latest Version shall be supplied by the contractor and this specification given here is only for laying of HDPE Pipe by 'No DIG' also known as TRENCHLESS/Horizontal directional drilling method using Trenchless Technology.

2. The work involves supply and laying of HDPE pipes 103 mm inner dia and 120 mm outer dia through Trenchless digging with HDD machines to a depth not less than 1500mm from ground level. The trench should be taken up under Railway track or as required at site for avoiding any damage to existing underground utilities for laying of HDPE pipes.
   Horizontal boring and Inserting HDPE pipe under railway track crossing in all type of soil i.e. Hard/Sand/Rocky etc. at prescribed depth, including all civil works, Supply of all tools, other required equipment's and consumable labour etc.

3. Entire site shall be surveyed to identity and prevent damage to Telephone/Signal Cables and other underground services. The contractor will be responsible for all damages to the underground utilities and the compensation claimed by the service provider should be paid by the contractor failing which the same will be adjusted against any amounts due to the contractor including running/final bills of this work.

4. The location of HDD machines (entry and exit points bore) marking shall be given by the site Engineer. The contractor has to remove the interlocking blocks, footpath stones and/or the foot path dividers (iron railings) in order to keep the HDD machine at the entry and exit points pits have to be a depth of at least 2.0 mtr or as required. As per the marking of the site engineer, the boring shall be done. After the bore reaches the exit point on the remote pit, if the site engineer is satisfied with the depth, the pipes are inserted and the bore is pulled back. The pipes are supplied in the length and they should be laid parallel on the ground. The pipes should be properly formed so the there is no coiling tendency for the pipes.

5. One number of pipe to be laid in one bore and the location will be advised by the site Engineer. At one location two pipes will be laid within two meter or as advised by the site Engineer as required. The pipes shall be brought above surface in the entry pit and end pugs are fixed tightly in the exit pit, the excess pipe is cut and the end plugs are tightly fixed. In case duct laying is completed on the other side, these pipes shall be connected to the existing ducts through couplers. After the boring work is completed, the pit shall be closed properly.

6. The contractor shall be responsible for all necessary arrangement to remove or pump out from trench. The contractor should survey the soil conditions encountered in the section and make his own assessment about dewatering arrangement that may be necessary. No extra payment shall be admissible for this.

7. Wherever the soil is hard due to dry weather conditions, if watering is to be done for wetting the soil to make it loose, the same shall be done by the contractor. No extra payment shall be admissible for this.

8. Preparatory to aligning the pipe for jointing, each length of the pipe shall be thoroughly cleaned to remove all sand, dust or any other debris that may clog, disturb or damage the cable when it is pulled at a later stage. The ends of each pipe and inside of each HDPE Socket shall be thoroughly cleaned of any dirt or other foreign materials.

9. Safety precautions when excavating of working in excavations close to electric cables. The Engineer in charge of the work should get full information from Electricity undertaking regarding any electric cables, which are known or suspected to exist near the proposed excavation and unless this is done, excavation should not be asked to send a representative and work should be preceded with close consultation with them.

10. Care should be taken to see that apparatuses, tools or other excavating implements or excavate materials are not left in a dangerous or insecure position.

Note: - It is advised to the tenderer that site must be inspected thoroughly before quoting the rates, Later on, no claim shall be accepted.

Item No.10: Supply, erection, testing & commissioning of 1.1 KV LT XLPE cables

Supply & transporting of ISI marked 1.1 KV (E) grade LT XLPE cables stranded compacted circular aluminium conductor, XLPE insulated, cores laid up inner sheath of PVC, galvanized steel flat string armoured and overall PVC sheathed coble conforming to IS: 7098 Pt-I pool with latest amendment cable marking of length and date of Manufacturing in every 5 meters with embossing Indian Railway RE in every 5 mtr.

i) 4CX25 Sqmm (1.1KV)
ii) 4CX50 Sqmm (1.1KV)
iii) 2CX25 Sqmm (1.1KV)
iv) 3.5CX120 Sqmm (1.1KV)

Make: Shanti, Alcon, Paragon, Windsor, Havells, Grandlay, Gemscab, CMI

The cables will be transported to the location/Site by the contractor in his own transport from the their stores.

The cable shall be laid as per IS code of practice and instructions given at site by site supervisor. Laying of cable will be done in accordance with the approved route-plan and in straight line as possible except where there is any obstruction due to sewer pipe line, water pipe line or nallah etc. for which the route will be decided by the electrical supervisor at site.

While laying the cable, a suitable curvature should be provided. The bending radius must not be less than 15 times the diameter of the cable at every change of direction of route.

A coil of approximately 4 to 5 meters of cable shall be laid near the terminating ends in the manner described above. The cable should be taken through Medium class GI pipe 100/150 mm dia/HDPE

pipe of 120 mm outer dia, 103 inner dia while laying it under pucca platform, pucca road or railway track. These pipes shall be laid at least 1.50 meter below the ground level or the formation level of the track (below the base of the ballast when it across the railway track) for through passage of the cable. Suitable cable route markers indicating the average charged voltage of the cable laid should be provided along with the cable as per requirement also at every turning point. These shall be 'J' shape and also of adequate length.

These cable route markers are to be provided simultaneously with the laying of cable by making the cable rest on the "J" seat of the route marker.

No joints are allowed in any nominated site. In this way each length of the cable shall have to be in single piece.

The cable should be tested before laying and also laying with 500 Volt Meggar before and test report should be jointly signed by the site supervisor of the Railway and the contractor (or his representative). Each test result should be submitted to Dy. CEE for perusal and approval for charging in the cable.

BHEL shall not be responsible for any damage/injury to the staff of the contractor during laying of the cable and it will be the sole responsibility of the contractor to give compensation, if any, for any mis-happening during the execution of work.

Cable trench should be made carefully so as not to damage any other cable which had already been laid in the proximity or any property of the railways or of other departments. The contractor shall be held responsible for such loss, if any, and shall have to make good the loss to the entire satisfaction of the railway at his own cost.

The contractor shall only use the cable jointing kits of approved makes. It shall also have to be ensured that self-life of the Kit has already not been exhausted or lapsed, before it is used at site. The contractor should show the sealed kit carton opening to the site supervisor so that the date of packing is ascertained at the time of its actual use at any site.

Item No.11: Supply, erection, testing & commissioning of PIJF cables

Armoured PIJF cables as per Railway specification shall be supplied for the following sizes as per RDSO specification:

i) 1P x 0.63mm
ii) 2P x 0.63mm
iii) 4P x 0.63mm
iv) 8P x 0.63mm

Laying of cable shall be as per Item no. 10.

Item No.12: GI Pipes

Medium class GI Pipe, 50 mm nominal bore shall confirm to IS: 1239 -1990. The price shall cover supply & Fixing of medium class GI Pipe of size duly clamped with Nut, Bolt and washer. Make: Tata, Jindal, BST or any ISI marked.

Item No.13: Cable Route Marker for 1.1KVcables

Cable route marker should be provided at approximately every 10 meter and also at bending /turning point of the cable of the cable route. The cable route marker of J shape made of cast iron plate 90 mm dia bolted with 2 nos. bolt nut and washers of suitable size on GI angle of size 25 x25x3mm of 1.25 meter length and route marker plate shall be available at site at the time of laying of cable. The cable marker should be grouting with1:2:4 cement concrete mixture on the top or base of the cable as per instruction of site supervisor.

Item No.14: Supply, Installation testing and commissioning of Feeding Post

The feeder post shall be suitable for operation on 3 phases, 4 wire AC systems, which shall be fabricated from 1.63 mm MS sheet and angle iron 50x50x6mm. It shall be painted with Powder Coated (50-micron thickness). Hinged doors should be provided on front to enable installation & inspection of cable connections and other maintenance requirements. The feeder post will be mounted on 750 mm long legs made of GI angle 50x50x6mm.The size of feeding post shall be approx. 810mm height (legs height excluded), 500mm width and 150mm depth.

The feeder post will be mounted on 750 mm long legs made of GI angle 50x50x6mm.

The canopy of sheet steel of 2mm thickness with powder coating of 50-micron thickness will be provided on the top for stopping entry of rain water inside it. The canopy height shall be 50mm and canopy shall protrude by 75mm on each side.

The cubical will be required to be mounted on bricks, cement concrete plinth 50 cm from the ground level. The entry / connection of cables and required inspection / removal, replacement to MCCB / MCB can be carried out at front side. Panel shall be IP55 protected as per IS: 60529(1991) TPN Aluminium Bus bar rating 150 amp of 25 x 6 mm size should be tapped with insulating tape with colours red, yellow, blue and back. Following MCCB / MCB should be fitted on the feeder post for completing the power supply requirements and connection to the Bus bars.

a) Incoming 1X100 amp TP MCCB of 35 KA breaking capacity conforming to IS: 13947 (Pt.2). Make Havells, Siemens, Schneider, C&S, ABB, GE.
b) Outgoing 6X32 amp DP MCB of 10 KA breaking capacity conforming to IS: 8828 of make Havells, Siemens, Schneider, Standard, Indo Kupp, GE, ABB.

The design and drawing of the above panel should be prepared by the successful tenderer and got approved from the Railway, before starting the fabrication of the panel. BHEL, Dy.CEE Railway or his authorized representative may inspect the progress of the fabrication stage of panel at contractor's site. The instructions of Dy.CEE about the drawing, design and fabrication of the panel will be binding on the contractor.

