Main Plant Packages: Civil, Structural & Architectural works (**Powerhouse to ID Duct Area**) 3x 800 MW NTPC Telangana BTG Package

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Civil, Structural & Architectural works including Leveling & Grading of the following packages at 3x 800 MW NTPC Telangana BTG Package: -

Package 2A:- Main Power Block Unit#3 (Powerhouse to ID Duct Area) :- Civil, Structural & Architectural works including Levelling/Grading works of Power House, CCR Building, TG, BFP, CEP, Mill & Bunker Building, Mill Foundations, Boiler, ESP, Fan Foundations, ESP Control Room, ID Ducts (Boiler to Chimney area), CEP VFD Building, AC & Ventilation Ducting, Pipe Racks/Cable Racks, Sheds for Construction workers and O&M Workers, Establishment of Safety control room (in Porta cabin), TG Hall EOT Crane Erection & commissioning including fixing of rails & DSL, Paving-Fire Protection System (FPS) & Sewerage Waterline Works, internal roads & drains, Structural Works of Powerhouse, Mill & Bunker, Pipe Racks and other Misc. structures etc.

Package 2B:- Main Power Block Unit#4 (Powerhouse to ID Duct Area) - Civil, Structural & Architectural works including Levelling/Grading works of Power House, CCR Building, TG, BFP, CEP, Mill & Bunker Building, Mill Foundations, Boiler, ESP, Fan Foundations, ESP Control Room, ID Ducts (Boiler to Chimney area), CEP VFD Building, AC & Ventilation Ducting, Pipe Racks/Cable Racks, Sheds for Construction workers and O&M Workers, Paving-Fire Protection System (FPS) & Sewerage Waterline Works, internal roads & drains, Structural Works of Powerhouse, Mill & Bunker, Pipe Racks and other Misc. structures etc.

Package 2C:- Main Power Block Unit#5 (Powerhouse to ID Duct Area)- Civil, Structural & Architectural works including Levelling/Grading works of Power House, TG, BFP, CEP, Mill & Bunker Building, Mill Foundations, Boiler, ESP, Fan Foundations, ESP Control Room, ID Ducts (Boiler to Chimney area), CEP VFD Building, AC & Ventilation Ducting, Pipe Racks/Cable Racks, Sheds for Construction workers and O&M Workers, Paving-Fire Protection System (FPS) & Sewerage Waterline Works, internal roads & drains, Structural Works of Powerhouse, Mill & Bunker, Pipe Racks and other Misc. structures etc.

BHARAT HEAVY ELECTRICALS LIMITED

TECHNICAL CONDITIONS OF CONTRACT (TCC)
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Sl. No.	Description	Details
1	**Project Title**	Telangana Super Thermal Power Project, Stage-II - (3x800 MW), BTG Package
2	Customer	NTPC
3	**Location**	Telangana Super Thermal Power Project (TnSTPP), Stage II has also been identified to be located within the MGR unloading bulb are of NTPC's Ramagundam Super Thermal Power Station, adjacent to the existing Telangana Stage I and situated at 18° 44' 47" (N) to 18° 45' 30" (N) and longitude 79° 28' 06" (E) East to 79° 28' 36" (E).
4	**Nearest Airport**	The nearest commercial airport Hyderabad is at a distance of about 210 km.
5	**Access by Road/Major Cities**	TnSTPP is located at about 51 km from district headquarter Karimnagar and at about 1 km near Ramagundam village. The site is well connected through NH-07 and NH-16 through (Hyderabad-Mancherial Road popularly known as Rajiv Rahadari). Nearest railway station Ramagundam is about 5 km from the plant which lies on the main Kazipet-Balarshah BroadGauge line of South-Central Railway
6	**Temperature**	As per the Climatological data from nearest observatory attached as **Annexure-II**
7	**Seismic Zone**	As per Technical Specification of Civil Works Seismic Design Criteria attached as **Annexure-E**
8	**Wind Speed**	As per Technical Specification of Civil Works Wind Design Criteria attached as **Annexure-D**

1.1	**INSTRUCTIONS TO BIDDERS**
1.1	The Bidder shall visit project site and acquire full knowledge and information about conditions prevailing at site and in & around the plant premises, together with site conditions, transportation routes, various distances, all the statutory, obligatory, mandatory requirements of various authorities and all information that may be necessary for preparing the bid and entering into the Contract. All costs for and associated with site visits shall be borne by the bidder.

1.2	Other contractors would be working in this area and their structures are to be protected. The material brought and stacked for construction should not make hindrance to other contractors.
1.3	The information given herein is for general guidance and shall not be contractually binding on BHEL/Owner. All relevant site data /information as may be necessary shall have to be obtained /collected by the Bidder.
1.4	The contractor, in the event of this work awarded to him, shall establish an office at site and keep posted an authorized, responsible officer with valid Power of Attorney for the purpose of the contract. Any order or instructions of the `Engineer' or his duly authorized representative, communicated to the contractor's representative at site office will be deemed to have been communicated to the contractor at his legal address.
1.5	No claim will be entertained by BHEL on ground of lack of knowledge and the contractor's rates shall be deemed to have taken this into account.
1.6	Bidders may fix up their site visit in consultation with below mentioned contact person:

Name:	Sh. K.S. Arun Bhandar
Designation:	Sr. Dy GM
Email:	ksabhandar@bhel.in
Ph no:	8800995575
Name:	Sh. Bharadwaj Chinthakindi
Designation:	Engineer
Email:	bharadwajch@bhel.in
Ph no:	9363225965

Note: - The bidder is advised to visit and examine the site of WORKS and its surroundings and obtain for himself on his own responsibility all information that may be necessary for preparing the bid and entering into the CONTRACT. All costs for and associated with site visits shall be borne by the bidder.

2.0	**Scope of Works:**
2.1	**Package 2A - Main Power Block Unit#3 (Powerhouse to ID Duct Area):-** Civil, Structural & Architectural works including Levelling/Grading works of Power House, **CCR Building,** TG, BFP, CEP, Mill & Bunker Building, Mill Foundations, Boiler, ESP, Fan Foundations, ESP Control Room, ID Ducts (Boiler to Chimney area), CEP VFD Building, AC & Ventilation Ducting, Pipe Racks/Cable Racks, Sheds for Construction workers and O&M Workers, Establishment of Safety control room (in Porta cabin), **TG Hall EOT Crane Erection & commissioning including fixing of rails & DSL,** Structural Works of Entire Power Block Area (Powerhouse, Mill & Bunker, Pipe Racks and other misc structures), "Paving-Fire Protection System (FPS) & Sewerage Waterline Works", internal roads & drains, etc. **(Excluding supply of Cement, Reinforcement Steel & Structural Steel which shall be issued by BHEL free of cost unless otherwise specified)** Note: This Package shall also include providing lab equipment, QA/QC Engineers & support staff for centralized quality lab. **Package 2B - Main Power Block Unit#4 (Powerhouse to ID Duct Area): -** Civil, Structural & Architectural works including Levelling/Grading works of Power House, CCR Building, TG, BFP, CEP, Mill & Bunker Building, Mill Foundations, Boiler, ESP, Fan Foundations, ESP Control Room, ID Ducts (Boiler to Chimney area), CEP VFD Building, AC & Ventilation Ducting, Pipe Racks/Cable Racks, Sheds for Construction workers and O&M Workers, Structural Works of Entire Power Block Area (Powerhouse, Mill & Bunker, Pipe Racks and other misc structures), "Paving-Fire Protection System (FPS) & Sewerage Waterline Works", internal roads & drains, etc. **(Excluding supply of Cement, Reinforcement Steel & Structural Steel which shall be issued by BHEL free of cost unless otherwise specified)** **Package 2C -Main Power Block Unit#5 (Powerhouse to ID Duct Area): -** Civil, Structural & Architectural works including Levelling/Grading works of Power House, TG, BFP, CEP, Mill & Bunker Building, Mill Foundations, Boiler, ESP, Fan Foundations, ESP Control Room, ID Ducts (Boiler to Chimney area), CEP VFD Building, AC & Ventilation Ducting, Pipe Racks/Cable Racks, Sheds for Construction workers and O&M Workers, Structural Works of Entire Power Block Area (Powerhouse, Mill & Bunker, Pipe Racks and other misc structures), "Paving-Fire Protection System (FPS) & Sewerage Waterline Works", internal roads & drains, etc. **(Excluding supply of Cement, Reinforcement Steel & Structural Steel which shall be issued by BHEL free of cost unless otherwise specified)** **Note:-** 1) EOT Crane Work is applicable in Package 2A only. 2) Centralized Quality Laboratory: - Providing lab equipment, QA/QC Engineers & support staff for centralized quality lab and its maintenance is applicable in Package 2A only. 3) CCR Building Work is applicable in Package 2A & Package 2B Only.

2.1.1	Scope of Consortium Partners (if applicable): a. Fabrication, Erection and Other Works Related to structural steel (Series 2300 of BOQ Cum Rate Schedule) And/or b. Raft, Column and Top Deck of TG Foundation Note: - **Works covered under the scope of the consortium partner shall be executed exclusively by the respective consortium agency. Deployment of technical manpower for execution and supervision of the consortium partner's scope of work shall be the responsibility of the consortium partner. However, this clause shall not absolve the prime bidder/contractor of its overall and prime responsibility under the contract.**
2.2	**The brief scope of work is as follows:**
2.2.1	The scope of Bidder for civil, structural, and architectural works as defined above shall include but not be limited to the following buildings/ areas/ systems along with their foundations, super structures and finishes complete: 1. Site clearance including cutting of trees of girth less than 30 centimeters. Removal and disposal of roots of trees of all girths (including trees of girth less than 30cm or more) and other vegetation is in Bidder's scope. 2. Removal of below ground facilities/sub structures (Existing facilities/structures shall be dismantled and removed upto ground level) all complete which have interference with the new facilities envisaged for Stage-II. Dismantling of all underground facilities including paving /flooring and projection of structures above ground level etc., if any, is in the scope of bidder. Existing foundation/underground structures interfering with new foundations/structures are to be removed by the bidder. All existing foundations/below ground facilities interfering with new facilities are to be dismantled upto minimum 10m or technical/system requirement, whichever is greater, from the extreme outline of the new underground foundation/ structure. No drawings for substructure are available. Bidder may assess the same as per actual site conditions without any additional time and cost implication to BHEL. Dismantled material such as reinforcement, structural steel, concrete, masonry waste, other demolition waste, etc., arising from civil structures shall be the property of the bidder. The bidder has to take care of this aspect while bidding. Bidder shall be responsible for safe disposal of all such materials outside the plant boundary in environmentally friendly manner meeting all statutory requirements. The liability for any payment w.r.t. removal /disposal of dismantled material including the applicable taxes/duties shall be that of the Bidder. The area will be handed over in as is and where is basis. 3. Infrastructure Works

a. Rigid pavements Roads as shown in Road layout tender drawing including approach road /heavy duty paving/heavy duty passage to buildings/ facilities in the package, including construction of priority roads at onset of project works and maintenance of the roads during the entire construction period. Laying of 40mm bitumen mastic wearing course over roads after completion of construction activities i.e. at the time of handover.

b. RCC Storm water drainage in BTG area (including facilities/structures) and RCC drains along roads in Bidder's Scope including connection up to terminal point as shown in GLP/Layout of drain. Drains shall be constructed simultaneously with roads.

c. Complete site levelling of BTG block area and any other area as shown in approved drawings.

d. Retaining walls/slope protection work under site levelling work.

e. Civil works for Water Supply for BTG area.

f. Zero liquid discharge and associated facilities for BTG area Separate RCC drainage network with GI rating cover and sump pit for plant effluents for all buildings and facilities in Bidder's scope including floor wash water from all the facilities in Plant Area upto Effluent Treatment plant including connection of effluent line from structures under the scope of package.

4. Foundations for all buildings/ area/ systems including machine foundations for BTG area.

5. All Civil, Structural, Architectural works including underground facilities like drainage, sewerage, trenches, earthing mat/ grounding for entire area under Bidder's scope covering the following:
   a. Boiler and ESP supporting structures and foundations.
   b. Elevator pit & Civil Works for Machine Room for Boiler Elevator.
   c. Mill Bunker building supporting structures and foundations, floors, roof & side cladding.
   d. ESP control room building.
   e. Mill reject silo and associated trenches.
   f. Coal mill foundations & PA/FD/ID Fan foundations.
   g. Seal air fan foundation and all other equipment foundations.
   h. Interconnecting galleries between Mill Bunker Buildings.
   i. Area Paving and miscellaneous foundations in entire area enclosed within the peripheral roads of the entire BTG area from edge of drain along peripheral road beyond Air Cooled Condenser up to heavy duty passage beyond ESP area bound by peripheral roads in orthogonal directions, including heavy duty

	passages, sump pits, drains, culverts, cable slits, fire water trench, including, rail/ road/ drain crossing of fire water trench & pipes etc. (as shown in GLP) j. Bunker MCC including RIO room. k. Main Power House building. l. Air-Conditioned Offices of 350 sqm to be provided in MPH building above Control Room. m. Foundations for turbine generator, turbine driven boiler feed pumps and motor driven boiler feed pump(s) including steel helical springs and viscous dampers below RCC top deck (The foundation type can be with/without steel helical springs/ dampers as per option provided in specification) n. ACW pit, CEP Pit, and all other equipment foundations in Turbine-Generator (TG) area. o. Civil, structural, architectural works for CPU system in Main Powerhouse & regeneration area including Switchgear/MCC and control room building and Transformer foundations. p. Civil, Structural & Architectural works for rooms for Owner's Electrical equipment like HT/LT switchgear, cable vault, batteries/battery chargers, foundation of service transformers, space for bus ducts and cable trays etc. as listed in Electrical Chapter of specifications. q. VFD Room in transformer Yard area, for CEP r. AC & Ventilation Ducting 6. Civil works for Outdoor transformer foundations. 7. Earthing mats & risers for all buildings under the bidder's scope. 8. Sheds for Construction workers and O&M Workers, including food serving kiosk and bio Toilet Blocks for ladies and gents to cater to the workers working in each work area. The sheds should be easily accessible to workers by foot. Drinking water facility and maintenance of toilet and shed shall be the responsibility of the bidder till COD of all the units. The sheds shall be constructed at start of the project construction and are permanent in nature. 9. Civil Works associated with fire detection and fire protection system as per Tender Drawing. 10. Civil works associated with air conditioning & ventilation system in BTG area. 11. Civil, Structural works for pipe /cable /duct supporting structures, trestles and foundations, trenches, culverts, duct banks, pedestals, Hume pipe & culverts, buried pipes, racks, culverts across rail/road tracks for pipes/ drains/ cables/ sewers and any other facility and thrust blocks etc. associated with all systems covered under the scope.

	12. Providing foundations and support structures for elevators mentioned elsewhere in the specifications. 13. All civil, structural and architectural works including extension of cantilever related to interface locations at terminal points for Pipe Cable Racks/Trestles/Galleries/ Connecting walkways, etc, as required during detailed engineering. 14. Any other miscellaneous building or facility required for completion of project.
2.2.2	**A. Erection of Shop Fabricated Structures: -** 1. Power House Building 2. Mill Bunker Structure **B. Site Fabrication & Erection works:** 1. Bunker Shell, Hopper and its supporting structures like ring beam, stub columns, plan bracings etc. 2. Pipe and Cable Racks 3. Any other miscellaneous structure. Note: Hard crusting (with 230 mm thk WBM/Paver block of 100 mm thick) of fabrication and pre-assembly area shall be done by contractor before commencement of fabrication activity at site, no extra payment shall be made to contractor against the same.
2.2.3	***Important Note for above clauses 2.2.1 & 2.2.2: -:*** ***The tentative list of building/ structures falling under scope of works of this tender is listed above, however, the same is not exhaustive. Any structure in addition to the listed above, which require to be constructed for completion of the package shall be the part of scope of work under this contract.***
2.2.4	**ERECTION, COMMISSIONING AND LOAD TESTING OF TG HALL EOT CRANES: (Scope of Work of EOT Crane Shall be applicable in Package 2A only.)**
2.2.4.1	1) **Scope of Crane Manufacturer (Shall be arranged by BHEL): -** Two (2) nos. 265/25T capacity x 29.00 m span EOT Cranes along with common lifting beam of 447T capacity have been envisaged for erection of turbo-generators and their auxiliaries in TG Hall. The scope of supply of the EOT cranes along rail and DSL, maintenance tools & tackles, first fill of lubricants & consumables along with spares for erection and commissioning, operation & maintenance spares, touch up paint is with the crane manufacturer. The crane manufacturer shall provide Supervision services for erection & commissioning and load testing during commissioning. 2) **The scope of work to be carried out by the bidder are detailed as follows.** After supply of the above cranes / parts thereof by the Crane Supplier, their erection and commissioning along with load testing for crane(s) and lifting beam is required to be carried out by the bidder.

2.1) Erection & Commissioning of the above EOT Cranes along with common lifting beam along with their accessories has to be carried out. Accordingly work required for completion of scope is detailed below: -

1. Transportation from BHEL Yard.
2. Assembly, erection, touch up painting of girders, end carriage, crab, maintenance cage, cabin etc.
3. Erection & commissioning of Long Travel rail along with end stoppers and DSL on the steel gantry girders for complete bay length for all the 3 Units.
4. Erection and commissioning of all electrical crane components such as panels, junction box, isolation switches, Radio remote control, pendant, master controller, DBR, lighting etc.
5. Dead load for load testing shall be provided by BHEL. Bidder shall supply cradle for load/overload testing at site. Crane supplier shall provide drawing for fabrication of cradle.

   Scope of shifting dead load & cradle to TG Hall area for load testing shall be in bidder's scope. Alternatively, bidder can use water balloons with load cell for testing.
6. Carrying out load testing of Cranes & lifting beam with available bay length, commissioning, obtaining clearance certificate for operation of crane/s from the concerned competent authority as per Government Norms/ Statutory body during commissioning.
7. Bill of material (Mechanical & Electrical items) of the 2 nos. EOT cranes with their dimensions, weights have been indicated in Annexure I to enable the bidder to understand the volume of work required.
8. Reference Field Quality plan is attached as Annexure II to understand the extent of checks and procedures to be followed at site.
9. The erection and commissioning methodology is attached as Annexure III for general understanding of work to be carried out.

   Supervision of Erection and Commissioning of Crane/s shall be provided by the crane manufacture.
10. After successful Erection and commissioning (including closure of punch points, if any) of cranes and lifting beam, cranes shall be handed over to BHEL/ Operation & Maintenance agency.

(3.0) Exclusions:

1. Unloading & storage.
2. Sling for load testing during commissioning, in case cradle is used.
3. Dead load for load testing in case load testing done through cradle.
4. Erection and commissioning spares (as per Annexure – IV).

	Following Specifications and Drawings are enclosed with the tender for bidder's reference and guidance purpose only: ➢ Specification for Erection & Commissioning of 265/25T Double Girder TG Hall EOT Cranes **(Specification No. PE-TS-546-501-A502, Rev.0),** consisting of detailed Bill of Material, Standard Field Quality Plan, Erection and Commissioning Procedure. (5.0) List of Enclosures: 1. Bill of material – Annexure I 2. Field Quality plan - Annexure II 3. Erection and commissioning methodology -Annexure III 4. Erection and commissioning spares listed in Annexure IV. Note: E&C Procedure given in the enclosed Specification No. **PE-TS-546-501-A502, Rev.0** is for reference purpose. Project specific Erection and Commissioning (E&C) procedure as submitted by the crane supplier shall be provided to the contractor during execution of contract and same shall be followed for erection and commissioning works.
2.2.5	**<u>List of buildings requiring AC Ducting:</u>** 1. TG Hall Building 2. ESP Control building 3. Any other building if applicable. **<u>List of buildings requiring Ventilation Ducting:</u>** 1. TG Hall Building 2. ESP Control building
2.3	BHEL at its discretion may include other area works limited to 15% of awarded contract value, which are not mentioned in above scope of works. Contractor shall execute such works as desired and as directed by BHEL Engineer. The item rates & contract conditions shall remain unchanged for such works.
2.4	The work under this contract shall be carried out as per BOQ Cum Rate Schedule and in compliance of tender conditions including technical specifications and approved drawings/ documents.
2.5	**General:**
2.5.1	Providing all incidental items not shown or specified but reasonably implied or necessary for the successful completion of the work in accordance with contract.

2.5.2	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.
2.5.3	Further this is to be noted that the drawings and the documents furnished along with this specification are the sole property of BHEL. It must not be used directly or indirectly in any way detrimental to the interest of the company.
2.5.4	Furnishing all labor, 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 handing over the works in accordance with the stipulations laid down in the contract documents and additional stipulations as may be provided by the Engineer during the course of works.
2.5.5	All the works areas shall be adequately flood lighted to the satisfaction of the Engineer-in-Charge when the work is in progress during the night shifts. LED flood lights and mobile tower lights shall be installed for proper illumination at night to ensure safe and serious working.
2.5.6	Drawings showing enough details for the construction as per the specification shall be furnished to the contractor in a phased manner as far as possible. Planning and RFC Drawings shall be issued progressively as per site requirement. Agency has to plan and execute the works in close co-ordination with BHEL EIC. Agency shall deploy experienced engineer/agency for evaluation of BOM from the drawings for further review/approval by BHEL Engg. /EIC time to time well in prior of starting a new work area at site
2.5.7	All necessary arrangement for safety like Hard Barricading around deep structures with scaffolding pipes and providing of safety net on the slope of excavated area is in contractor's scope. Contractor shall comply with all safety requirements as per statutes, BHEL and Customer specifications as applicable for execution of works. Safety rules and guidelines of BHEL and Customer are provided elsewhere. **The contractor shall also deploy PVC/MS barricading with fluorescent stickers mentioning agency's name in addition to the hard barricading with proper signages as instructed by BHEL.**
2.5.8	The Customer may depute their representative for checking and supervision of important stages of work based on Field Quality Plan. The contractor shall be required to provide all facilities for inspection of works at no extra cost to BHEL. Any defect in quality of work or deviations from drawings / specifications pointed out during such inspection shall be made good by the contractor in the same way as if pointed out by the BHEL Engineer, without any cost implication to BHEL.

2.5.9	Giving all notices, paying all fees, taxes etc., in accordance with the general conditions of contract, that is required for all works including temporary works.
2.5.10	**<u>Royalty & other fees:</u>** Royalty challan and statutory documents shall be submitted along with RA Bills for processing of Bills. In the event of non-availability of royalty/statutory documents along with RA Bill, BHEL site at its discretion may opt to withhold relevant amount from the running RA Bills and process the bill further to maintain proper cash flow and continuity of work. The Contractor shall pay and indemnify the Employer against any default in payment of Royalties and/or Seignorage Fees and/or Cess and/or other charges by the Contractor or the agency from which the Contractor purchases soil/earth, sand, stone/aggregates, metals, minerals or minor minerals. In the event of there being a statutory increase in the rates of royalty charges/fresh levy of royalty on materials, the same shall be reimbursed to the Contractor upon submission of original challan by him of having made the payments at revised rates. In the event of there being a decrease in such rates, the same shall be recovered from the Contractor. The base date for calculating the increase or decrease shall be the rate as on seven (7) days prior to the date of Techno-commercial (Envelope-I) bid opening. The total reimbursement (positive or negative) as specified above, to be paid or recovered, shall however be calculated on the quantity of materials actually accepted for payment), whichever is less, and on the basis of documentary evidence of Govt. Notification. However, the Contractor will settle claims, if any, on account of over charge by the State Authorities. **ROYALTY/ SEIGNIORAGE CHARGES FOR EXCAVATION INSIDE PROJECT PREMISES** i. The contract price shall be excluding Royalty for excavation inside Project premises, if any. The Bidder need not quote for the same in his price. ii. Royalty/ seigniorage charges (if any) for excavation inside project premises, if it becomes applicable, as per Govt. of Madhya Pradesh Notification shall be reimbursable to the bidder by BHEL for the quantum of earth work done on submission of necessary documentary evidence as proof of payments/ challans as required by BHEL for reimbursement by the contractor for making such payments as per statutory provisions and this reimbursement shall be over and above the contract price. If there is a demand by statutory bodies at a later date from the contractor for payment of royalty for excavation inside project premises the same will be reimbursed to the contractor at actual against submission of documentary evidence and any penalty levied by the statutory bodies in this regard will be to contractor's account.
2.5.11	Carrying out topographic survey of the Scope area and establish levels and coordinates at suitable intervals from existing grid levels and coordinates 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. It is the responsibility of the contractor to deploy experienced surveyors well acquainted with latest versions of auto-cad for correct plotting and representation of line, levels, contours and co-ordinates, auto-cad drawings for civil works. The contractor shall take all precautions to maintain same levels of all civil structures with respect to the Bench Mark Pillars (installed by BHEL). For works on emergency basis/ special assignments as per project requirement under the instruction of BHEL EIC, the agency shall deploy the surveyor with no extra cost to BHEL.
2.5.12	Arranging for joint checking (with BHEL / BHEL's Customer / Consultant) of all site construction activities Preparation of joint protocols for each & every activity and maintaining quality records for audit/inspection as per approved FQP by BHEL.
2.5.13	Medical/First aid center/medicine purchased for emergency/Doctor purpose along with ambulance services with fuel and operator (round the clock) shall be arranged by BHEL for handling medical emergencies. Cost against these facilities shall be distributed / shared among the vendors working in Project site proportionately based on contract value.
2.5.14	The complete works shall be carried out as per BOQ cum Rate schedule. If any work covered in the scope of contract cannot be executed using items available in BOQ, additional / extra items shall be made and rates for such items shall be worked out as per GCC clause 2.15.7. However, contractor shall be bound to execute all the works under the scope of the contract and decision whether an extra item is applicable or not, shall be taken by BHEL Engineer which will be binding on the contractor.
2.5.15	Any activity which is necessarily required for satisfactory execution of any item of BOQ in line with technical specifications shall be deemed to be included in BOQ item even if it is not described in the item description and no extra payment shall be made against such activity.
2.5.16	**Documentation and Reporting:** The Contractor shall maintain accurate records of material supplies, including delivery challans, invoices, and stock registers. These records shall be submitted to BHEL on monthly basis maintaining proper format of records in consultation with BHEL site.
2.5.17	**Quantity Assessment of Supply Items: -** Supply of BOI material shall be based on assessment of the project status/requirement and shall be done only after written clearance of BHEL's Engineer-In-Charge. The supply quantities shall be calculated based on available drawings and work fronts.