Item No. 15: Supply, installation and commissioning of Meter cum distribution box

Meter Box shall be of 1.2mm thick sheet steel of size 500 mm height, 300 mm width, 135 mm depth finished in Grey stove enamel. It should be having two equal compartments independently lockable. The hinged lockable doors of both compartments should be properly rubber gasketed. The rubber gaskets shall be fixed in a grove provided in the door itself. The openings and doors of both compartments should have collar of 10mm width neat finish to prevent water. Upper compartments shall be suitable for accommodating 8 to 12 SPMCB's (Outgoing) of upto 32A rating but shall be equipped with specified numbers of MCB as per requirement of quarter and as per schedule of work, directly mounted on a Bus Bar. The copper bus bar shall be insulated from body of box .This compartment shall also have copper neutral link and one earth link. It shall be suitable for fixing single phase energy meter. This compartment shall also be provided with glass windows size 90mmx70mm such that the meter reading is taken without opening the door. MCBs shall be suitably mounted in the box of elevated sheet steel supports so that only the knobs of the MCB's are outside for operation without opening the door. The meter box shall be suitable for mounting 1 single phase/3 Phase energy meter in the lower compartment with suitable fixing base along with 6mm thick suitable size sheet. The box shall have knock out end type 40mm dia 3 nos. Cable entry holes with grummets on the top and bottom of the meter box. The meter box shall also confirm with degree of protection IP:42 confirming to IS:8623/ part-I & III shall be confirmatory to IS:732 and IS:4648. The meter box cum distribution box in quarters shall be located outside the quarters in such a position that it is easily accessible to maintenance staff and Meter reader. However, the location of meter box shall be decided by the Engineer incharge at site.
Payment of supply of Energy meter and MCB shall be made under item No. 16 and item No.46 respectively.

Item No. 16: Supply & Installation of 1-Phase AC static watt hour meter
The price shall cover supply of single phase, 20 amp, 240 volts AC, 50 hertz (Hz) static watt hour meter (ISI mark) with digital display. Energy meter shall conform to IS: 13779 and IS: 12346/1999. The accuracy class shall be 1.0. The maximum error in calibration shall be plus/minus 2%. The meter shall be supplied fully calibrated along with calibration certificate. This will include cost of fabrication also.

Item No. 17: Supplying and erecting static energy meter 440 V 50 Hz. 100A ISI mark meter AC 3 phase 4 wires LCD/LED display complete on existing board and duly wiring with required size of weather proof PVC wires duly tested for class II accuracy by electric supply company as per railway requirements/respective state electricity board requirements

Item No. 18: Supplying and fixing 8-way, single pole and neutral, sheet steel, MCB distribution board, 240 V, on surface/ recess, complete with tinned copper bus bar, neutral bus bar, earth bar, din bar, interconnections, powder painted including earthing etc. as required. (But without MCB/RCCB/Isolator) as per CPWD DSR Item 2.3.2.

Item No. 19: Supplying and fixing 6-way, horizontal type three pole and neutral, sheet steel, MCB distribution board, 415 V, on surface/ recess, complete with tinned copper bus bar, neutral bus bar, earth bar, din bar, interconnections, powder painted including earthing etc. as required. (But without MCB/RCCB/Isolator) as per CPWD DSR Item 2.4.1.

Item No. 20: Supply & erection of Hot Dip Galvanized octagonal Pole, 7.0 mtr

The rates quoted shall cover supply and erection of 7.0 mtr hot dip Galvanized Octagonal pole fabricated from High Tensile steel with 70 mm top dia, 130mm mm bottom dia, 3 mm thick HT sheet, with base plate of size 200x200x12mm thick, earth lug, along with 300 mm long standard single arm bracket made of 35 mm dia pipe including TS-600 grade J-type M20x600 mm long foundation bolt along with required quantity of templates for pole & flush door 0.5 m above the base plate consisting of Smart pack junction box, 1 No. MCB (SP) of 6 Amp & stud type terminal block (3PH+1N) suitable for loop in loop out of armoured cable. This will be used for Street Light, Yard light, etc. Make Philips, Bajaj, Surya, GE, Crompton Greaves

Design: The octagonal pole shall be designed to withstand maximum wind speed of 169 Kmph, To loading i.e. area and weight of fixtures are to be considered to calculate maximum deflection of pole and shall meet requirement of BS: 5649 part (VI) 1982 & octagonal poles shall be in single section. There shall not be any circumferential weld joint. Octagonal pole shall be supplied as per approved make. Pole shaft shall have octagonal cross section and shall be continuously tapered with single longitudinal welding. There shall not any circumferential welding. Welding of pole shaft shall be done by submerged arc welding (SAW) process. All octagonal pole shafts shall be provided with rigid flange plate of suitable thickness. With provisions for fixing four numbers foundation bolts. Its base plate shall be fillet welded to pole shaft at two locations i.e. from inside and outside. The welding shall be done as per qualified manual mettle arc welding (MMAW) process.

Octagonal pole shall have door of appropriate 500 mm length at the elevation of 500 mm from base plate. Door shall be vandal resistant and shall be weather proof to ensure safety of inside connection. There shall also be suitable arrangement for the purpose of Earthing. Pole shall be adequately strengthened at location of door to compensate for loss in section. Smart pack junction box with one no. single pole 6Amp MCB 10 KA breaking capacity “C” series and four terminal as approved by Railways.

Galvanised mounting single arm 300mm long bracket as required shall be supplied along with octagonal poles for installation of LED street light fitting at pole.

Rate of foundation/muffing is excluded and shall be paid separately. However, rates are including painting, earthing etc as per ISS & IE rules & site. The pole shall be complete with holes, Anchor bolts, bottom plate etc.

Item No. 21: Astromical time switch along with TPN MCB 63 A

The price shall cover design, Manufacturing ,supply, installation, testing & commissioning of Astromical time switch along with TPN MCB 63A & associated accessories as per details given below.

a) Astromical time switch, Make: Indo Asian, MDS legrand, Siemens, L&T, AEG,ABB.
b) 65A TP Contactor, Make: L&T, Siemens, ABB, AEG.
c) TPN MCB 63 Amps Make: ABB, Havells, Standard, L&T.
d) Accessories like wiring, locks, hinges, rubber gasket, nuts & bolts etc.
e) MS fabrication box 2mm CRCA Sheet size 43mm x 31mm x15mm powder coated to 50micron thickness.

Item No. 22: Supply of LED Street light fitting 45 watt.

Supply and installation of 45 watts pressure single die cast Aluminium alloy housing LED street light luminaries complete with accessories of apprised make on erected pole including wiring from junction Box to fitting with 2x2.5 sq mm PVC insulated multi started ISI marked copper conductor flexible cable including testing & commission .

The price is inclusive of supply and erection of LED street light fitting. (45) Watts LED Street light Luminaire pressure die cast aluminum alloy specially formulated shall be of Crompton Greaves, Philips, GE, Bajaj Make with not less than IP65 & complete with all accessories. Control gear for LED's drive lamps prewired upto terminal block, heat resistant toughened clear glass, colour temperature more than 6500 degree K and working upto voltage 140 270 Volt and suitable mounting arrangement for installation on 7 M GI Pole/GI bracket as required.

Approval of Dy.CEE/RE or his representative is essential before the procurement of luminaries.

Item No. 23: Supplying and fixing of 32/40 mm dia x 2.00 metres long G.I. pipe (medium class) bracket for mounting of LED street light fitting on Wall including bending the pipe to the required shape, 2 nos 40 mm X 3 mm flat iron clamps with nuts, bolts and washer, painting the flat iron with primer and finish paint etc. as required as per CPWD E&M DSR Item no 12.34.

Item No. 24: Supply, Erection, testing & commissioning of Point Wiring for light point/ fan point/ exhaust fan point/ call bell point as per CPWD E&M DSR Item no 1.10 with 2.5 sq.mm FRLS PVC insulated, flexible, multistranded Cu conductor single core cable instead of 1.5 Sqmm cable.

Item No. 25: Wiring for circuit/ submain wiring alongwith earth wire FRLS PVC insulated copper conductor, single core cable in surface/ recessed medium class PVC conduit as required as per CPWD E&M DSR Item no 1.14.

Item No. 26: Supplying and drawing FRLS PVC insulated copper conductor, single core cable in the existing surface/ recessed steel/ PVC conduit as required.as per CPWD E&M DSR Item no 1.17.

Item No. 27: Same as Item 25 above however with 1 pair, 0.5 mm dia annealed copper conductor, FRLS PVC insulated, unarmoured, telephone cable or Co-axial TV cable RG-6 grade, 0.7 mm solid copper conductor PE insulated, shielded with fine tinned copper braid protected with PVC sheath FRLS PVC insulated copper conductor

Item No. 28: Supplying and fixing following size/ modules, GI box alongwith modular base & cover plate for modular switches in recess etc. as required as per CPWD E&M DSR Item no 1.27.

Item No. 29: Supplying and fixing following modular switch/ socket on the existing modular plate & switch box including connections but excluding modular plate etc. as required as per CPWD E&M DSR Item no 1.24.

Item No. 30: Supply and installation of Bracket light angle holder as per CPWD E&M DSR Item no 1.34.