	Contractor shall be the custodian of the BOI supplied items. In case, contractor fails to execute/install/fix/etc. the BOI items for recorded reasons, the contractor shall be liable to handover the materials in good usable condition to BHEL Stores. Further, if the contractor denies to/doesn't handover the materials on the instruction of BHEL-In Charge, payment made against such supplies shall be recovered from the contractor. The decision of Engineer-In-Charge Shall be final and Binding to the contractor.
2.5.18	**Reconciliation of Supply:** The final quantities of BOI materials supplied shall be reconciled upon the final execution of the total scope of work. The measurement against supply portion shall be reconciled after final execution of total work and the actual executed quantities as per BOQ items shall be considered for final measurement for recording in measurement book.
2.5.19	The contractor has to intimate, share atleast two months in advance regarding any quantity variation in BOQ items for review by BHEL.
2.6	**Tentative Technical Staff Requirement: (Per Package Requirment)**
2.6.1	Required experienced Engineers and Supervisors in sufficient numbers for execution of the site works and other functions like quality, safety, store & purchase, material management, planning, finance, administration etc. are to be provided as per site requirement. However, tentative staff requirement is as below: **A – Civil Works** • **Project Manager/ Project In charge –** 01 Head with minimum 15 Years' experience in Industrial Construction Projects preferably in Power Plant Civil & Architectural Works etc. • **Asst. Project Managers –** 01 Heads with minimum 12 Years' experience in Industrial Construction Projects preferably in Power Plant Civil & Architectural Works etc. • **Experienced Civil Engineers –** 06 heads (Civil- dedicated for Power House, Boiler, ESP, Mill & Bunker, Pipe & Cable Racks, etc.) • **Experienced Foreman / Supervisors** – 10 heads (2 nos. for round the clock concreting activities, 2 nos. for centralized bar bending, 2 nos. for centralized formwork fabrication, balance 4 nos. for site supervision works) **B – Structural Steel Works (Site Fabrication & Erection):** • **Asst. Project Managers –** 01 Heads with minimum 12 Years' experience in Industrial Construction Projects preferably in Power Plant Structural Steel Fabrication, Erection Works etc. • **Experienced Structural Fabrication & Erection Engineers** – 04 heads (Dedicated 02 Nos. for Fabrication Works & 02 Nos For Erection Works) • **Experienced Foreman / Supervisors** – 8 heads (02 nos. for round the clock for pre-assembly, 01 nos. for material inspection / management, 02 Nos for site fabrication works and balance 03 nos. for site supervision works).

C- Common for Planning, Billing, Quality, Safety, Administration & Miscellaneous Works:

- **Planning & Billing Engineers** –02 heads (1 experienced head with 1 nos. engineer (for civil and structural works, preparation of BOM, maintaining DPRs, BOI procurement plan and overall execution plan vis-a vis financial plan and material requirements)
- **Stores, Gate Pass** – 04 head
- **Accounts & Administration** – 02 head
- **Quality Control Engineer–** 05 heads (1 no. with minimum 8-10 years of experience and 04 nos. (2 nos. civil and 2 no. structural) with minimum 5 years of experience including relevant experience in NDT (Level-2 in RT, UT, LPI/MPI) & QA/ QC of Piping for contractor's scope of work at site.
- **Safety Engineer –** As per HSE Plan
- **Surveyor –** 02 head capable to handle total station
- **Licensed Electrician, Mechanic —** Minimum 2 Nos.
- **Security Guards (Round the Clock) –** As per requirement**.**

Note:

1. **Dedicated deputation of Project-In-Charge, Planning & Billing Engineers, Quality Control Engineer, Safety Head is must during the entire duration of execution.**
2. **Contractor shall deploy such Technical Staff (as mentioned above) as per directions of BHEL Engineer within 07 days from the date of intimation from BHEL Site.**
3. **In case of non-compliance, penalty shall be imposed as decided by Engineer In-charge. Such penalty shall be deducted from the corresponding month's RA Bill (RA Bill of the month where technical staffs were not deployed as per BHEL's requirement.)**
4. **Maximum Penalty can be up to Rs. 1,00,000 per Man-Month (unless a higher penalty is mentioned in other part of tender document.)**
5. **Recovery can also be done on pro-rata basis as per no. of days of short deployment in the month.**

C – Tentative Breakup of Manpower Requirement for Civil & Structural Works:

Experienced Carpenters & Helpers	Approx. 200 nos.
Experienced Mason, Bar Benders & Helpers	Approx. 250 nos.
Experienced Erection Manpower including Fabricator, Rigger, Fitter & Helpers.	Approx. 150 nos.
Other manpower like Painters, Supervisors, Operators, Helpers, etc	Approx. 100 nos.

	Total	**Approx. 700 nos.**
	Note: - Manpower requirement shown in the above-mentioned list is peak period suggestive requirement only. Deployment of manpower shall be progressive to meet the project schedule. However, manpower mobilization schedule as mutually agreed in Monthly Progress Review(F-14) at site, shall be decided(increased/decreased) based on front availability, drawing availability and erectable target completion to meet project milestones without additional financial implication to BHEL.	
2.6.2	Deputation of above man-power shall be jointly decided at site in line with construction Schedule. In case of any dispute, the decision of BHEL shall be final binding on you.	
2.6.3	Engineer/ supervisor for other functions like store & purchase, material management, finance, administration etc. are to be provided as per site requirement and not considered in above list.	
2.6.4	BHEL reserves the right to reject or approve the list of personnel proposed by the contractor. The persons whose bio-data have been approved by BHEL will have to be posted at site and deviation in this regard will not be permitted unless specific & reasonable justification is made.	
2.6.5	In addition to above, a well experienced qualified engineer to be designated, as 'Project Co-coordinator', shall be deployed by the contractor. Such engineer shall have adequate exposure on the job and shall remain fully involved in all planning activities, guidance etc. to contractor's own team during the complete execution period of contract. The contractor shall not transfer/shift areas for the deployed staff without prior permission of BHEL.	
2.7	**Computer Infrastructure & Operator/Support Staff for exclusive use of BHEL:- (Per Package Requirement)**	
2.7.1	**Laptop/Computer and Printer for exclusive use of BHEL:** The bidder will have to provide **Two (02) No. of Laptops/Computer (**X-86 Architecture Based, 64-Bit Supported, minimum intel core i-7 or equivalent CPU, On-board Graphics feature, Minimum 16 GB DDR4 RAM (or higher) upgradeable to 32 GB, minimum 512 GB SSD M.2 Hard Drive or higher, minimum 14" high definition anti-glare LED back lit Screen, OEM USB Optical Travel Mouse, Integrated High definition audio with integrated speakers and volume control (Hardware/Software). Single audio jack (single pin) for connecting ear phones and mic, Built-In HD Webcam with Built-In Microphone, integrated 100/1000 Mbps port, Integrated Wi-Fi 6, supporting industry standard IEEE 802.11ax + Bluetooth 5.0 or higher, Minimum 2xUSB 3.1 Ports, 1xType C, Stereo headphone/ microphone combo jack,1 x HDMI Port. 1 x RJ – 45, Minimum 3-cell battery	

	capable of providing 6 hours or more backup in standard business environment, ACPI Compliant, OEM AC Adaptor suitable for 230V supply, Should come pre-installed with Windows 11 Professional Edition or latest version with 64 bit latest service pack, OEM carry bag to be supplied with OS Certification from Microsoft and required software like latest MS Office Professional, latest AutoCAD, latest ADOBE PDF CREATOR **with Two (2 nos.) laser jet printer compatible for A4 and A3 size printing with power backup at places out of which 1 no shall be color printers, as per instruction of BHEL**. **All software/hardware component supplied with the laptops/computer shall be properly licensed.** These laptops/ printers shall remain contractor's property/ownership for all legal/technical purposes. However, contractor will be allowed to take out the same after completion of the site works. The computer/printer shall remain at BHEL offices during the contract period/ extended period (if any).
2.7.2	These laptops/ printers shall remain contractor's property/ownership for all legal/technical purposes. However, contractor will be allowed to take out the same after completion of the site works. The computer/printer shall remain at BHEL offices during the contract period/ extended period (if any). If case successful bidder fails to provide computer/ printer as per requirement, for a continuous period of fifteen days or more, BHEL shall have the right to procure the same and deduct the expenses plus 5% overheads from contractor's RA bill or any other dues.
2.7.3	**<u>Computer Operator and Support Staff:</u>** The successful bidder shall also provide the following for miscellaneous service for BHEL's use at site/ PSWR-HQ for construction detail drawings, reconciliation, progress review & day-to-day planning purpose, documentation, etc.: - • 02 Nos Computer operator and 4 nos supporting staff at BHEL Site office for assist in bill processing and maintaining infrastructure provided by the bidder (Computer, Printer etc.) to BHEL site office. Approval or Rejection of the candidate shall be sole discretion of BHEL and shall be binding on the Contractor. These facilities are to be provided within 15 days from the written intimation of BHEL site till completion of scheduled contract period (i.e 32 contractual months). If case successful bidder fails, to provide computer/ printer or personnel as per requirement in the aforesaid mandatory period (i.e 32 contractual months), for a continuous period of fifteen days or more, BHEL shall have the right to deduct as per following rates on prorate basis, from successful bidder's RA bill or any other dues with 5% overheads. a. @Rs 30,000/- (Thirty thousand) per month for each computer operator. b. @Rs 25,000/- (Twenty-five thousand) per month for each supporting staff. Computer/Printer as per actual purchase/market price with 5% overheads.

	In case BHEL intends to extend the services of computer operator or service staff beyond the aforesaid mandatory period (i.e 32 contractual months), the successful bidder shall extend the service to BHEL, for which BHEL will reimburse following rates. a. @Rs 30,000/- (Thirty thousand) per month for each computer operator. b. @Rs 25,000/- (Twenty-five thousand) per month for each supporting staff.
2.8	**Field Quality Assurance:**
2.8.1	The contractor shall be responsible for day-to-day quality checks for civil, structural and architectural works including concrete and other building materials in line with approved Field Quality Plan (FQP) and Manufacturing Quality Plan (MQP) during the progress of work. All quality records and log sheets shall be maintained as per the requirement of BHEL/CUSTOMER and as per FQP/MQP approved by BHEL/CUSTOMER. **Setting up & Maintenance of Centralized Quality Laboratory shall be the responsibility of Package 2A contractor only.**
2.8.2	**<u>Setting Up of Laboratory Works:</u>** **Initially, the contractors shall arrange for civil quality laboratory setup with minimum required testing facilities for his own scope of work.** Subsequently in Package 2A, BHEL shall set up centralized civil quality laboratory in the close vicinity of the work site wherein test shall be performed for all civil contractors working for the project. The centralized civil lab building shall be constructed by BHEL and handed over to Package 2A contractor. The Package 2A contractor shall supply, install, calibrate & commission all latest testing equipment as required and shall further maintain the laboratory till completion of contract. Sampling of all construction materials, cube casting for concrete (required number of cubes to be arranged by contractor), etc. shall be carried out by contractor, transported to the laboratory and handed over to the service provider of the centralized laboratory for routine testing and documentation. All field test like slump test (at batching plant/ field), soil test for compaction (MDD), test for road work, etc. shall be carried out by the contractor without any extra cost to BHEL. In case, third party testing related to the scope of work is required to be conducted for any reason whatsoever, shall be arranged/conducted by the contractor without any extra cost to BHEL. Contractor shall depute their representative QA/QC Engineer and Supporting Staff at site/lab during testing and documentation, etc. for satisfactory conductance of the routine test. In view of above scope matrix for the routine testing, contractor does not absolve from their responsibility for satisfactory performance of the work done as per terms and conditions of the contract.

	However, after completion of centralized civil laboratory by BHEL, all tests shall be performed at the centralized place only. **<u>Documentation and Reporting</u>** The contractor shall maintain a dual documentation system, encompassing digital and physical formats. This includes test requests, sample records, test data sheets, equipment logs, calibration records, non-conformance reports, and corrective action reports. • Digital Records: Maintained through the online system, with regular backups and security measures. • Physical Records: Properly filed and stored in the laboratory for easy verification. Daily test reports must be submitted in prescribed formats via the online system and in hard copy, supplemented by weekly summaries and monthly progress reports. All necessary files, papers, consumables, and stationery required for laboratory documentation shall be provided by the bidder. Confidentiality must be strictly maintained, with all data and information secured and not shared or removed without prior written permission from BHEL. **<u>Testing Standards and Calibration</u>** All testing services shall be conducted in strict compliance with BHEL/ customer-approved Field Quality Plans (FQPs) and relevant standards, including Indian Standards (IS), ASTM Standards, or other specified international standards. Testing methodologies must adhere to prescribed procedures, ensuring accuracy and precision in results. The Service Provider shall maintain all necessary reference standards, the latest IS codes, ASTM standards, testing manuals (in soft copy), and calibration certificates at the laboratory. Equipment calibration shall be regularly conducted through NABL-accredited laboratories, ensuring traceability of measurements.
2.8.3	**Experienced QA/QC engineers/ Lab Technician/ Lab Assistant shall be arranged by contractor for their scope of work.** CV with a covering letter from the Contractor (certifying that the candidate has been interviewed and all supporting documents verified) in line with the requirements along with copy of proof of identity and address, academic and professional qualifications and experience shall be submitted to BHEL for approval before deployment to project site. Interview (Physical/telephonic/Video Conferencing) shall be conducted by BHEL before acceptance / approval of the personnel, if so desirous. Verification of certificates of selected candidates from concerned institutions/board will be carried out by the Contractor (If required by BHEL) at the cost of the Contractor. Approval or Rejection of the candidates shall be sole discretion of BHEL and shall be binding on the Contractor. In case of rejection of any candidate by BHEL, Contractor shall submit the details of alternate candidates without any delays and no claim for compensation / time extension in this regard will be entertained.

	Post deployment approval shall not be permitted nor any deviation accepted. The candidate shall be required to produce all original certificates for verification purpose. Any mismatch will render to the rejection of candidate The following modality shall be followed for the above: - a) The Quality Manpower shall report directly to BHEL Project Site Quality Head. b) Contractor shall deploy only skilled and highly experienced personnel and seek prior approval of BHEL-Region Quality Department before deployment. c) Periodic examination of deployed quality manpower functioning shall be conducted by BHEL-Region Quality Department.
2.8.4	**Initially Mix design** for various grade of concrete shall be provide by BHEL, based on Mix Design Report Contractor shall conduct trial mixes. The approved design mix shall be followed by the bidder. However, in case any mix design is required to be carried out due to change in brand of cement/change in source of raw materials during any stage of the project, the same shall be in bidder's scope and to be carried out from NCCBM / IITs / NITs / other reputed laboratories approved by CUSTOMER/BHEL. Contractor has to ensure adding of high grade PCE based admixture to minimize the cement content in line with ASTMC 494 as advised by BHEL time to time without any additional cost.
2.8.5	All other tests related to MDD for backfilling, road sub-base, etc, slump, cube for concrete and mortar, water, etc have to be carried out by the contractor from above mentioned laboratories as advised by BHEL/Customer without any extra cost to BHEL.
2.8.6	The following specifications of PCE-type high performance super plasticizer shall be used for concrete works as per BOQ item.
2.8.6.1	High performance super plasticizer PCE-based water reducing admixture of Type-G/F as per ASTMC-494 of approved make FOSROC/STP/SIKA/BASF or Equivalent having minimum water reduction capability of 30%. The performance compliance of the Super-plasticizer should be ensured based on the following tests: a) Marsh cone test for optimum dosage of admixture with specific brand of cement. b) Slump retention test of concrete. c) Water reduction capability test by doing trial mix. d) Rheological properties of fresh concrete on trial mix.
2.8.7	In case ambient temperature is greater than 32 Degree Celsius, Placement temperature should be controlled with necessary temperature correction of concrete by introducing Chiller Plant along with Batching Plant or by adopting ice concrete. If ice is used, the ice water source test report shall be provided for review and approval of BHEL/Customer prior to use. **(Note: -Contractor may make alternative arrangement for temperature control of fresh concrete.)**

2.9.0	**Fabrication & Erection Clause:**
2.9.1	The work to be carried out at quoted / accepted rates by the Contractor under the scope of these specifications covers the complete work of handling, loading and transporting of materials from project stores sheds / storage yards to site of erection or preassembly yard and unloading at pre-assembly area/erection site, checking, cleaning chipping and levelling of foundations, providing packers and shims/pre-assembling of equipment at the preassembly yard, inspection, minor rectification, preservation, erection, levelling, and other adjustments, cutting, edge / surface preparation, welding, fixing, grinding, wherever needed (as and where required). Bidder must acquaint himself to the locality and power station and the planning must be in line with the clear understanding that the project is inside an existing unit and all procedures and norms of the land/owner has to be followed. No delay/justification shall be accounted due to above.
2.9.2	The works to be performed under this contract consist of providing all labour, supervision, material, scaffolding, construction equipment's, tools and plants, temporary works, supplies including Consumables, transportation and all incidental items not shown or specified but reasonably implied or necessary for the proper completion of work in all respects. Testing of all materials etc. are included on the rates of items of work. Works shall be carried out only with approved structural erection drawings. The unit rates shall include all resources, consumables, equipment, fixtures, labour, construction plant, temporary works and everything whether of permanent or temporary nature necessary for the completion of job in all respects.
2.9.3	The bidder should fully apprise himself of the prevailing conditions at the proposed site, climatic conditions including monsoon pattern, local conditions, soil strata and site-specific parameters and shall include for all such conditions and contingent measures in the bid, including those which may have not been specifically brought out in the specifications.
2.9.4	The quantities indicated in the tender specification are approximate and are liable for variation at the discretion of BHEL. The work executed shall be measured and priced as per the unit rate arrived at for each work area as mentioned in the relevant clauses.
2.9.5	Supervisors / Engineers, consumables etc., required for the scope of work shall be provided by the contractor. All the expenditure including taxes and incidentals in this connection will have to be borne by agency unless otherwise specified in the relevant clause. The contractor's quoted rates should be inclusive of all such contingencies.
2.9.6	It shall be specially noted that, the contractor may have to work round the clock (24x7) or may have to deploy additional manpower/resources to achieve the completion schedules / plans / targets during the entire course of erection and commissioning works, which may involve considerable expenses including overtime. Hence contractor's

	quoted rate shall take into consideration of all expenses that will be incurred for such arrangement of personnel including labours, engineers / supervisors, T&Ps etc. Time is the essence of contract. Night shift working is envisaged for works not hazardous in nature with due permission of BHEL like- Erection works at low heights, Material shifting, Preassembly works etc.
2.9.7	The terminal points can be inferred from the relevant drawings and any further clarifications can be obtained/decided by BHEL and that is final and binding on the contractor for deciding the scope of work and effecting the payment for the work done up to the terminals. Carrying out work as per the specification between equipment constituting terminal points, whether the terminal equipment fall within the scope of work/specification, contractor shall carry out the terminal joints at either end.
2.9.8	The work shall conform to dimensions and tolerances given in various drawings and quality manuals provided by BHEL. If any portion of work is found to be defective in workmanship not conforming to drawings or other stipulations, the contractor shall dismantle and redo the work duly replacing the defective materials at his cost, failing which the job will be carried out by BHEL by engaging other agencies / departmentally and recoveries will be affected from contractor's bill towards expenditure incurred including BHEL's overhead charges (5%).
2.9.9	No member of the already erected structure/ platform, pipes, grills, platform, other component and auxiliaries should be cut without specific approval of BHEL engineer. In case it is necessary to cut, the contractor shall take prior approval of BHEL. If approved, after completion of work the contractor rectify / repair in a manner acceptable to BHEL / Customer without any additional cost.
2.9.10	**BHEL storage yard shall be located outside the plant boundary approx.12km away from the project premises**. All materials have to be transported from storage yard to construction area by the contractor at his own cost, using own **Pick & Carry Crane (Farana)**, crane and trailer.
2.9.11	VOID
2.9.12	During the course of erection, certain rework / modification / rectification / repairs / fabrication etc will be necessary on account of feedback/revision from various relevant sources, and also on account of design discrepancies/ alterations, manufacturing defects, site operations/ maintenance requirements. This will also include modifications / re-works suggested by BHEL / customer / other inspection group. Contractor shall carry out such rework / modification / rectification / fabrication / repairs etc promptly and expeditiously.
2.9.13	The scope of work covered under this specification is of highly sophisticated nature, requiring the best quality workmanship, engineering and construction management including high standard safety management (as per relevant clause of tender document)

	and green belt management (Project Management, HSE & Quality etc.). The contractor should ensure successful and timely completion of the work. The contractor must have adequate quantity of tools, construction aids, equipment etc., in his possession. He must also have on his rolls adequately trained, qualified and experienced supervisory staff and skilled personnel. The manpower deployment identified by contractor shall match with above scope of works. **(Refer HSE Manual)**. Contractor shall execute the work as per sequence and procedure prescribed by BHEL at site. The erection manuals which are available with BHEL site office are to be referred for compliance and guidance before taking up the work. Any failure to comply with the above might lead to rework and the cost for the same shall be borne by the contractor only. BHEL engineer, depending upon the availability of materials, fronts etc., will decide the sequence of erection and methodology. No claims for extra payment from the contractor will be entertained on the grounds of deviation from the method/sequence of erection adopted in erection of similar jobs or for any reason whatsoever.
2.9.14	Furnishing samples of all materials required by the engineers for testing/inspection and approval for use in the works. The samples may be retained by the engineer for final incorporation in the works.
2.9.15	Furnishing test reports for the products used or intended to be used, if called for the specifications or if so desired by the engineer.
2.9.16	Giving all notices, paying all fees, taxes, statutory clearances/license/Certificates (like T&P load test, etc), etc., in accordance with the general conditions of contract, that is required for all works including temporary works is in the scope of bidder.
2.9.17	Arranging manufacturer's supervision for items of work done as per manufacturer's specifications when so specified.
2.9.18	The contractor shall provide the owner/BHEL such an 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.
2.9.19	Providing all incidental items not shown or specified but reasonably implied or necessary for the successful completion of the work in accordance with contract.
2.9.20	Arranging for joint checking (with BHEL / BHEL's Customer / Consultant) of all site construction activities Preparation of joint protocols for each & every activity and maintaining quality records for audit/inspection as per approved FQP by BHEL.
2.9.21	**Contractor shall set up suitable guarded storage facilities.** The plant is under operation and open land (very limited space) for storage shall be provided by BHEL on free of cost basis as per availability. You shall maintain one centralized fenced store cum bar bending yard.

	Contractor shall ensure the Storage of only those material at site which will be erected/Pre-assembled within 10 days OR as directed by BHEL Engineer. Any wastage due to lapse of storing shall be debited to contractor with 5% overhead.
2.10	**HEIRARCHY:**
2.10.1	In case of any conflict/deviations amongst various documents, the order of precedence shall be as follows: 1.Items Description in BOQ Cum Rate Schedule 2.Technical Conditions of Contract (TCC) 3.Customer's Technical Specifications (Section-C) 4.BHEL's Standard Specification (Section-D)

Sl. No	Description PART I	Scope		Remarks
		BHEL	Bidder	
3.1	**Establishment:**			
3.1.1	**For Construction Purpose:**			
a	Open space for office (as per availability inside project premises)	Yes		Location will be finalized after joint survey with owner.
b	Open space for storage (as per availability inside project premises)	Yes		Location will be finalized after joint survey with owner.
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 purpose of the bidder:**			
a	Land for Labour colony & accommodation of labour.		Yes	
3.2	**Electricity:**			
3.2.1	**Electricity for construction purposes (for Site/Project works only) 3 Phase 415/440 V**			
a	Single point source	**Yes**		Construction power shall be provided by BHEL free of cost at one point near the site at a distance of approx. 500M.
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	

Sl. No	Description PART I	Scope		Remarks
		BHEL	Bidder	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.2.2	**Electricity for office, stores, canteen etc. of the bidder**			
a	Single point source		**Yes**	Contractor has to make his own arrangements
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.2.3	**Electricity for living accommodation of the bidder's staff, engineers, supervisors, labour Hutment etc:**			**Contractor has to make his own arrangements**
a	Single point source		Yes	
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Payment/Duties and deposits including statutory clearances if applicable		Yes	
3.3	**Water Supply:**			
3.3.1	**For construction purposes:**			
a	Making the water available at single point	Yes	Yes	BHEL shall provide water supply free of cost (at single point source) for construction purpose However, contractor may initially make his own arrangement for water supply till source is obtained from Customer.
b	Further distribution as per the requirement of work including supply of materials and execution.		Yes	