Item No. 31: Supply, installation, testing & commissioning of LED 18 W Tube Light Luminaire

The price includes cost of LED tubelight, luminaire fitting and installation of 18 W Tube Light Luminaire box type fitting and LED tubelight shall be of make of Surya, Philips, Crompton Greaves, Bajaj, Osram, Havells& complete with all accessories. Control gear for LED's drive lamps prewired upto terminal block , heat resistant toughened clear glass , colour temperature more than 6500 degree K and working upto voltage 140-270 Volt and suitable mounting arrangement to installation as required

Item No. 32: Supply, installation, Testing & Commissioning of Ceiling Fan
The price shall cover supply, installation, Testing & Commissioning of Energy saving, A.C. Ceiling Fan 1200 mm sweep, 5-star rated three blade, double ball bearing, metallic suitable for 220-230 volts, 50Hz, AC supply with modular electronic fan regulator complete in all respect. The price shall cover cost of all fittings, wirings etc.
Ceiling Fan Make: C&G, Bajaj, Khaitan, Usha, Crompton.

Electronic fan regulator make: Havells, Legrand, Anchor, Usha.

Item No. 33: Supplying and fixing call bell/ buzzer suitable for single phase, 230 V, complete as required as per CPWD E&M DSR Item no 1.38.

Item No. 34: Supply, fixing, testing & commissioning of AC Exhaust fan 300mm
The price shall cover supply, fixing, testing and commissioning of AC Exhaust fan of polycarbonate body of 300mm complete with bracket on wall. The fan will be fitted in an enclosure and then entire assembly will be fitted on the wall or frame etc. as required. Make:Khaitan, Summer Cool, Usha, Bajaj, Crompton Greaves.

Item No. 35: Supply, fixing, testing & commissioning of Wall mounted Decorative fan 400mm sweep.
The price shall cover supply, installation, Testing & Commissioning of Energy saving, A.C. Wall mounted Fan 400 mm sweep, 5-star rated three blade, double ball bearing, metallic suitable for 220-230 volts, 50Hz, AC supply. The price shall cover cost of all fittings, wiring etc.

Item No. 36: Supply, erection, testing and commissioning of metal clad Socket for AC & Geyser
The price shall cover supply, erection, fixing, testing and commissioning of metal clad distribution box with 32 Amp. Plug socket and 32 Amp. SP MCB complete in all respect as per site requirement etc. The price shall include cost of plug, socket and MCB Make:Legrand, GE, Havells, and Schneider.

Item No. 37: Supply, erection, testing and commissioning of 10-Pair, 20-Pair and 40-Pair Telephone J.B.
Jb shall be of suitable size and made of 1.6mm thick CRCA Sheets. JB shall be powder painted. JB shall be suitable for mounting of wall and Plinth as required and for termination(along with the glands and lugs as per railway standards) of PIJF cables supplied at S. no. 11.

Item No. 38: EARTHING SYSTEM

Earthing system shall conform to the following specification. For other details not covered under these specification, IS:3043 shall be referred to. The earthing electrode shall be GI pipe 'B' 50mm dia. 3-Mtr in length out tapered at the bottom with holes of 12 mm dia drilled not less than 75 mm from each other up to 2 mtr of length from the bottom. The top of the GI pipe electrode shall be housed in a masonry enclosure and shall be covered with MS plate or RCC covering of suitable thickness. The pipe electrode shall be buried in ground vertically top nearly 200 mm below the top of the masonry enclosure.
Minimum size of earthing lead shall be maintained as per IS code of practice (IS 3043-1966). The earthing lead shall be connected by means of GI bolts, nuts & washers on top of the earth electrode and the body of the equipment's / pole. The earthing lead shall be suitable protected from mechanical injury by burying it in the soil or protecting it by suitable size of GI pipe (min 15 mm dia) Portion of this pipe within ground shall be buried at least 30 cm deep to be increased to 60 cm in case of road crossing or pavement etc. the portion within the building shall be recessed in wall and floors to adequate depth.

Normally an earth electrode shall not be situated less than 1.5 mtr away from any building. The location of earth shall be such where the soil has reasonable chances of moisture as far as possible. Drains, pavements and roads are definitely to be avoided for location of earth electrodes. The location of the earth electrode shall be fixed in consultation with the site supervisor. Water pipe shall NOT (under any circumstances) used as earthing lead or earth continuity conductor. All equipment's/poles shall be earthed at two different places with earth electrodes. Loop earthing shall be provided for all mountings of electrical equipment.

The earth resistance and earth continuity test shall be carried out with earth resistance testing Meggar (Earth Tester) and under no circumstances the resistance of earth electrodes shall be more than 5 (five) ohms.

On every earth masonry enclosure following data should be marked with black letters on yellow square base.

a) Earth No.
b) Date of test
c) Earth resistance.

Item No. 39: Supply & connecting various sizes of GI strip/wire for earthing as per CPWD E&M DSR

i) 25X6mm GI strip in 40mm dia GI pipe from earth electrode including connection with G.I. thimble excavation and re-filling as required as per CPWD E&M DSR Item no. 5.11
ii) 6 SWG GI wire in 15mm dia GI Pipe from earth electrode including connection with G.I. thimble excavation and re-filling as required as per CPWD E&M DSR Item no. 5.12
iii) 25X6mm GI strip in recess/surface as per CPWD E&M DSR Item no. 5.15
iv) 6 SWG GI strip in recess/surface as per CPWD E&M DSR Item no. 5.16

Item No. 40: Supply, fixing, testing and commissioning of hot pressed Sheet Moulding Compound (SMC) junction box

The price shall cover supply, fixing, testing and commissioning of hot pressed SMC junction box with hinged door and base fitted with four ways connections with nut bolt of stainless steel and one kit-kat 16 amp duly fitted of box size 250 mm X 200 mm X 105 mm for AC incoming and outgoing cables with two no plastic glands & neutral link or equivalent of other reputed brand on poles with clamp (note- 2 nos of bus bar of suitable size fixed on insulator will be provided for termination of cables).

Item No. 41: Supply, Installation, Testing & Commissioning of 230 V AC Geyser 25 Ltr. capacity

The price shall cover Supply, Installation, Testing & Commissioning of 230 V AC Geyser 25 Ltrs capacity 5 star rating complete with branded inlet and outlet PVC pipe etc. The price shall also include drilling, grouting of nuts & bolts and finishing. The features of Geyser should be as follows:

(i) Geyser should have polycarbonate body.
(ii) Geyser should be of vertical mounted type.
(iii) Multiple Safety system for protecting Geyser.
(iv) LED ON and OFF indication.
(v) Suitable for High Pressure and Pressure Pump installations.
(vi) High efficiency long life heating element.

Make: Bajaj, Havells, Usha, Crompton, Recold.

Item No. 42: Supply & Erection of LT Sub-Distribution board

The sub distribution panel should be suitable for Outdoor operation on 3 phase 4 wire 50Hz AC system and should be fabricated from 1.63 mm sheet steel and GI angle of 50mm x 50mm x 6mm size. It shall be painted with Powder Coated (50-micron thickness). It will be totally enclosed, dust and vermin proof. Thickness of the coating shall not be less than 50micron. Hinged doors shall be provided both on from and rear to enable installation, inspection and maintenance of cable connections. The size shall be approx. 920mm width, 310mm depth and 1400 mm height.

A canopy of 2.0mm thick sheet steel shall be provided on top for preventing the entry of rain water inside the panel. The panel will be required to be mounted on bricks, cement and concrete plinth 20 cm above the ground level which shall be cast in the ratio of 1:2:4. The canopy height shall be 50mm and canopy shall protrude by 75mm on each side.

The above panel shall have high quality aluminum bus bars suitable for a rating not less than 400 amp. which will be properly tapped in overlap with PVC insulated tape of ISI mark and of colours red, yellow, blue and black for different phases & neutral.

The following MCCB as per site requirements should be provided on the Sub Distribution panel with proper and separate fabricated chamber for different Equipments. The connections to the bus bar shall be firmly made through the extension pieces of copper or brass strip of adequate size. The cable termination at no stage shall be connected directly with the MCCB contacts. All the MCCB shall be provided as per IS 13947 Pt.2 or latest) with the indications lights on all different phases.

a) MCCB Four Pole 300 Amp/50 KA — 1 nos for incoming lines.
b) MCCB Three Pole 100 amp/35 KA — 2 nos for outgoing feeders.
c) MCCB Three pole 63 amp/25 KA — 2 nos for outgoing feeders.

For incoming line, voltmeters 0-500 V with selector switch and ammeter 300 A with CTs. And selector switch and indication lights shall be provided so as to assess the load conditions on the incoming feeders, Cable alley of suitable size should be available for incoming and outgoing cables and sufficient elbow room shall be available.

The design and drawing of the above panel should be prepared by the successful tenderer and got approved from The Railway, before starting the fabrication of the panel. BHEL, Dy. CEE (Railways) or his authorized representative may inspect the Progress of fabrication stage of the panel at contractor's work. The instructions of Dy.CEE(Railways) about the drawing, design and fabrication of the panel will be binding on the contractor.