Sl. No	Description PART I	Scope		Remarks
		BHEL	Bidder	
3.3.2	**Water supply for bidder's office, stores, canteen etc.**			**Contractor has to make his own arrangements**
a	Making the water available at single point		Yes	
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.3.3	**Water supply for Living Purpose**			**Contractor has to make his own arrangement**
a	Making the water available at single point		Yes	
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.4	**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 3. 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	***Communication facilities for site operations of the bidder***			
a	Téléphone, fax, internet, intranet, e-mail etc.		Yes	

Sl. No	Description PART I	Scope		Remarks
		BHEL	Bidder	
3.6	***Compressed air wherever required for the work***		Yes	
3.7	***Demobilization of all the above facilities***		Yes	
3.8	***Transportation***			
a	For site personnel of the bidder		Yes	
b	For bidder's equipment and consumables (T&P, Consumables etc.)		Yes	
3.9	**Fabrication & Erection Facilities**			
3.9.1	Engineering works for construction:			
a	Providing the erection/constructions drawings for all the equipment covered under this scope	Yes		
b	Drawings for construction methods	Yes	Yes	In consultation with BHEL
c	As-built drawings where ever deviations observed and executed and also based on the decisions taken at site		Yes	Changes are to be marked in drawing & handed over to BHEL on completion of work.
d	Shipping lists etc. for reference and planning the activities			Not Applicable
e	Preparation of site construction / erection schedules and other input requirements as per Form-14.	Yes	Yes	In consultation with BHEL
f	Review of performance and revision of site construction / erection schedules in order to achieve the end dates and other commitments	Yes	Yes	In consultation with BHEL
g	Weekly construction / erection schedules based on Sl. No. e		Yes	In consultation with BHEL
h	Daily work plan based on Sl. No. g		Yes	In consultation with BHEL

Sl. No	Description PART I	Scope		Remarks
		BHEL	Bidder	
i	Periodic visit of the senior official of the bidder to site to review the progress so that works is completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two months.		Yes	
j	Preparation of preassembly bay		Yes	
k	Laying of racks for gantry crane if provided by BHEL or brought by the contractor /bidder himself		Yes	

3.10	**Land/Open Space:**
3.10.1	Availability of land within plant boundary is very limited and the contractor has to plan and use the existing land considering the use of land by other Civil /mechanical/ electrical contractors and the storage of plant machineries and materials. The existing land shall be shared by all erection agencies. BHEL shall provide free of charge limited open space for office, storage shed and laydown area as and where made available by Customer. It is the responsibility of the contractor to construct sheds, fabrication yard, establish batching plant, provide all utilities and dismantle and clear the site after completion of work or as and when required, as a part of his scope of work.
3.11	**Labour and Staff Colony:** **Following are in the Bidder's scope of work for labour & staff colony:**
3.11.1	BHEL shall not provide any space or residential accommodation to the contractor for his staff or labour and the contractor has to make his own arrangements at his cost. Labour colony is to be developed by bidder for all the labourers required to be deployed for the works. Bidder has to identify the land for labour colony at their cost and no land will be given by BHEL for labour colony purpose. The contractor to develop/ construct labour colony/ hutment fulfilling the minimum requirements as specified by BHEL as well as meeting the statutory norms. Ownership of the labour hutment shall be of the contractor and contractor shall keep BHEL indemnified from any statutory obligations/ legal compliances w.r.t. labour hutment establishment during as well as after the completion of contract
3.11.2	Contractor shall ensure establishment & maintenance of workmen/labour colony in line with BHEL layout drawings & Guidelines **(As per Annexure A - Standard Guidelines for Worker's Accommodation / Establishments at BHEL-Project Sites).**

3.11.3	Land for labor colony shall be arranged by Contractor at their own cost as per availability outside project area. Necessary levelling/ dressing of land shall be done by the contractor. All arrangement for electricity and drinking/service water to be arranged by the contractor within his quoted price. The contractor shall provide adequate water arrangement for drinking/ washing/ bathing with required toilets, drainage system, and electrification etc. in labour colony at his own cost.
3.11.4	Development of Bidder's temporary staff colony and labour colony having adequate no. of rest rooms along with toilets & fencing etc.
3.11.5	All Civil and Structural work associated with drinking and service water for Bidder's labour and other personnel at the work site/colony/offices including pump houses, pipes, overhead tank, tube wells etc.
3.11.6	Providing and maintaining facilities for safety, welfare, drinking water and sanitation, hygiene, biennial health check-up etc. for construction workers at their workplaces as well as at labour & staff colonies.
3.11.7	Development and maintenance of above facilities for construction workers deployed by the Contractor shall solely rest with the Contractor.
3.12	**Installation of necessary amenities- and temporary infrastructure for construction activities at Project site locations.** Following are the minimum amenities to be provided by the bidder within the quoted price including necessary maintenance, removal/disposal of the same in environment friendly manner after its intended use/completion of scope of work: i. Labour rest sheds near work spot. ii. Canteen facility creation. iii. Drinking water facility. iv. Labour Bio toilets near work spot in sufficient nos. with regular cleaning & maintenance arrangement. Exclusive arrangement of Bio toilets to be made at site for ladies. v. Labour colony should have all hygienic condition, dining hall, toilets, proper sewerage system, good drinking water arrangements. vi. Recreational facilities, etc.
3.13	**Construction Power:**
3.13.1	**Construction power (three phase, 415 V/ 440 V**) shall be provided by BHEL free of cost at one point near the site at a distance of **approx. 500M within 06 months** from the date of start of work. Further, distribution shall be arranged by the contractor at his own cost and services.

	However, contractor has to deploy DG Sets to meet power requirement in case of delay in availability of single source or any kind of power interruptions during the course of the project at no extra cost to BHEL. If any other voltage level (other than normally available) is required, the same shall be arranged by the contractor from power supply as above. Contractor shall be responsible for fulfilment of all requirements including statutory requirements in this regard.
3.13.2	Contractor shall deploy and install required energy meter, cables, fuses, distribution boards, switchboards, bus bars, earthing arrangements, protection devices and any other installation as specified by statutory authority/act. Contractor shall also obtain approvals of appropriate authority and pay necessary fees, levies etc. towards the clearance of such installations, prior to use.
3.13.3	Sufficient power factor compensation equipment like capacitor shall be provided by contractor for reactive loads like welding machines etc. In case of any fine/penalty on account of low power factor, same shall be shared by contractor proportionately according to power consumption.
3.13.4	Contractor shall make necessary arrangements for onward distribution of construction power taking due care of surrounding construction activities like movement of cranes & vehicles, civil work, fabrication/construction/assembly/ erection etc. and safety of personnel. It may become necessary to relocate some of the installations to facilitate work by other agencies or by him.
3.13.5	It shall be the responsibility of the Contractor to provide, maintain the complete installation on the load side of the supply with due regard to the safety requirements at site. All cabling and installations shall comply in all respects with the appropriate statutory requirements. The installation and maintenance of this shall be done by licensed and experienced electrician.
3.13.6	While reasonable efforts will be made to ensure continuous electric power supply, interruptions cannot be ruled out and no claim from the Contractor shall be entertained on this account such as idle labour, extension of time etc. The Contractor shall adjust his working shift accordingly and deploy additional manpower, if necessary, so as to achieve the target.
3.13.7	Contractor to note that till construction power is made available by BHEL; contractor shall make his own arrangement like DG set etc. The contractor shall also take the approval/ permission of statutory authorities for his DG set installation. The Contractor has to make his own arrangement for the same as required to carry out the job under the scope of work within the quoted rate. Nothing extra shall be paid on this account of DG set up and running for construction and office, maintenance etc.

3.13.8	Contractor shall be well equipped with back-up power supply arrangement like DG set and diesel operated welding machine etc. to tackle situations arising due to failure of supplied power, so as to ensure continuity and completion of critical processes that are underway at the time of power failure or important activities planned in immediate future.
3.13.9	BHEL is not responsible for any loss or damage to the Contractor's equipment as a result of variations in voltage or frequency or interruptions in power supply.
3.13.10	The bidder will have to procure & install General mobile illumination system during construction right from start of his work. This system will include temporary pole lighting, portable lighting towers with DG back-up, within the quoted price. The illumination should be such that minimum illumination requirement as specified by Indian standards for general illumination is maintained.
3.13.11	Supply of electricity shall be governed by Indian Electricity Act and Installation Rules and other Rules and Regulation as applicable. The contractor shall ensure usage of electricity in an efficient manner and the same may be audited by BHEL time to time. In case of any major deviation from normally accepted norms is observed, BHEL will reserve the right to impose penalty as deemed fit for such cases.
3.14	**Construction water:**
3.14.1	BHEL shall provide water supply free of cost (at single point source) for construction purpose as and when made available by customer within months from date of start of work for construction purpose. Contractor has to make arrangement of further distribution. However, contractor shall make alternate arrangement of construction water till the same is made available by BHEL.
3.14.2	The Contractor should make arrangements for storage of sufficient quantity of water required for work. The agency should also construct sumps (if required) of suitable size for storage of construction water as per their requirement for use in construction purposes.
3.14.3	Contractor to satisfy himself that the water drawn by him is fit for construction / consumption and adequately treat such water at his cost when it is not found fit for the said purposes. Necessary tests as per FQP to be carried out time to time and reports to be submitted to BHEL.

4.0 Tools and Plants: (Per Package Requirement)

Nos. of T&Ps to be deployed at site shall be decided w.r.t. monthly plan and review format (F-14) based on site requirement. Below given Nos. are tentative for planning purposes by the bidder.

Sl. No.	Description of T&P	Quantity
A	**T&Ps for Civil Works**	
1	Concrete Transit Mixer	Min. 06 Nos.
2	Batching Plant **(60 Cum/Hr.)** with Sufficient Capacity of Silos.	01 No.
3	Hydraulic Excavator /Poclain	02 Nos
4	Poclain with rock breaker arrangement	02 Nos
5	Concrete Pump of Suitable Capacity with Sufficient lift **(Minimum 80-100m)** in order to pour concrete at roof of Transfer Points	01 No.
6	Mini excavator with dozing blade and auger arrangements and mini bucket arrangements	As per Requirement
7	Back Hoe Loader (JCB)	02 Nos.
8	Dumper (with capacity 16 to 25 mt) However, may need more as per requirement.	6 Nos. Balance as per requirement
9	Concrete Boom placer **min. 35m long**	01 No
10	Vibrators (electrical/diesel)	10 Nos.
11	Self-priming Dewatering pump of various capacity (Diesel/Electric) From 2 HP to 7.5 HP	05 Nos.
12	Curing / dewatering pump – 1.5 / 2 HP	7 Nos.
13	De-watering pump (diesel operated) – 50 HP & 10 HP	10 HP 2 nos, 20 HP 1 nos 50 HP 1 nos
14	Pneumatic rock breaker with jack hammer	04 Nos.

15	Ply Shuttering board with adequate scaffolding supporting structure – (Old steel shuttering plates will not be allowed).	As per requirement & as per the direction of Engineer In charge.
16	Farana crane (Required Capacity) *Note- Hydra is not allowed at project site	Min. 01 Nos.
17	Trailer (min 20MT Capacity)	Min. 01 No.
18	Tractor mounted grader/ loader	As per requirement
19	Scaffolding Pipes, Clamps / Swivel Couplers (One/Two Way), Props, Jacks, Screw Heads, MS Pipes, Wooden Battens, Planks, Bullies, H Frames, Tie Rods with Nuts, Adjustable Achro Span (Considering Individual Areas)	Scaffolding Pipes with clamps– Min. 1500 Nos. for execution purpose for safety related other than Scaffolding Pipes – As per requirement.
20	Reinforcement bending machine	04 Nos.
21	Reinforcement cutting machine	06 Nos.
22	Plate compactor	02 Nos.
23	Earth Compactor- 3MT Capacity	01 Nos.
24	Total Station with prim and stand	02 Nos.
25	Auto level & staff	03 Nos.
26	Vibro roller	01 No
27	Dozer (D-80) capacity	01 Nos
28	Water Tanker with sprinkler attachment	01 No.
29	All equipment for area Lightning like LED/Halogen bulbs and Portable light Towers etc.	As per Requirement
30	Computer with printing/photocopy & CD writing facility	As per Requirement
31	Man lift crane of Minimum 20m reach	As per Requirement
32	DG Set of 125 KVA Capacity	01 No.
33	DG Set of 250 KVA Capacity	01 No.
34	Fully mechanized paver fitted with electronic sensors	As per requirement

35	Reinforcement scrap straightening machine	As per requirement
36	Portable Welding machine	As per requirement
37	Builder Hoist	2 nos
38	Electric winch 5T capacity	4 nos
39	Movable tower crane	As per requirement
40	Plate vibrators for slab concrete	2 nos
41	T&Ps for hard rock blasting arrangements (controlled blasting)	As per Requirement
B	**T&Ps for Structural Fabrication & Erection works**	
1	150 MT Capacity Crawler Crane	01 No.
2	75 MT Capacity Crawler/Tyre Mounted Crane	01 No.
3	Low bed trailer Low bed trailer with min 70-100 feet span_60 MT	Minimum 01No.
4	Trailers with pulling unit_40 MT	Minimum 01 No.
5	Trailers with pulling unit_20 MT	Minimum 01 No.
6	Farana crane (Required Capacity) ***Note- Hydra is not allowed at project site**	04 No.
7	Gantry Crane For Fabrication Yard (60 T-1 no. & 40 T-1 no)	As per requirement
8	Fabrication Bed Material	As per requirement
9	Lathe Machine	As per requirement
10	SAW Machine	As per requirement
11	H-Beam Assembler	As per requirement
12	Tandem Welding Machine	As per requirement
13	Power/Hand winch	As per requirement
14	Welding Machine	As per requirement
15	Heating Oven	Minimum 03 No.