Item No. NS-43:LED Bulk Head Luminare, 9W
The price shall cover supply, fixing and commissioning of integrated LED Bulk Head Luminare 9W comprises of pressure die cast housing, Acrylic diffuser and frame with IP.65 Protection suitable for 230 V, 50 Hz AC supply. Make: Bajaj, Phillips, Crompton Greaves, Bajaj, Osram, Havells

Item No. 44: Supplying and fixing 5 A to 32 A rating, 240/415 V, 10 kA, "C" curve, miniature circuit breaker suitable for inductive load of various poles in the existing MCB DB complete with connections, testing and commissioning etc. as required as per CPWD E&M DSR Item no. 2.10.

Make: Legrand, GE, Havells, Schneider, Standard, Indoasian, CRS, Indokopp, HPL.

Item No. 45: Providing and fixing various rating and breaking capacity and pole MCCB with thermomagnetic release and terminal spreaders in existing cubicle panel board including drilling holes in cubicle panel, making connections, etc. as required. as per CPWD E&M DSR Item no. 2.2.

Item No. 46: Supplying and erecting Borewell submersible pumpset of 3.75KW/5 HP with 415 V, 50 Hz AC supply suitable for 150 mm dia. borewell suitable for 70 to 250 LPM discharge at 87 to 48 m head & (max. efficiency at 76 m head & 160 lpm) discharge & delivery pipe of Size-50 mm diameter with a necessary H type clamps as per as per specification no. WP-SMP

Item No. 47: Supplying and erecting Borewell submersible pumpset of 5.625 KW/7.5 HP with 415 V, 50 c/s AC supply suitable for 150 mm dia. borewell suitable for 60 to 175 LPM discharge at 97 to 56 m head & (max. efficiency at 79 m head & 125 lpm) discharge & delivery pipe of Size-50 mm diameter with a necessary H type clamps as per specification no. WP-SMP.

Item No. 48: Supplying and erecting Centrifugal water pump (Monoblock), 415 V, three-phase, 50-cycles A.C. supply of 5.625 KW/7.5 HP with discharge 4.5/8.6 Litres per second (LPS) for head of 32/52 m and 65 mm suction/ 50 mm delivery pipe of size or with discharge of 11.1/19.9 Litres per second (LPS) for head of 16/30 m and 80mm suction/ 65mm delivery pipe of size, on provided C.C. foundation as per specification no. WP-CGP

Item No. 49: Supplying and erecting Centrifugal water pump (Monoblock), 415V, three phase 50 cycles A.C. supply of 2.25KW/ 3 HP with discharge 4.9/9.2 Litres per second (LPS) for head of 10/26 m and 65 mm suction/ 50 mm delivery pipe on provided C.C. foundation as per specification no. WP-CGP

Item No. 50: Supplying and erecting ISI mark GI pipe 50 mm. dia C-class position with accessories complete as per specification no CW-PLB/GP.

Item No. 51: Supplying and erecting ISI mark GI pipe 65 mm. dia C-class position with accessories complete as per specification no CW-PLB/GP.

Item No. 52: Supplying and erecting flat flexible 3 core 4 sq mm PVC sheathed submersible type copper cable suitably clamped at fixed intervals with column pipe assembly complete

Item No. 53: Supplying & erecting automatic control panel for 3 Ph, 415 volt, A.C. Submersible/centrifugal pump set upto 7.5 HP consisting of DOL starter having relay range 9-14 AMP,S.P.P., Combined ammeter/ voltmeter, phase indicating lamp enclosed in CRCA powder coated Vibration proof enclosure with IP 54 protection. Control Panel should offer single phasing, phase reversal, phase imbalance etc.

Item No. 54: Supplying and erecting D.O.L. Starter 400V. 3 phase, 50 cycles with no volt coil and overload element with necessary materials and connected to supply upto 7.5 H.P

Item No. 55: Supplying and erecting 50 mm dia. gunmetal sluice valve at position with necessary materials complete

Item No. 56: Supplying and erecting 65 mm dia. gunmetal sluice valve at position with necessary materials complete

Item No. 57: Supplying and erecting non-return valve 50 mm dia in position made of gunmetal complete

Item No. 58: Supplying and erecting non-return valve 63 mm dia in position made of gunmetal complete

Item No. 59: Supplying and erecting pump protection relay comprising current sensing phase failure and UV+OV relay with dry run and overload protection suitable for 3 phase pumps

Item No. 60: Supplying & erecting Water level controller 230/ 415V AC., Four way for underground & Over-head tank operation

Item no. 61: Survey and Preparation of Drawings of structures

The item covers survey and Preparation/Development of Drawing/Tracing of electrical network/tracing of route of electrical LT Cable and supply of Autocad drawings/plans. It shall be Contractor's responsibility to get approval from Railways before start of work and within 60 days from the award of work. The size of each drawing/tracing shall be A2/A1 size and preparation of ammonia print in 05 copies.
The drawing/tracing Job shall be for various items and details are as follows:

- General Arrangement of distribution 415V of 50 Hz supply to various loads.
- Type-II Quarter
- Type-III Quarter
- Type-IV Quarter
- Other Miscellaneous drawings /LT cable routing and Colony street lighting arrangement.

The drawing/tracing should show the following information:

i) Layout of conduit pipe on roof and walls.
ii) Position and size of GI boxes.
iii) Lay out of wiring with size and wires.
iv) Position of switches and sockets.
v) Position of ceiling Rose/Holders.
vi) Position of meter cum distribution board.
vii) Layout of incoming cable with cable sizes.
viii) Staircase wiring etc.
ix) Any other item required to complete the work and not mentioned above or as directed by Railway Engineer.

Contractor shall supply drawing/tracing as per site and on the adequate size of paper prepared on AutoCAD after duly approved by purchaser then preparation of Ammonia Print from existing tracing shall be provided by contractor in 5 prints. These Tracings/drawings can be modified if required "as erected" after completion of work.

The bidder shall quote single lumpsum amount for each specific structure.

<u>List of Makes for Material</u>

1. MCCB: L&T, GE, Havells, C&S, ABB, Siemens, LegrandRittal, or Scheinder
2. MCB: Standard, Indo Kupp, Havells, C&S, GE, ABB, Legrand, Siemens, Schneider, Standard
3. G.I.Pipe: Tata, Jindal, BST, confirming to IS: 1239 -1990 or ISI Mark.
4. PVC wire: Nicco, L&T, National, Delton, Anchor, Havell‟s, Plaza, KEI, Phenolex & Skytone.
5. Electrical Accessories: SSK, Anchor, Havell‟s& East-west
6. PVC Conduit: Any ISI Brand to be approved by purchaser.
7. MCB Distribution Box: Standard, MDS, Havells‟s, Indo Kupp.
8. Exhaust Fan: Khaitan, Summer Cool, Usha, Bajaj.
9. Ceiling Fan: C&G, Bajaj, Khaitan, Usha.
10. Electronic Fan regulator: Metro ortem,Bajaj&Khaitan
11. LED Fitting: C&G, Philips, Bajaj,surya.
12. Geyser: Bajaj, Havell‟s, Usha
13. HDPE Pipe any make ISI mark
14. Heat Shrinkable Jointing KIT for HT: 3 M Birla, Safe kit, Cab seal, Power Tech, Denson
15. LT & HT power armoured XLPE Cables: Havells, ALPHA, Universal, Gloster, Asian, Skytone, KEI, Windsor, Polycab and Paragon.
16. CTs, Ammeter & Voltmeter: AE, IMP, Enercon

One sample of each item should be submitted to the site supervisor before using at site. All items specifically mentioned or not in the above list of approved makes or elsewhere in the specification but otherwise required to be used shall be got approved from the Dy.CEE Railways or his authorized representative by showing the sample of the same.

Scope:
Specification No (SS-TR)

Supplying and erecting AC three phase 11or 22 kV/0.44 kV, 50 Hz, oil immersed and naturally cooled indoor/outdoor type copper wound distribution transformer of specified capacity, connected delta on HV side and star on LV side with additional neutral brought out on load side.

Recommended standards:
The following list shows Indian Standards which are acceptable as good practice and accepted standards.

IS 335: 1963	Dielectric Strength
IS 2026 part I 1977	Specification for Transformer
IS 2026 part II 1977	Specification for type of cooling and permissible temp. rise of transformer
IS 2026 part III 1981	Specification for insulation level and dielectric strength of transformer
IS 2026 part IV 1977	Specification for terminal marking tapping and connections
IS 1180 part I 1989	Specification for outdoor type three phase distribution transformer
IS 10028 Part I 1985	Code of practice for selection installation and maintenance of transformers
CBIP/TAC Manuals	

Material:
1. Copper wound Transformer with Delta connection on HV side and star connection on LV side complete with Manufacturer's test certificates
2. Standard mountings required for transformer are shown below. The mountings are to be selected from them and any additional if required.

- Off load tap changing
- Oil conservator with fitting holes and cap and plain oil level gauge
- Silica gel dehydrating breather
- Oil drain valve
- Thermometer pockets
- Oil filter valve
- Lifting arrangement
- Two earthing terminals
- Diagram and rating plate
- Four bi directional plain rollers
- Air vent
- Explosion vent
- Terminal arrangement
- Bushing with lugs and/or cable end box on LV side
- HV cable end box and/or HV bushing

The transformer losses shall be as mentioned in Table No 10.1/1

Method of Construction:
The contractor should intimate name of manufacturer and make of the Transformer and location of the manufacturer factory to engineer in charge prior to delivery of the transformer. After manufacturing of the transformer, the agency/contractor shall intimate the engineer-in-charge for carrying out the inspection.
After receipt of intimation engineer-in-charge or his representative should inspect the Transformer at manufacturer factory and shall carry out the following tests jointly in presence of concern contractor.

1) Open Circuit test
2) Short Circuit test
3) Specific Resistance Test
4) Insulation Resistance of HV, LV, in between HV and LV, Winding and Body.
5) Dielectric Strength and acidity test of Transformer oil.

The test results of joint inspection shall be recorded on the test report of Transformer with its Sr. No. prior to delivery of the Transformer to site.
Necessary work of plinth and or for D.P. structure with D.O. set, L.A., A.B. switch should be completed before dispatch of the transformer. The channel arrangement on plinth is to be done. Earthing arrangement should be completed. The Transformer should be installed on plinths / double pole structure/floor by arranging chains pulley block, crane etc as per IS Norms.
After installation of Transformer the stopper/lock should be provided to rollers of the Transformer.
The connection of H.T/L.T. side should be completed by provided Copper wire/ cable with necessary lugs to avoid loose connection. The earthing (2 Nos for Neutral & 2 Nos for Body) should be connected from distinct electrodes. The earthing should be connected by lugs/proper size of strip.
The Engineer in charge or his representative should check all connections on H.T. side, L.T. side and earths and insulation and earth résistance test should be carried out and results obtained shall be recorded.

Statutory Permissions to be obtained by the Agency/Contractor:
Before commencement of work, the drawings of installation shall be got approved from the Electrical Inspector, I E & L Department.
The installation should be got inspected from Electrical Inspector and obtain written permission to charge the Transformers.

Commissioning:
After above formalities the Transformer, should be charged/commissioned in presence of Engineer in charge or his representative along with load trials and shall be handed over to the department for beneficial use
After charging the Transformer, line, phase voltages and line current shall be measured, and the same shall be submitted.
Following test certificates shall be submitted:

1. Manufacturer's original certificate of Transformer as stipulated in IS.
2. Test certificate for dielectric strength of oil as per IS.
3. Test results of IR values.
4. Test results of all earth electrodes.
5. Readings of Voltages & currents at the time of commissioning.

Scope:
Specification No **(WP-CGP)**

Providing, installing, testing & commissioning of ISI mark Centrifugal water pump (Monobloc), of required HP with specified discharge and head with required size of suction & delivery, foundation bolts grouted in provided cement concrete. (As Per IS: 9079 specifications)

The following list records those Indian Standards, which are acceptable as good practice, and accepted standards.

SP 30: 1984	:	National Electrical Code
SP 7 (Group 4): 2005	:	National Building Code

Material:
Pump Body: Cast iron Grade FG 200 of IS 210 -1978
Impeller: Cast iron Grade FG 200 of IS 210 -1978
Shaft: High grade carbon steel Grade C-40 of IS 2073
Bearings: Stainless Steel
Motor: Squirrel cage induction.
Protection class: IP 55 TEFC with Class "F" insulation, with copper windings operated on Single phase, 250 V / Three phase 415 V, 50 Hz, AC, Supply, with 2900 RPM. IS: 325
Base plate: Mild steel
Foundation Nut Bolts: Mild steel
Shaft seal: Fitted with high quality mechanical seal ensuring zero leakage

Method of Construction:
Pump mounted with motor on base plate, shall be placed on provided foundation with perfect alignment, proper leveling. The pump should be connected to suction & delivery in an approved manner, with provided MS / CI flange. (Refer drawing no.WP-1 (Fig.1))
After the completing the erection of pump ,it shall be run continuously for minimum 2 hours, and following tests shall be carried out for its performance:
a) Alignment, b) Bearing noise, c) Discharge, d) Current

Mode of Measurement: Executed quantity will be counted on number basis. (Each)

Dismantling:
Dismantling of pump along with/without pipeline shall be done with utmost care with required tools / shackles, machinery, if any. The dismantled pump and the pipeline shall be store in a safe place or shall be transported to the place as per the direction of Engineer-in-charge.

Mode of Measurement: Executed quantity will be counted on number basis. (Each)

Scope:
Specification No (WP-SMP)

Supplying and erecting ISI mark submersible pump set suitable for bore well, with high quality wear resistance and dynamically balanced bronze impeller with stainless steel shaft sleeves, pump-coupling and pivot with squirrel cage induction motor of 415 V/230 V, 50 cycles A.C. supply winding with waterproof PVC insulated copper wire of high precision strength, not to be affected by chemically aggressive water and suitable bronze

bearings with nut & bolts etc. of required stage, specified H.P, discharge, head and delivery pipe with necessary H. type clamp of suitable size and strength.

The following list records those Indian Standards, which are acceptable as good practice, and accepted standards.

SP 30: 1984	:	National Electrical Code
SP 7 (Group 4): 2005	:	National Building Code
IS 8034	:	Submersible Pumps

Material:
Pump Body: Cast iron Grade FG 200 of IS 210 -1978.
Impeller: Made of Gun metal.
Shaft: High carbon steel Grade C-40 of IS 2073.
Bearings: Mitchell type thrust bearing unit with tilting pad assembly.
Motor & Pump: Windings with weather proof class, PVC insulated copper wire, Rotor with stainless steel shaft & spine coupling, Stage casing high grade engineering polymer & intermediate plate with stainless steel protection ring, Re-woundable stator with stainless steel casing, Diffuser with stainless steel protection ring, etc.
H type clamps with nut, bolts: Made from Mild steel.
Foundation Nut Bolts: Mild steel.

Method of Construction:
Before installing the pump, the bore shall be checked thoroughly for its trueness and presence of any protruding material (stones, tree roots, etc). After ascertaining the trueness, the pump along with pipe line shall be lowered in to the bore with the help of Tripod. While connecting delivery pipe to Submersible pump do not over tighten as this may damage the threads on Submersible pump, Keep the pipes in vertical position & fill the same with water & check the leakage at joints. The delivery pipes shall be clamped with 2 Nos of 'H' type clamps and shall be rested on the top of the bore casing. (Refer drawing no.WP-1 (Fig.2))
After the completing the erection of pump ,it shall be run continuously for minimum 2 hours, and following tests shall be carried out for its performance:
a) Alignment, b) Bearing noise, c) Discharge, d) Current

Mode of measurement: - Executed quantity will be counted on number basis. (i.e. each).

Dismantling:
Dismantling of pump along with the pipeline shall be done with utmost care with required tools / shackles, machinery, if any. The dismantled pump and the pipeline shall be store in a safe place or shall be transported to the place as per the direction of Engineer-in-charge.

Mode of Measurement: Executed quantity will be counted on number basis. (i.e. each).

Specification No **(CW-PLB/GP)**

Supplying and erecting GI Pipes of specified class, with necessary accessories, (such as: bends, tees, couplings, unions, sockets, enlargers, reducers, check nuts, plugs, etc.) at designated place, having relevant ISI mark, complete to the satisfaction of the department.

Material:

Pipe: The galvanized iron pipes shall comply with IS: 1239--1973 and 1969 for the specified class. The specified diameter of the pipes shall refer to inside diameter.

Fittings & Accessories: Bends, Tees, Couplings, Unions, sockets, bends, tees, enlargers, reducers, back nuts, plugs, unions, etc shall made of galvanized iron and shall comply IS: 1239-1973 and 1969.

Plumbing material: Hemp, Linseed oil.

MS Clamps: Clamps fabricated of required length and shape, of 3/6 mm thick mild steel having 25/50 mm width.

Hardware: MS nuts & bolts of required size and strength, Sheet Metal (SM) screws of d sizes, plugs/wooden gitties, etc.

Method of Construction:

Pipes to be used as Enclosure:

Erection of Pipe on wall:

The required length of pipe shall be machine cut, without any sharp edges, burrs, etc. The pipe duly enclosing the specified material, shall be erected on wall in plum, and fixed with required size of MS clamps on wall with plugs, gitties, etc.

When the pipe is to be fixed to walls it shall be fixed with standard bracket, clips or holder by keeping the pipe about 12mm clear of the wall. The pipe shall be fixed to the wall horizontally and vertically and parallel to one another, when more than one pipe is to be laid, unless unavoidable. The supporting clips, etc. for the pipe shall be spaced at about two meters or so as necessary. Holes cut during construction shall not be left out; they shall be filled and finished after passing of the pipe through it.

Erection of Pipe on pole:

The required length of pipe shall be machine cut, without any sharp edges, burrs, etc. The pipe duly enclosing the specified material, shall be erected on pole in plum, and fixed with required size of MS clamps with MS nuts & bolts of required size and strength.

When the pipe is to be used as cable enclosure and is to be terminated on street light pole(s), the pipe at the trench level should be placed at least 30 cm above the cable level for avoiding damage to the insulation of cable.