16	Portable Oven	As per requirement
17	Portable grinding machine of various sizes	As per requirement
18	Calibrated Power driven bolt tightening machines	1 Nos.
19	Manual Torque tightening machine	1 Nos.
20	Torque calibrator	As per requirement
21	Bolt Tension Calibrator	As per requirement
22	Impact wrench with socket (Pneumatic)	As per requirement
23	3-phase distribution board with complete set up for drawl of construction power	As per requirement
24	Power cable for drawl of construction power	As per requirement
25	Self-drilling cum tapping machine for screws	As per requirement
26	Radiography arrangement with radioactive isotope source	As per requirement
27	Pug Cutting machines	As per requirement
28	Plasma Cutting Machine	1 no
29	Rolling Machine	1 no
30	Chain pulley blocks	As per requirement
31	Turn Buckles and Huck-Chuks	As per requirement
32	Scaffolding materials with clamps for cladding fixing, etc works	As per requirement
33	Hoisting and pulley devices/pulleys	As per requirement
34	SPANNERS / EYE BOLTS (OF ALL SIZES)	As per requirement
35	Wooden/Concrete sleeper 1.5-2.0 Mtr length	As per requirement
36	Sufficient quantity of steel ladders for approach up to the top of each erected column to be required during erection of columns.	As per requirement

37	Suspended working platform Size :7mX1mX0.5m, Rated load 800 kg to 1000 Kg **(For Cladding Fixing Works)**	01 Nos.
38	Theodolite of required accuracy	Minimum 02 Nos.
39	Air compressor/blower (electric/diesel operated)	Minimum 01 Nos.
40	Hydraulic Jack set for Tank Erection	As per requirement
41	Fill pump	As per requirement
42	Hydraulic Test pumps/ Hand pumps Along with Suitable/ different ranges of calibrated Pr. gauges	As per requirement
43	Shot Blasting Cleaning set up with copper slag	As per requirement
44	Stud Welding Machine	As per requirement
45	UT Machine	As per requirement

S.No.	**List of suggestive safety Equipment /PPEs to be included in List of minimum T&P:**	**Remarks**
1.	Safety Net (Conforming IS 11057:1984) Safety Net (Net Size: 10m x 5m, Mesh Size: 25 mm, Mesh Rope: 2mm double cord, Border/Tie Cord: 12mm diameter polypropylene rope (tested as per IS: 5175). Two meters length shall be provided at all four corners.	Min-50 Nos
2.	**Fall Arrester** 'Rope grab fall arrester' & anchorage line. Anchorage Line: 14mm- 16 mm diameter, three strand twisted Polyamide rope. Rope Grab fall arrester: Openable & Guided type Fall Arrestor (on flexible line) conforming EN 353-2 & works on 14-16 mm diameter polyamide rope. Material: Nickel Chrome plated Steel Connector: Karbiner conforming to EN 362 (Minimum Strength 22 KN), material: Steel Retractable Fall arrestor Block (Range 6 Mtr to 15 Mtr)	Min. 25 nos. of Rope Grab Fall arrester' and Karbiner each. Min 15 nos. anchorage line, 30 metre long each, 05 nos. anchorage line, 40 metre long each Min 25 Nos
3.	**Horizontal life line** Stainless Steel Wire rope of 8mm diameter. Minimum six nos. of steel U-bolt clips are required for clamping each wire rope to a rigid support (03 nos. of U-bolt clips at each end).	Min 05 nos. of wire rope, each 40m long. Min 25 nos. of wire rope, each 25 metre long.
4.	**Ladders on column**	Cumulative length of ladders is 300 metres

	The minimum design live load on metallic ladder shall be a single concentrated load of 100 kilo grams. All rungs shall have a minimum diameter of 16mm to 25 mm, and minimum clear length of rungs shall be 40.6 centimetres. The distance between rungs shall not exceed 30.5 centimetres. Each ladder shall have maximum height of 9.0 metre. The ladder shall have proper fastenings for attaching it to a column using positive means such as bolt, weld or other type of fasteners.	
5.	Height Rescue Kit and Confined space rescue kit	1 No each
6.	Lux Meter & Breathe Analyser	2 Nos each
7.	Multi Gas Meter	1 No
8.	ELCB & RCCB Tester	1 No
9.	Earth Resistance meter	1 No
10.	Scaffolding materials as per EN 74 for hard barricading	As per requirement
11.	Oxygen Meter	1 No
12.	Fire Blanket	As per requirement
13.	**Fire resistant tarpaulins**	As per requirement
14.	**Safety Posters as per BHEL Guidelines**	As per requirement and instruction of BHEL
15.	**Fire Extinguishers:** ABC – 6 Kg: 50 Nos, Co2 – 4.5 Kg: 20 Nos, Foam – 9 Kg: 5 Nos. Fire Bucket (set of ¾ buckets) with stand – 10 Nos	
16.	Rubber Mat as per IS 15652	Min 200 Sqm
17.	Electrical rubber gloves	As per requirement
18.	Water Sprinkling tanker for dust suppression	2 Nos.
4.3	**Measuring and Monitoring Equipment (MMEs):** To be finalized as per site requirement.	

4.4	**T&Ps (excluding Cranes of 75T, 150T and above capacity) shown in the above-mentioned list is suggestive requirement**. However, mobilization schedule as mutually agreed at site for major T&Ps, have to be adhered to. **Numbers/time of requirement will be reviewed from time to time at site and contractor will provide required T&Ps/equipment to ensure completion of entire work within schedule/target date of completion without any additional financial implication to BHEL.** Contractor will give advance intimation & certification regarding capacity etc. prior to dispatch of heavy equipment. Also, on completion of the respective activity, demobilization of T&Ps in total or in part can be done with the due approval of Engineer-In-Charge. Retaining of the T&Ps during the contract period will be mutually agreed in line with construction requirement.
4.5	The contractor shall arrange crane operator, diesel, petrol and other consumables including electrical / water / air connections required for the tools and plants, equipment etc. Preventive and routine maintenance of T & P are also to be arranged by the contractor at his cost without any delay. Required number of experienced mechanics and helpers for routine maintenance of the above T&Ps shall be provided by the contractor within his quoted rate.
4.6	Any heavy equipment (Crane, Winch machine etc.) manufactured less than 15 years from the current year shall be only allowed to be used at project site. Pre-Safety Inspection of the equipment by safety Deptt. Shall be done before mobilizing the equipment at project site.
4.7	Other terms and conditions regarding T&Ps to be deployed by Contractor, shall be as per clause No. 4.2 of SCC

5.1 **LIST OF T&P TO BE PROVIDED BY BHEL FREE OF HIRE CHARGES ON SHARING BASIS:**

5.2

SN	DESCRIPTION	QUANTITY	REMARKS
1	CRAWLER/ TYRE-MOUNTED CRANE OF CAPACITY 75 MT & 150MT CRANE	Over and above quantity mentioned in Chapter – IV – (T&PS AND MMES TO BE DEPLOYED BY CONTRACTOR.)	BASED ON WORK REQUIREMENT
2	CRAWLER/ TYRE-MOUNTED CRANE OF CAPACITY OVER AND ABOVE 150 MT CRANE	As per requirement	BASED ON WORK REQUIREMENT

5.3 Note:

1. The contractor shall plan to execute the work by deploying cranes mentioned in Chapter-IV of TCC. However, BHEL at its discretion may provide additional cranes of capacity 75 MT and above to expedite the work. The decision of BHEL Site In-charge / Construction Manager in this regard shall be final.
2. The cranes may be BHEL owned or may be obtained on hiring basis including operating and maintenance crew.
3. Operator and O&M for BHEL owned crane will be provided by BHEL.
4. Operator and O&M for hired crane will be provided by the hiring agency.
5. Contractor shall provide the fuel for BHEL (Hired/owned) provided cranes for his use.
6. Contractor shall provide necessary manpower assistance for initial and final assembly & dismantling and for subsequent operations of boom extension and reduction during execution of work. Contractor shall also make necessary arrangements like laying of special sleeper beds and steel plates (material shall be provided by BHEL) for movement and operation of the crane (including initial movement/marching of crane within the plant premises).

5.4	Cranes provided by BHEL will be on sharing basis with other agencies / contractors of BHEL. The allocation of cranes shall be the discretion of BHEL engineer, which shall be binding on the contractor. Cranes will be deployed at appropriate time and location within plant premises, as decided by BHEL for suitable duration and intended purpose. Augmentation of BHEL T&P under special circumstances shall be discretion of BHEL.

6	**Time Schedule and Mobilization:**
6.1	**Initial Mobilization and Time Schedule:** After issue of LOA (though Fax/courier/email) the contractor shall report to the Construction Manager/Site In-Charge of BHEL at site within seven (07) days from date of LOA and submit detailed mobilization plan to start work within 15 days from date of LOA; unless instructed by BHEL to differ start of work in writing. The contractor has to subsequently augment his resources in such a manner that the entire works are completed within the contract period of **Thirty-Two (32) Months** from the date of start of work in a manner required by BHEL to match with the project schedule. Date of Start of work shall be considered as 15 days after date of LOA or as instructed by BHEL in writing.
6.2	**Schedule of Completion:** The entire work under the scope of this contract shall be carried out in such a manner that the following listed major milestones are achieved as per completion schedule given against each activity & released for erection by other agency.

6.3

Sub-Clause No	Activity	Schedule completion from date of start of work
6.3.1	**Civil Works**	
6.3.1.1	**Boiler Foundations (M1)**	**6th Month**
6.3.1.2	TG Raft	7th Month
6.3.1.3	ESP Foundations	7th Month
6.3.1.4	Bunker Bay Foundation	9th Month
6.3.1.5	PH Foundations(A-B-C Row)	9th Month
6.3.1.6	Duct Foundations (Boiler to ESP)	9th Month
6.3.1.7	Mill Foundations	10th Month
6.3.1.8	**TG Deck (M2)**	**13th Month**
6.3.1.9	FD Fan	16th Month
6.3.1.10	PA Fan	16th Month
6.3.1.11	Duct Foundations (ESP to ID)	16th Month
6.3.1.12	ID Fan	16th Month
6.3.1.13	Pipe & Cable Rack Foundations	20th Month
6.3.1.14	ESP Control Room Building	22nd Month
6.3.1.15	CCR Building	24th Month
6.3.1.16	Power House Building	28th Month
6.3.1.17	Road & Drains	31st Month

	6.3.2	**Structural Works**	
	6.3.2.1	Bunker Bay Assembly	14th Month
	6.3.2.2	PH Columns(A-B-C Row)	16th Month
	6.3.2.3	Readiness for EOT Erection	16th Month
	6.3.2.4	Mill & Bunker Building including bunker and its supporting structures	24th Month
	6.3.2.5	Pipe & Cable Rack	25th Month
	6.3.2.6	Misc Structure Erection	30th Month
	6.3.3	**Completion of all works & handing over**	32nd Month

6.3	The above schedule is only tentative. The above schedule shall be advanced, if there are requirements to advance the project schedule and the civil works in the scope of the contractor is to be advanced to meet the project requirement. No extra payment whatsoever shall be paid on this account.
6.4	The Contractor shall submit a detailed L-2 schedule for execution of the complete works covered under the scope of this tender at the BHEL site within fifteen (15) days from the date of issuance of the Letter of Acceptance (LOA). The L-2 schedule shall be reviewed and approved by the BHEL site. **The L-2 schedule, duly approved by the BHEL Site-In-Charge/ Construction Manager, shall be a pre-requisite for signing of the contract.** The Contractor shall make all efforts to achieve the targets stipulated in the detailed (L-2) schedule and shall deploy and augment the required resources, as necessary, to meet the approved schedule.
6.5	In order to meet the above schedule in general, and any other intermediate targets set, to meet customer/ project schedule requirements, Contractor shall arrange & augment all necessary resources from time to time on the instructions of BHEL Engineer.
6.6	**Intermediate milestones:**
6.6.1	Two Major Intermediate Milestones are identified as M1 and M2 above.