Laying the Pipe underground:

The excavation for laying the pipe underground shall be done as required, and in advance of laying, so as to cause least damage to the trench and least inconvenience to traffic and in other respects. The trench for laying the pipe shall be excavated to the lines and levels as directed by the site engineer. The bed shall be made even. Unless otherwise

specified in the special provisions, the excavation shall be about 30 cm. wide and not less than 45 cm. deep. The trench shall be excavated through all strata met with. Where necessary, sides may be shored or sloped. In case rock is met with the section of the trench, the depth may be slightly reduced but shall be sufficient to receive the pipe and the cushioning with a safe margin. Dewatering shall be done where necessary.
During excavation, if any, pipes, water mains, cables. etc. are met, these shall be carefully protected and supported; any damage done shall be made good by the contractor at his own cost.

Pipe used for Plumbing purpose:
The required length of pipe shall be machine cut and threaded (threading shall be done by machine only), without any sharp edges, burrs, etc. The pipe shall then be properly aligned with the accessory and tightening by applying hemp, linseed oil, so as to make it leak proof. During the erection, wherever required, correct accessory shall be used. When holes are not left during construction they shall be cut into the walls or slabs, etc., to pass the pipe through. The necessary clamps, supports shall be provided wherever required.

Mode of Measurement:
Executed quantity shall be measured on running meter basis, including the entire accessory. The lengths shall be measured net including the straight and bends along the center line of the pipes and fittings correct up to a cm. (i.e. per meter)

Chapter II- TECHNICAL SPECIFICATIONS & DRAWINGS FOR INFORMATION

NOTE: Contractor has to make himself well conversant with the Customer specification. In case of ambiguity between BHEL and customer specification, customer specification shall prevail.

Design Standards

The Railway Project including Project Facilities shall conform to design requirements set out in the following documents:

Indian Railways Permanent Way Manual, Indian Railway Bridge Manual, Indian Railway Schedule of Dimensions & relevant IRS Specifications referred in the Manual, Indian Railway Signalling Engineering Manual, Indian Railway Telecom Manual, AC Traction Manual, Rules for Opening Railways

Latest Version
Latest version of the Manuals, Specifications and Standards including the amendments notified/published by the Base Date shall be considered applicable.

Absence of specific provision

In the absence of any specific provision on any particular issue in the aforesaid Manuals, specifications, or Standards, the following standards shall apply in order of priority
Bureau of Indian Standards (BIS) Euro Codes or British Standards or American Standards

Any other specifications/standards proposed by the Contractor and reviewed by the Authority's Engineer.

Specifications and Standards
All Materials, works and construction operations shall conform to the following manuals:

(a) Indian Railways Permanent Way Manual
(b) Indian Railway Bridge Manual
(c) Indian Railway Schedule of Dimensions
(d) The relevant IRS Specifications
(e) Specifications of Works of concerned zonal railway

Bidder to note that above list is not exhaustive and other railway standards as required for OHE foundation works shall be applicable for the works.

In case of any contradiction in the various codal provisions, the order of precedence shall be as follows:-
aa) Provisions of RDSO tender document
bb) IRS Codal provisions
cc) IRC Codal provisions
dd) IS (BIS) Codal provisions

RDSO standards

104	Volume chart and equivalent chart of foundations (Side bearing, Side gravity and W.B.C.)	TI/DRG/CIV/ FND/RDSO	00001/04/0 SH-1	B
105	Volume chart and equivalent chart of foundations (Side bearing, Side gravity and W.B.C.)	TI/CIV/FND/ RDSO	00001/12/0 SH-1	A
106	Volume chart and equivalent chart of foundations (NG type)	TI/DRG/CIV/ FND/RDSO/	00001/04/0 SH-2	B
107	Volume chart and equivalent chart of foundations (NG type)	TI/CIV/FND/ RDSO	00001/12/0 SH-2	A
108	Volume and equivalent chart of foundations for Dry black cotton soil (NBC type) (For 16500 & 11000kgf/ m²)	TI/DRG/CIV/ FND/RDSO/	00001/04/0 SH-3	B
109	Volume and equivalent chart of foundations for Dry black cotton soil (NBC type) (For 16500 & 11000kgf/ m²)	TI/CIV/FND/ RDSO	00001/12/0 SH-3	A
110	Volume chart and equivalent chart of New pure gravity foundations (500 mm exposed)	TI/DRG/CIV/ FND/RDSO/	00001/04/0 SH-4	B
111	Volume chart and equivalent chart of New pure gravity foundations (500 mm exposed)	TI/CIV/FND/ RDSO	00001/12/0 SH-4	A
112	Volume and equivalent chart of New foundations for Dry black cotton soil only (8000 kg/m²)(NBC type) 2.5 M depth	TI/DRG/CIV/ FND/RDSO/	00001/04/0 SH-5	B
113	Volume and equivalent chart of foundations for Dry black cotton soil only (8000 kg/m²) NBC type 2.5 m depth	TI/CIV/FND/ RDSO	00001/12/0 SH-5	A
114	Volume and equivalent chart of foundations (For 8000 kg/m² Direct load)	ETI/C	0058 Sh.6	B
115	Special BFB portal for 5 tracks (General arrangement)	-do-	0026 Sh.1	C
116	Protective screen of foot-over bridge and road over-bridge.	-do-	0068	H

1	2	3	4	5
117	Chart for portal foundation	-do-	0005/68	
118	Muff for OHE structures	-do-	0007/68	E
119	Structures muff for sand cored foundations	-do-	0012/69	E
120	9.5 m Standard traction mast (fabricated `K' series)	-do-	0018-2	D
121	Remote Control Cubicle at Stn, Foundation, RCC slab, Building plant & Steel door	-do-	0067	B
122	9.5 m long standard traction mast (fabricated with bottom plates `B' series)	ETI/C	0071	E
123 (a)	Details of OHE foundation in soft rock (Bearing capacity 45,000 Kgf/m²).	ETI/C	0059	C
123 (b)	Details of OHE foundation in Hard rock (Bearing capacity 90,000 Kgf/m²).	ETI/C	0060	D

Note:

The above list is indicative and not exhaustive and bidder is expected to get conversant with latest RDSO, Core, ACTM & railway standards and drawings. All works are to be strictly executed as per Railway standards and drawings. Bidder is requested to arrange Railway standards and drawings on his own and no standards will be provided by BHEL.

Chapter III- PREAMBLE FOR THE SCHEDULE OF QUANTITIES (SOQ)

1) Details of the items in this Schedule shall be read in conjunction with the corresponding Railway specifications, drawings and other documents and shall have precedence over any contrary statement mentioned anywhere in this document.

2) The work shall be carried out as per construction drawings, specifications and the description of the items in this schedule and/or Engineer's instructions. Drawings enclosed with these documents are only indicative giving some idea of the type of work involved. The layout, sizes and details of the building, structures and foundations shown in tender drawings may vary at a large extent during actual construction. Final drawings will be issued progressively during the execution of the work.

3) Items of work provided in this schedule but not covered in the specifications shall be executed strictly as per instructions of the Engineer.

4) Unless specifically mentioned otherwise in the contract, the bidder shall quote his rates for the finished items and shall provide for the complete cost towards fuel, tools, tackle, equipment, constructional plant , temporary works, labour materials, levies , taxes , transport, layout, repairs, rectification, maintenance till handing over, supervision, shops, establishments, services , temporary roads, revenue expenses, contingencies, overheads, profits and all incidental items not specifically mentioned but reasonably implied and necessary to complete the works according to the contract.

5) The rate quoted shall be inclusive of cleaning the site of any vegetation, dressing and micro leveling etc., required for commencement of site activities. No separate payment will be made towards the same.

6) The rate shall also be inclusive of carrying out survey of site to establish levels and coordinates at suitable intervals, form existing grid levels and coordinates furnished by the owner, establish bench marks, setting out the location and levels of the proposed structures, constructions and making references, pillars and other identification marks etc. No separate payment will be made towards the same.

7) The rate quoted shall be inclusive of liaising with customer for approval of drawings prepared/furnished by BHEL. BHEL will provide drawings to contractor. Contractor shall take prior approval from customer before proceeding for site work. No separate payment will be made towards the same.

8) Rates shall be quoted both in figures and in words in clear legible writing. No over writing is allowed. All scoring and cancellation should be counter signed by the bidder. In case of

illegibility, the interpretation of the engineer shall be final. All entries shall be in English language.

9) Engineer's decision shall be final and binding on the contractors regarding clarification of items in this schedule with respect to the other section of the contract.