Milestones	**Activity**	**Schedule of completion from start of work**
M1	Boiler Foundations (M1)	6th Month
M2	TG Deck (M2)	13th Month

6.7	**Provision of Penalty in case of slippage of Intermediate Milestones:** In case of slippage of Two Major Intermediate Milestones, mentioned as M1 & M2 above, delay Analysis shall be carried out on achievement of each of these two Intermediate Milestones in reference to F-14.
6.7.1	In case of slippage of these identified Intermediate Milestones, Delay Analysis shall be carried out on achievement of each of these two Intermediate Milestones.
6.7.2	In case delay in achieving M1 Milestone is solely attributable to the contractor, 0.5% per week of executable contract value*, limited to maximum 2% of executable contract value, will be withheld.
6.7.3	In case delay in achieving M2 Milestone is solely attributable to the contractor, 0.5% per week of executable contract value*, limited to maximum 3% of executable contract value, will be withheld.
6.7.4	Amount already withheld, if any against slippage of M1 milestone, shall be released only if there is no delay attributable to contractor in achievement of M2 Milestone.
6.7.5	Amount required to be withheld on account of slippage of identified intermediate milestone(s) shall be withheld out of respective milestone payment (corresponding RA Bill) and balance amount (if any) shall be withheld @10% of RA Bill amount from subsequent RA bills.
6.7.6	Final deduction towards LD (if applicable), on account of delay attributable to contractor shall be based on final delay analysis on completion/ closure of contract. Withheld amount, if any due to slippage of identified intermediate milestone(s) shall be adjusted against LD or released as the case may be.
6.7.7	In case of termination of contract due to any reason attributable to contractor before completion of work, the amount already withheld against slippage of intermediate milestones shall not be released and be converted into recovery.
6.8	Common activities shall be completed in Phase wise manner/ Instruction of Engineer within the Contractual time.
6.9	Above milestone dates has to be completed in parallel.
6.10	Bidders are requested to submit Resource deployment plan Area wise with detail program in line with above schedule in the form of Bar Chart/ MS project planer along with their offer.
	*Executable Contract Value - Value of work for which inputs/ fronts were made available to contractor and were scheduled for execution till the date of achievement of that milestone.

6.11	**COMPLETION OF WORK AND COMMENCEMENT OF GUARANTEE PERIOD**
6.11.1	The works shall be completed to the entire satisfaction of the Engineer and in accordance with the completion schedule as specified in the Contract, and all unused stores and materials, tools, plant, equipment, temporary buildings, site office, labor hutments and other things shall be removed and the site and work cleared of rubbish and all waste materials and delivered up clean and tidy to the satisfaction of the Engineer at the Contractor's expenses.
6.11.2	BHEL shall have power to take over from the Contractor from time to time such sections of the work as have been completed to the satisfaction of the Engineer. Such work however shall not be treated as have been completed until the remaining / pending works are executed to the satisfaction of Engineer.
6.11.3	The Engineer shall certify to the contractor the date on which the work is completed and the date thereof for commencement of Guarantee Period. Guarantee Period shall be as given in GCC.

7.0	**Terms of Payment:**
7.1	**Progressive Payment/ Final Payment:** The payments for works under the scope of this contract shall be as per clause no 2.6; 2.22; 2.23 of General Conditions of Contract and Volume-IB, Chapter-X of SCC. **Measurements shall be recorded and certified building/structure-wise. Separate measurement sheets shall be prepared for each applicable building/structure and shall form part of each Running Account (RA) Bill.** **A) <u>Additional Payment Terms for Stipulated Buildings/Structures: -</u>** **<u>Payment for Civil works of Steel Framed Buildings/Structures Like Boiler, Mill & Bunker, ESP, ID Duct, etc:</u>** **a.** 75% of the certified RA Bill value for the respective building/structure shall be payable upon certification of measurements by the BHEL Engineer-in-Charge. **b.** Balance 25% shall be released upon certification by the BHEL Engineer-in-Charge as detailed below: - i. 15% on completion of raft and pedestals of the building/structure. ii. 10% on completion of backfilling & handing over to mechanical agency for erection works. **<u>Payment for Civil works of RCC Framed Buildings:</u>** a. 75% of the certified RA Bill value for the respective building/structure shall be payable upon certification of measurements by the BHEL Engineer-in-Charge. b. Balance 25% shall be released upon certification by the BHEL Engineer-in-Charge as detailed below: - i) 10% on completion of RCC Framework including roof slab & parapet wall. ii) 10% on completion of all internal finishing works like-brickwork, plastering, flooring, floor finish, false ceiling, doors & windows, painting, plumbing, sanitary & handing over with lock & key for electromechanical erection/usage of BHEL/Customer. iii) 5% on completion of external finishing works like roof treatment, rain water pipes, outside paint, plinth protection, garland drains, approach to building and closure of punch points for the building. **<u>Note 1:-</u>**

	Applicable Buildings/Structures falling under this additional payment terms category shall be as follows: - 1. Main Power House Building except TG Foundation (Raft, Columns and Top Deck), MDBFP and TDBFP 2. Mill & Bunker 3. Boiler 4. ESP 5. ID Ducts 6. ESP Control Room Building 7. Fan (PA, FD, ID & SA) **Note 2: -** **Amount linked to Safety Aspect/ Compliance to Safety Rules (as applicable) shall be billed, withheld / released / deducted as per the procedures defined in the NTPC Safety Rules document.** All other terms and conditions shall be governed by Clause Nos. 2.6, 2.22, and 2.23 of the General Conditions of Contract (GCC) and Volume-IB, Chapter-X of the Special Conditions of Contract (SCC).
7.1.1	**<u>Documents required for RA Bill:</u>** • GST Complied Invoice of the work done as per approved BBU. • WAM -6 for RA Bill. • Jointly signed Measurement sheet. • Power of Attorney before submission of Bill. • Validity of Bank Guarantees as applicable under the contract. • Certified Quality Documents as per FQP. • HR/IR compliance documents: i. Wages payment sheet as per applicable minimum wages. ii. Proof of PF contribution submission. iii. Proof of ESI/ WC contribution submission iv. Proof of Bonus payment as per Bonus Act if applicable. v. Proof of EL payment if applicable. vi. Any other statutory document if applicable. vii. Royalty challan and statutory documents shall be submitted along with RA Bills for processing of Bills.
7.1.2	**<u>Documents required for Final Bill:</u>**

	The final bill is drawn as soon as the entire work is completed. From the final amount due, all amounts already claimed up to the previous running account bill will be deducted. It should be ensured that in the final bill the following additional particulars have been provided: • Final Bill in WAM-7 Format. • 'No claim' certificate from the contractor. • Clearance certificates where ever applicable viz. Clearance Certificates from Customer, various Statutory Authorities like Labour department, PF Authorities, Commercial Tax Department, Mining Dept(if applicable), etc. • Final Material re-conciliation statement duly approved by BHEL. • Indemnity Bond as per prescribed format. • Deviation statement showing the difference between the actuals and as per the contract. • Final Delay Analysis.
7.2	**SECURED RECOVERABLE ADVANCES:** **Interest Free Secured Mobilization Advance as per GCC Clause No. 2.13.1** will be payable under exceptional circumstances on certification of BHEL Construction Manager/Project Director at Site. Interest Free Mobilization Advance shall be disbursed in specifically mentioned stages of major resource mobilization as specified hereunder: 1. For Mobilization of Batching plant (1 No.), Excavator (1 Nos.) & Dumper (2 Nos), Transit Mixers (2 Nos.), JCB (1 Nos), Boom Placer/Concrete Pump (1 Nos.), Farana (1 Nos.) & DG Set (1 Nos.)- 2.0% 2. For Mobilization of Excavator (1 No.), Dumper (2 Nos), Transit Mixers (2 Nos.), Farana (2 Nos.), - 2% 3. For Mobilization of Crane (75 MT-1 No.), Trailer (1 No.), Installation and Erection of Site Infrastructure by contractor i.e. site office & stores. - 1% Note: 1. BHEL Site-CM/Project Director shall be the deciding authority for assessing the admissibility of advance payment to contractor. 2. In case contractor do not fulfil the agreed conditions of payment of 1st mobilization advance, BHEL Construction Manager will have the authority to not allow the 2nd mobilization advance to contractor.
7.3	The contractor shall maintain the labour colony for its workmen as per BHEL guidelines. 0.25 % of every RA Bill shall be linked on certification from BHEL for compliance with the guidelines of labour colony.

	Regular visit of workmen establishment shall be done by team from BHEL to ensure implementation of above guidelines. Any irregularities observed shall have to be rectified by agencies on immediate basis. In case, the report submitted by BHEL team is not satisfactory, necessary actions including recoveries (0.25% of RA Bill value) shall be done as per contract. In addition to the recoveries as per contract (0.25% of RA Bill value), expenses incurred (if any) for maintenance & rectification by BHEL shall be recovered from agency along with 5% overheads.

8.0	**TAXES & DUTIES**
8.1	The contractor shall pay all (save the specific exclusions as enumerated in this clause) taxes, fees, license, charges, deposits, duties, tools, royalty, commissions, other charges, etc. which may be levied on the input goods & services consumed and output goods & services delivered in course of his operations in executing the contract. In case BHEL is forced to pay any of such taxes/duties, BHEL shall have the right to recover the same from his bills or otherwise as deemed fit. However, provisions regarding **GST** on output supply (goods/service) and TDS/TCS as per Income Tax Act shall be as per following clauses.
8.2	**GST (Goods and Services Tax)**
8.2.1	GST as applicable on output supply (goods/services) are excluded from contractor's scope; therefore, contractor's price/rates shall be **exclusive** of GST. Reimbursement of GST is subject to compliance of following terms and conditions. BHEL shall have the right to deny payment of GST and to recover any loss to BHEL on account of tax, interest, penalty etc. for non-compliance of any of the following condition.
8.2.2	The admissibility of GST, taxes and duties referred in this chapter or elsewhere in the contract shall be limited to direct transactions between BHEL & its Contractor. BHEL shall not consider GST on any transaction other than the direct transaction between BHEL & its Contractor.
8.2.3	Contractor shall obtain prior written consent of BHEL before billing the amount towards such taxes. Where the GST laws permit more than one option or methodology for discharging the liability of tax/levy/duty, BHEL shall have the right to adopt the appropriate one considering the amount of tax liability on BHEL/Client as well as procedural simplicity with regard to assessment of the liability. The option chosen by BHEL shall be binding on the Contractor for discharging the obligation of BHEL in respect of the tax liability to the Contractor.
8.2.4	Contractor has to submit GST registration certificate of the concerned state. Contractor also needs to ensure that the submitted GST registration certificate should be in active status during the entire contract period.
8.2.5	Contractor/Vendor has to issue Invoice/Debit Note/Credit Note indicating HSN/SAC code, Description, Value, Rate, applicable tax and other particulars in compliance with the provisions of relevant GST Act and Rules made thereunder.
8.2.6	Vendor has to submit GST compliant invoice within the due date of invoice as per GST Law. In case of delay, BHEL reserves the right of denial of GST payment if there occurs any hardship to BHEL in claiming the input thereof. In case of goods, vendor has to provide scan copy of invoice & GR/LR/RR to BHEL before movement of goods starts to

	enable BHEL to meet its GST related compliances. Special care should be taken in case of month end transactions.
8.2.7	Vendor has to ensure that invoice in respect of such services which have been provided/completed on or before end of the month should not bear the date later than last working day of the month in which services are performed.
8.2.8	Subject to other provisions of the contract, GST amount claimed in the invoice shall be released on fulfilment of all the following conditions by the Contractor: - a. Supply of goods and/or services have been received by BHEL. b. Original Tax Invoice has been submitted to BHEL. c. Contractor/ Vendor has submitted all the documents required for processing of bill as per contract/ purchase order/ work order. d. In cases where e-invoicing provision is applicable, vendor/contractor is required to submit invoice in compliance with e-invoicing provisions of GST Act and Rules made thereunder. e. Contractor has filed all the relevant GST return (e.g. GSTR-1, GSTR-3B, etc.) pertaining to the invoice submitted and submit the proof of such return along with immediate subsequent invoice. In case of final invoice/ bill, contractor has to submit proof of such return within fifteen days from the due date of relevant return. f. Respective invoice has appeared in BHEL's GSTR - 2A for the month corresponding to the month of invoice and in GSTR-2B of the month in which such invoices has been reported by the contractor along with status of ITC availability as "YES" in GSTR-2B. Alternatively, BG of appropriate value may be furnished which shall be valid at least one month beyond the due date of confirmation of relevant payment of GST on GSTN portal or sufficient security is available to adjust the financial impact in case of any default by the contractor. g. Contractor has to submit an undertaking confirming the payment of all due GST in respect of invoices pertaining to BHEL.
8.2.9	Any financial loss arises to BHEL on account of failure or delay in submission of any document as per contract/purchase order/work order at the time of submission of Tax invoice to BHEL, shall be deducted from contractor's bill or otherwise as deemed fit.
8.2.10	TDS as applicable under GST law shall be deducted from contractor's bill.