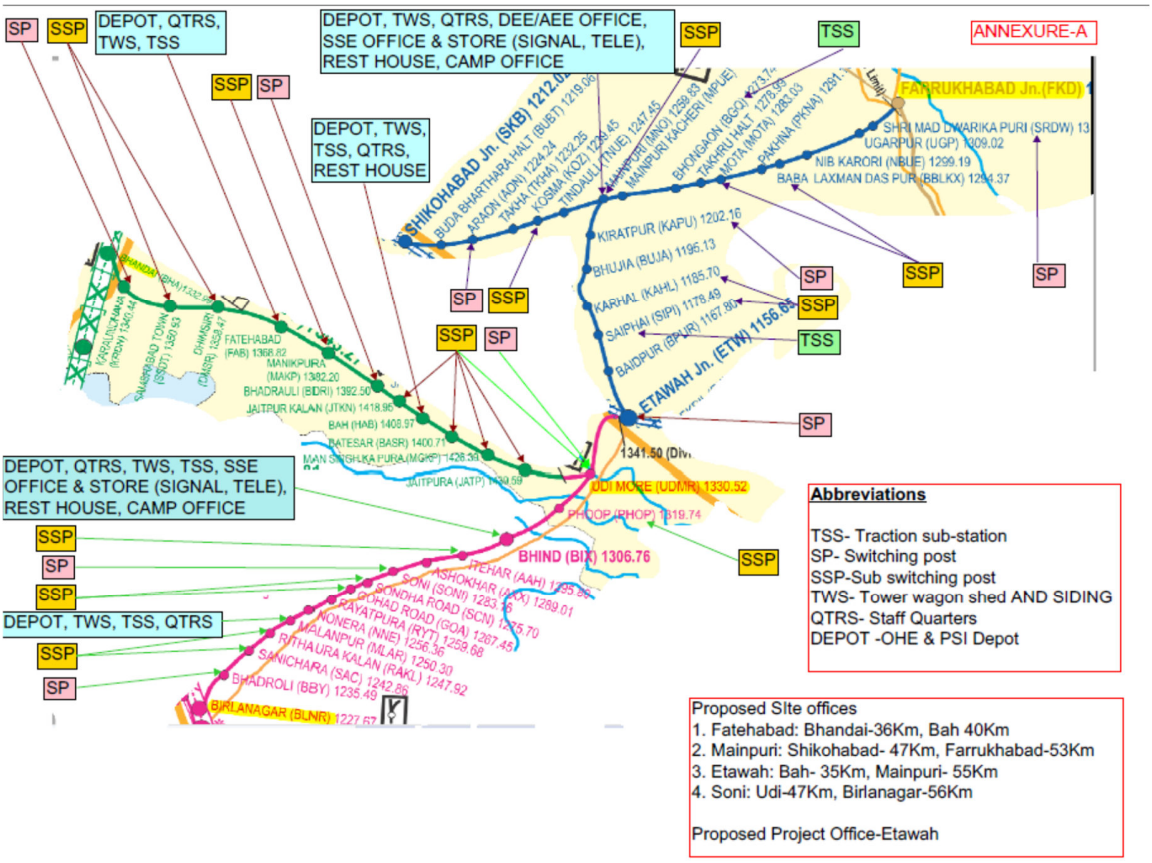
10) Incase of any discrepancy between item descriptions, relevant drawing and/ or specification clarification shall be sought at tender stage itself. Otherwise, it shall be assumed that the bidder has quoted for the more stringent requirement.

11) The price also includes dismantling of all connected temporary arrangements, back filling with earth and compacting the same to the required height and width as per drawing to ensure safety of foundation, confining the exposed height of foundation block to within 10 cm., and removal of spoil. The BHEL's Engineer shall certify where use of chisel and hammer has been necessary.

The tentative location & details of facilities extracted from CORE tender document are indicated below for information purpose only.

Staff Quarters

S.No.	Section & Group	Location	Types of Quarters	Single Stores/Multi-storey building	No of Quarters	Approx. Plinth area of each unit (Qtr)	Length of Road	Length of boundary wall
1	Bhandai – Udi Gr-240	BAH	Type-II	Single-storey	05	55.47 m2	500m	250m
			Type-III	Single-storey	02	65.67 m2		
			Type-IV	Single-storey	01	88.66 m2		
		Fatehabad	Type-II	Single-storey	05	55.47 m2	500m	250m
			Type-III	Single-storey	02	65.67 m2		
			Type-IV	Single-storey	0			


ANNEXURE-A
SP
SSP
DEPOT, QTRS, TWS, TSS
DEPOT, TWS, QTRS, DEE/AEE OFFICE, SSE OFFICE & STORE (SIGNAL, TELE), REST HOUSE, CAMP OFFICE
TSS
DEPOT, TWS, TSS, QTRS, REST HOUSE
SHIKOHABAD Jn. (SKB) 1212.0
FARRUKHABAD Jn.(FKD)
SHRI MAD DWARIKA PURI (SRDW) 13
UGARPUR (UGP) 1309.02
NIB KARORI (NBUE) 1299.19
BABA LAXMAN DAS PURI (BBLKX) 1294.37
KIRATPUR (KAPU) 1202.16
BHIJUA (BIJA) 1196.13
KARHAL (KAHL) 1185.70
SAIPHAI (SIPI) 1178.49
BAIDPUR (BPUR) 1167.90
ETAWAH Jn. (ETW) 1156.65
1341.50 (Div.
FATEHABAD (FAB) 1368.82
MANIKPURA (MAKP) 1382.20
BHADRAULI (BDRI) 1392.50
JAITPUR KALAN (JTKN) 1418.95
BAH (HAB) 1408.97
BATESAR (BASR) 1400.77
JAITPURA (JATP)
UDI MORE (UDMR) 1330.52
PHOOP (PHOP) 1319.74
BHIND (BIX) 1306.76
ASHOKHAR (AKX) 1289.01
SONDHIA ROAD (SCN) 1275.70
RAYATPURA (RYT) 1259.68
NONERA (NNE) 1256.36
MALANPUR (MLAR) 1250.30
SANICHARA (SAC) 1242.86
BHADROLI (BBY) 1235.48
BIRLANAGAR (BLNR) 1227.67
DEPOT, QTRS, TWS, TSS, SSE OFFICE & STORE (SIGNAL, TELE), REST HOUSE, CAMP OFFICE
DEPOT, TWS, TSS, QTRS
Abbreviations
TSS- Traction sub-station
SP- Switching post
SSP-Sub switching post
TWS- Tower wagon shed AND SIDING
QTRS- Staff Quarters
DEPOT -OHE & PSI Depot
Proposed SIte offices
1. Fatehabad: Bhandai-36Km, Bah 40Km
2. Mainpuri: Shikohabad- 47Km, Farrukhabad-53Km
3. Etawah: Bah- 35Km, Mainpuri- 55Km
4. Soni: Udi-47Km, Birlanagar-56Km
Proposed Project Office-Etawah

Chapter IV: Quality

1) Introduction

This part of the specification covers the sampling, testing and quality assurance requirement for all civil and structural works covered in this specification. This part of the technical specification shall be read with other parts of the technical specifications, general condition of contract and special condition of contract, which covers common QA requirements. Wherever IS code or RDSO standards have been referred they shall be the latest revisions.

The QA and QC activities in all respects as specified in the technical specifications/ drawings / data sheets /quality plans / contract documents shall be carried out at no extra cost to the owner. The contractor shall prepare detailed construction and erection methodology scheme which shall be compatible to the requirements of the desired progress of work execution, quality measures, prior approvals if any and the same shall be got approved by the BHEL and Railway(Authority's Engineer). If required, work methodology may be revised/reviewed at every stage of execution of work at site, to suit the site conditions by the contractor at no extra cost to the owner.

2) Methodology

The Contractor shall, at least 15 (fifteen) days prior to the commencement of construction, submit to the BHEL and Railway(Authority's Engineer) for review the methodology proposed to be adopted for executing the Works, giving details of equipment to be deployed, traffic management and measures for ensuring safety. The BHEL and Railway(Authority's Engineer) shall complete the review and convey its comments, if any, to the Contractor within a period of 10 (ten) days from the date of receipt of the proposed methodology from the Contractor. For the avoidance of doubt, the Parties agree that the methodology for executing critical works such as laying foundations, erection of masts and stringing of conductors shall ordinarily rely on mechanised means. For the avoidance of doubt, the Contractor shall use auger machine for excavation of foundations, and mechanised equipment for erection of steel structures, or any equivalent thereof.

3) QA and QC Manpower

The contractor shall appoint adequate work force at site. Contractor shall give details organization chart and appointed manpower details for BHEL approval /acceptance. The contractor shall appoint a dedicated, experienced and competent QA&QC in charge at site. The contractor shall nominate one overall QA coordinator for the contract detailing the name, designation, contact details and address at the time of post bid discussions. All correspondence related to Quality Assurance shall be addressed by the contractors QA coordinator to BHEL. BHEL shall address all correspondence related to Quality issues to the contractors QA coordinator.

4) Laboratory and Field Testing

The field laboratory for QA and QC activities shall be constructed and set-up by the contractor. The Laboratory shall be constructed and installed with the adequate facilities to meet the requirement of envisaged test set up as per RDSO standard requirement. Temperature and humidity controls shall be available wherever necessary during testing of samples. The contractor shall deploy and equip the field quality laboratory for meeting the field quality plan requirements.

The Contractor shall procure all documents, apparatus and instruments, fuel, Consumables, water, electricity, labour, Materials, samples, and qualified personnel as are necessary for examining and testing the Works, Materials. The cost of testing of Construction, Materials and workmanship shall be borne by the Contractor.

The contractor shall furnish a comprehensive list of testing equipment's / instrument required to meet the planned/scheduled tests for the execution of works for BHEL acceptance/ approval. The contractor shall mobilize the requisite laboratory equipment and QA&QC manpower at least 15 days prior to the planned test activity as per the schedule of tests. All equipment's and instruments in the field shall be calibrated before the commencement of tests and then at regular intervals, as per the manufacturer's recommendation and as directed by the BHEL. The calibration certificates shall specify the fitness of the equipment's and instruments within the limit of tolerance for use. Contractor shall arrange for calibration of equipment's and instruments by an NABL / NPL accredited agency and the calibration report shall be submitted to BHEL.

5) Sampling And Testing of Construction Materials

For determining that the Works conform to the Specifications and Standards, the BHEL and Railway(Authority's Engineer) shall require the Contractor to carry out or cause to be carried out tests, at such time and frequency and in such manner as specified in this Agreement, and in accordance with Good Industry Practice for quality assurance. The Contractor shall, with due diligence, carry out all the tests in accordance with the Agreement and furnish the results thereof to the BHEL and Railway(Authority's Engineer). Of the total tests for each category or type to be undertaken by the Contractor under the provisions of this Agreement and Good Industry Practice, the BHEL and Railway(Authority's Engineer) shall (a) carry out or cause to be carried out, test checks equal to about 10% (ten per cent) of the number of the tests required to be undertaken by the Contractor; and (b) witness or participate in at least 10% (ten per cent) of the number of such tests conducted or caused to be conducted by the Contractor.

In the event that results of any tests conducted as per above establish any Defects or deficiencies in the Works, the Contractor shall carry out remedial measures at its own cost and furnish a report to the BHEL and Railway(Authority's Engineer) in this behalf. The BHEL and Railway(Authority's Engineer) shall require the Contractor to carry out or cause to be carried out tests to determine that such remedial measures have brought the Works into compliance with the Specifications and Standards, and the procedure shall be repeated until such Works conform to the Specifications and Standards.

The method of sampling for testing of construction materials and work / job samples shall be as per the relevant IS / RDSO standards in line with the requirements of the technical specification / quality plans. The contractor shall carry out testing in accordance with the RDSO standards in line with the requirements of the technical specifications and quality plans.

Where no specific testing procedure is mentioned, the tests shall be carried out as per the best prevalent engineering practices and to the directions of the Engineer. All testing shall be done in the presence of the engineer or his authorized representative in a NABL accredited / Govt. Laboratory acceptable to BHEL and Railway(Authority's Engineer).

The Contractor shall submit the following samples of Materials and relevant information to the BHEL for review:

(a) manufacturer's test reports and standard samples of manufactured Materials; and
(b) samples of such other Materials as the BHEL may require.

6) Inspection and review by the Railway

The Railway(Authority's Engineer) or any representative authorised by the Railway(Authority's Engineer) in this behalf may inspect and review the progress and quality of the construction of Works and issue appropriate directions to the Authority's Engineer and the Contractor for taking remedial action in the event the Works are not in accordance with the provisions of this Agreement.

7) External technical audit

At any time during construction, the Railway(Authority's Engineer) may appoint an external technical auditor to conduct an audit of the quality of the Works. The findings of the audit, to the extent accepted by the Authority, shall be notified to the Contractor and the Authority's Engineer for taking remedial action in accordance with this Agreement. The Contractor shall provide all assistance as may be required by the auditor in the conduct of its audit hereunder.

8) Inspection of records

The Authority shall have the right to inspect the records of the Contractor relating to

the Works.

9) Inspection of Works

The Railway(Authority's Engineer),BHEL and its authorised representative shall at all times:
(a) have full access to all parts of the Site and to all places from which natural Materials are being obtained for use in the Works; and
(b) during construction at the Site and at the place of production, be entitled to examine, inspect, measure and test the Materials and workmanship, and to check the progress.

The Contractor shall give the Railway(Authority's Engineer),BHEL and its authorised agents access, facilities and safety equipment.

The contractor shall submit a monthly inspection report to the BHEL and the Contractor bringing out the results of inspections and the remedial action taken by the Contractor in respect of Defects or deficiencies.

10) Monthly progress reports

During the Construction Period, the Contractor shall, no later than 10 (ten) days after the close of each month, furnish to the BHEL on the progress of Works and shall promptly give such other relevant information as may be required by the BHEL and Railway(Authority's Engineer).

11) Examination of work before covering up

In respect of the work which the BHEL and Railway(Authority's Engineer) are entitled to examine, inspect, measure or test before it is covered up or put out of view or any part of the work is placed thereon, the Contractor shall give notice to the BHEL and Railway(Authority's Engineer) whenever any such work is ready and before it is covered up. BHEL and Railway(Authority's Engineer) shall then either carry out the examination, inspection or testing without unreasonable delay, or promptly give notice to the Contractor that the BHEL and Railway(Authority's Engineer) does not require to do so. Provided, however, that if any work is of a continuous nature where it is not possible or prudent to keep it uncovered or incomplete, the Contractor shall notify the schedule of carrying out such work to give sufficient opportunity, not being less than 3 (three) business days' notice, to the BHEL and Railway(Authority's Engineer) to conduct its inspection, measurement or test while the work is continuing. Provided further that in the event the Contractor receives no response from the BHEL and Railway(Authority's Engineer) within a period of 3 (three) business days from the date on which the Contractor's notice

hereunder is delivered to the BHEL and Railway(Authority's Engineer), the Contractor shall be entitled to assume that the BHEL and Railway(Authority's Engineer) would not undertake the said inspection.

12) Rejection

If, as a result of an examination, inspection, measurement or testing, any Plant, Material, design or workmanship is found to be defective or otherwise not in accordance with the provisions of this Agreement, the BHEL and Railway(Authority's Engineer) may
reject such Plant, Material, design or workmanship by giving notice to the Contractor, with reasons. The Contractor shall then promptly make good the Defect and ensure that the rejected item complies with the requirements of this Agreement.

If the BHEL and Railway(Authority's Engineer) requires a Plant, Material, design or workmanship to be
retested, the tests shall be repeated on the same terms and conditions, as applicable in each case. If the rejection and retesting cause the BHEL and Railway(Authority's Engineer) to incur any additional
costs, such costs shall be recoverable by the BHEL and Railway(Authority's Engineer) from the Contractor and may be deducted by the BHEL and Railway(Authority's Engineer) from any monies due to be paid to the Contractor.

The Contractor shall not be entitled to any extension of time on account of rectifying any Defect or retesting.

13) Remedial work

Notwithstanding any previous test or certification, the BHEL and Railway(Authority's Engineer) may instruct the Contractor to:
(a) remove from the Site and replace any Plant or Materials which are not in accordance with the provisions of this Agreement;
(b) remove and re-execute any work which is not in accordance with the provisions of this Agreement and the Specification and Standards; and
(c) execute any work which is urgently required for the safety of the Railway(Authority's Engineer) Project, whether because of an accident, unforeseeable event or otherwise; provided that in case of any work which is required on account of a Force Majeure Event.

If the Contractor fails to comply with the instructions issued by the BHEL and Railway(Authority's Engineer) within the time specified in the BHEL and

Railway(Authority's Engineer) notice or as mutually agreed, the BHEL and Railway(Authority's Engineer) may advise to have the work executed by another agency.

14) Quality control System & records

The Contractor shall hand over to the BHEL and Railway (Authority's Engineer) a copy of all its quality control records and documents before the Completion Certificate.
The Contractor shall establish a quality control mechanism to ensure compliance with the provisions of this Agreement (the "Quality Assurance Plan" or "QAP") in accordance with ISO-9001.

The Contractor shall submit to the Railway and BHEL and take approval its Quality Assurance Plan from Railway which shall include the following:
(a) organisation, duties and responsibilities, procedures, inspections and documentation;
(b) quality control mechanism including sampling and testing of Materials, test frequencies, standards, acceptance criteria, testing facilities, reporting, recording and interpretation of test results, approvals, check list for site activities, and proforma for testing and calibration in accordance with the Specifications and Standards and Good Industry Practice; and
(c) internal quality audit system.

15) Suspension of unsafe Construction Works

Upon recommendation of the BHEL and Railway(Authority's Engineer) to this effect, or on its own volition in cases of emergency or urgency, the BHEL and Railway(Authority's Engineer) may by notice require the Contractor to suspend forthwith the whole or any part of the Works if, in the reasonable opinion of the BHEL and Railway(Authority's Engineer), as the case may be, such work threatens the safety of the Users and or other persons on or about the Railway Project.

The Contractor shall suspend the Works or any part thereof for such time and in such manner as may be specified by the BHEL and Railway(Authority's Engineer) and thereupon carry out remedial measures to secure the safety of suspended works, the Users, other persons and vehicles on or about the Railway Project.

16) Purchase And Service

All Material shall be procured from RDSO approved vendor list.

17) Field Quality Plan

The contractor shall prepare the FQP in line with RDSO standard and take prior approval from BHEL and Railway (Authority's Engineer).

18) General QA Requirements

The contractor shall ensure that the works, BOIs and services under the scope of contract at site or at any other place of work are in accordance with the BHEL technical specification, RDSO standards, approved drawings / data sheets / quality plans and BOQ. All the works, BOIs and services shall be carried out as per the best prevalent engineering practices and to the directions of the Engineer.

The contractor shall Carried out the laboratory and field tests and carry out independent tests in the site laboratory; wherever necessary (All tests are to be strictly executed as per RDSO standards. The tests which cannot be carried out in the site laboratory shall be done at a laboratory as per RDSO standard. The test samples for such test shall be jointly selected and sealed by the engineer and thereafter these shall be sent to the concerned laboratory through the covering letter signed by BHEL engineer and Railway(Authority's Engineer). The test report along with the recommendations shall be obtained from the laboratories without delay and submitted to BHEL and Railway.

The contractor shall Maintain records of all testing, including cross referencing to items of work to which each test refers and the location from which any samples were obtained for testing.

Chapter V: Indicative Map