8.2.11	Contractor shall comply with the provisions of e-way bill wherever applicable. Further wherever provisions of GST Act permits, all the e-way bills , road permits etc. required for transportation of goods needs to be arranged by the contractor.
8.2.12	Contractor shall be solely responsible for discharging his GST liability according to the provisions of GST Law and BHEL will not entertain any claim of GST/interest/penalty or any other liability on account of failure of contractor in complying the provisions of GST Law or discharging the GST liability in a manner laid down thereunder.
8.2.13	In case declaration of any invoice is delayed by the vendor in his GST return or any invoice is subsequently amended/altered/deleted on GSTN portal which results in any adverse financial implication on BHEL, the financial impact thereof including interest/penalty shall be recovered from the Contactor's due payment.
8.2.14	Any denial of input credit to BHEL or arising of any tax liability on BHEL due to non-compliance of GST Law by the Contractor in any manner, will be recovered along with liability on account of interest and penalty (if any) from the payments due to the Contactor.
8.2.15	In the event of any ambiguity in GST law with respect to availability of input credit of GST charged on the invoice raised by the contractor or with respect to any other matter having impact on BHEL, BHEL's decision shall be final and binding on the contractor.
8.2.16	**Variation in Taxes & Duties:** Any upward variation in GST shall be considered for reimbursement provided supply of goods and services are made within schedule date stipulated in the contract or approved extended schedule for the reason solely attributable to BHEL. However downward variation shall be subject to adjustment as per actual GST applicability. In case the Government imposes any new levy/tax on the output service/goods after price bid opening, the same shall be reimbursed by BHEL at actual. The reimbursement under this clause is restricted to the direct transaction between BHEL and its contactor only and within the contractual delivery period only. In case any new tax/levy/duty etc. becomes applicable after the date of Bidder's offer but before opening of the price Bid, the Bidder/Contractor must convey its impact on his price duly substantiated by documentary evidence in support of the same before opening of price bid. Claim for any such impact after opening the price bid will not be considered by BHEL for reimbursement of tax or reassessment of offer.
8.3	**Income Tax:** **TDS/TCS** as applicable under Income Tax Act, 1961 or rules made thereunder shall be deducted/collected from contractor's bill.

8.4 BOCW Act & Cess Act

8.4.1 BOCW Cess is not to be borne by contractor. Refer Annexure-I for BOCW Act & Cess Act.

Annexure-I:	
Bidder may please note that the sub-contractor/bidder of BHEL engaging building or construction worker in connection with building or other construction work, are required to follow the procedures enumerated below:	
1.	It shall be the sole responsibility of the contractor as employer to ensure compliance of all the statutory obligations under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder.
2.	It shall be sole responsibility of the contractor engaging Building Workers in connection with the building or other construction works in the capacity of employer to apply and obtain registration certificate specifying the scope of work under the relevant provisions of the Building and Other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 from the appropriate Authorities.
3.	It shall be responsibility of the contractor to furnish a copy of such Registration Certificate within a period of one month from the date of commencement of Work.
4.	It is responsibility of the contractor to register under the Building and other Construction Workers' Welfare Cess Act, 1996 and deposit the required Cess for the purposes of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 at such rate as the Central Government may, by notification in the Official Gazette, from time to time specify. However, before registering and deposit of Cess under the Building and other Construction Workers' Welfare Cess Act, 1996, the contractor will seek written prior approval from the Construction Manager.
5.	It shall be sole responsibility of the contractor as employer to get registered every Building Worker, who is between the age of 18 to 60 years of age and who has been engaged in any building or other construction work for not less than ninety days during the preceding twelve months as Beneficiary under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996.
6.	It shall be sole responsibility of the contractor as employer to maintain all the registers, records, notices and submit returns under the Building and other Construction Workers'

	(Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder.
7.	It shall be sole responsibility of the contractor as employer to provide notice of poisoning or occupation notifiable diseases, to report of accident and dangerous occurrences to the concerned authorities under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the rules made thereunder and to make payment of all statutory payments & compensation under the Employees' Compensation Act, 1923.
8.	It shall be the responsibility of the sub-contractor as employer to make payment/deposit of applicable cess amount on the extent of work involving building or construction workers engaged by the sub-contractor within a period of one month from the receipt of payment. It shall also be responsibility of the Contractor to furnish BHEL on monthly basis, Receipts/ Challans towards Deposit of the Cess under the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder along with following statistics: i) Number of Building Workers employed during preceding one month. ii) Number of Building workers registered as Beneficiary during preceding one month. iii) Disbursement of Wages made to the Building Workers for preceding wage month. iv) Remittance of Contribution of Beneficiaries made during the preceding month.
9.	**BHEL shall reimburse the contractor the Cess amount deposited for the purposes of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 under the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder.** However, BHEL shall not reimburse the Fee paid towards the registration of establishment, fees paid towards registration of Beneficiaries and Contribution of Beneficiaries remitted.
10.	It shall be responsibility of the Building Worker engaged by the Contractor and registered as a beneficiary under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 to contribute to the Fund at such rate per mensem as may be specified by the State government by notification in the Official Gazette. Where such beneficiary authorizes the contractor being his employer to deduct his contribution from his monthly wages and to remit the same, the contractor shall remit such contribution to the Building and other construction Workers' Welfare Board in such manner as may be directed by the Board , within the fifteen days from such deduction.

11.	**Bidders may please note that though the quoted price is exclusive of BOCW (which will be reimbursed by BHEL as per sub-clause 9 above) , however, If at any point of time during the contract period, non-compliance of the provisions of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder is observed, BHEL reserves the right to deduct the applicable cess (1%) on the contract value and penalty (if any, imposed by Cess Authorities) from the payables on account of non-compliance.**
12.	The contractor shall declare to undertake any liability or claim arising out of employment of building workers and shall indemnify BHEL from all consequences / liabilities / penalties in case of non-compliance of the provisions of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder.

9.0	**MATERIAL**
9.1	Material to be issued by BHEL (Free of Cost) unless otherwise specified in BOQ cum Rate Schedule 1. Cement 2. Reinforcement Steel and MS Round Bar (Earthing Rod) 3. Structural Steel. 4. Shop fabricated Material **(Note: All material required for the development of Labour sheds shall be in the scope of the bidder)**
9.2	All other materials required for proper completion of job shall be provided by the contractor and is deemed to be inclusive in the quoted price. Bidder's scope also includes following:
9.2.1	Furnishing samples of all materials required by the BHEL Engineer for testing/inspection and approval for use in the works. The samples may be retained by the Engineer for final incorporation in the works. The Approved BOI categorization plan shall be followed.
9.2.2	Furnishing test reports for the products used or intended to be used, if called for the specifications or if so desired by the engineer.
9.2.3	Arranging manufacturer's supervision for items of work done as per manufacturer's specifications when so specified.
9.2.4	Contractor shall set up suitable storage facilities for Cement, sand, bolts, aggregate, reinforcement steel, structural steel, handrail, grating, foundation bolts, shuttering item, inserts, water proofing material, admixture, cladding sheets, other BOI's etc. and all are stored properly as per IS recommendation/technical specifications/ manufacturer recommendation. Wastage due to inadequacy/lapses/negligence of storage will be on account of contractor.
9.3	**HANDLING OF MATERIAL ISSUED BY BHEL:** **Refer Chapter-VI "Material Handling, Storage & Preservation" of SCC**
9.3.1	Cement, Reinforcement Steel, (wherever specified as free issue by BHEL) required for the tender scope shall be procured by BHEL and issued to contractor free of cost (As FOC Item). However, unloading, handling / storage of Cement, Gratings and Reinforcement steel procured by BHEL for this tender scope at site, Contractor's Stores, issuance of materials from BHEL Stores and further transportation from Stores to work area (including loading and unloading) will be in the scope of contractor. If

	required, bidder has to provide the services for escorting the cement/steel vehicle from source to site. No Extra payment shall be made for this work.
9.3.2	The contractor shall take care of material issued by BHEL and shall protect the same from damage and weathering. Contractor shall construct waterproof cement store (capacity minimum 300 MT/ 6000 Bags) for storing and stacking of cement issued by BHEL free of cost.
9.3.3	The theoretical weight of each bag of cement for issued purposes will be considered as 50kg, the contractor shall be accountable for the cement issued to the contractor on this notional weight only. No claim whatsoever will be entertained because of difference between theoretical and actual weight of the bags of cement.
9.3.4	The empty cement bags duly accounted for against issue shall be the contractor's property and the same shall be disposed as per statutory regulation prevailing in the project.
9.3.5	The contractor shall satisfy himself of the quality and quantity of supplied cement at the time of taking delivery from BHEL stores. No claims whatsoever will be entertained by BHEL because of quality or quantity after the materials are taken by the contractor from BHEL stores.
9.3.6	Contractor will be responsible for sampling and testing of cement as per Indian Standard / Specification / approved quality plan in the testing laboratory established by the contractor.
9.3.7	No cement will be issued on free basis for bought out item like Hume pipe, Interlocking Paver block, fly ash brick, etc. or any other BOI which involves cement and is procured from outside of plant premises. However, cement for mortar for fixing of these items if required will be issued on free basis.
9.3.8	One month shall be the limit for the maximum quantity of BHEL issued cement that would be with the contractor at any point of time when work is in progress (excluding what has already been incorporated in the works). Necessary arrangements for first in first out must be maintained.
9.3.9	Contractor will be responsible for unloading the cement as soon as the arrival of cement in the weather proof cement storage sheds/ Silo's having dense impervious bituminous or concrete floors which shall be kept swept clean at all times. The storage arrangements shall be fully completed and approved by the owner before any cement is delivered to site. The construction of cement storage sheds as per the requirement of BHEL, unloading of cement bags, stacking properly in the storage sheds, removal of the sheds after the completion of the work are in the scope of bidder. Though the cement is unloaded directly at the contractor storage shed, it will be deemed to be

	considered that the cement was issued from BHEL stores. Necessary documents are to be submitted by the contractor to the BHEL stores for having received cement.
9.3.10	The contractor shall in no case be entitled for any compensation on account of any delay in supply or non-supply thereof for all or any such materials. However, in case of non-availability of any specific material / section(s) which delays the completion of work, such cases shall be recorded separately in monthly planning format (F14) and shall be considered for time extension of contract.
9.3.11	Contractor will have to make his own arrangement at his own cost for procurement of any other materials except as mentioned above, as required for the works and of such quality as acceptable to BHEL.
9.3.12	Contractor shall also carryout in complete association with BHEL, the material management functions and execution like day-to-day update of materials, issued to contractor, accounting for surplus/scrap material returned etc. These functions shall also be carried out through computerized system utilizing suitable software. Contractor shall engage experienced software personnel to associate on dedicated basis for efficient discharge of the same in time.
9.3.13	The contractor shall solely be responsible for the safety & security of material after it is handed over and issued to contractor by the BHEL.
9.3.14	BHEL reserves the right to recover from the contractor any loss of material issued by BHEL arising out of damage/ theft or any other causes during verification/stacking or at any time under the custody of the contractor.
9.3.15	BHEL issued materials, shall not be under any circumstances whatsoever, and shall be taken out of the project site unless otherwise permitted by BHEL for outside job.
9.3.16	The contractor shall maintain proper store account for all the BHEL issued materials and shall give Three (03) copies of monthly-computerized reconciliation statement of such account showing total receipt, consumption and balance at site to the BHEL. BHEL Engineer's certification for the reconciliation of steel shall be final. Contractor shall also maintain Cement register and other free issue item register and update on daily basis and share with BHEL
9.3.17	Before commencement of work, Contractor has to satisfy/ensure the above design mix proportion through conducting trial mix. Contractor shall not be absolved from the responsibility of quality of concrete works as per relevant specification, standard and to ensure satisfactory performance as per terms and conditions of contract. Any issue raised regarding design mix after successful completion of trial mix shall not be entertained and contractor shall not be entitled for any cost or damages.

9.4	**Issue of Cement**
9.4.1	Cement as received from the manufacturer/ stockiest will be issued free of cost to the contractor. The theoretical weight of each bag of cement for issued purposes will be considered as 50 kg, the contractor shall be accountable for the cement issued to the contractor on this notional weight only. No claim whatsoever will be entertained because of difference between theoretical and actual weight of the bags of cement.
9.4.2	In case cement is issued through bulkers being supplied from manufacturer/stockiest; the same shall be emptied in cement silos of batching plant and necessary assistance shall be provided by contractor.
9.4.3	In case BHEL supplies cement through Bulker, Bidder has to store cement in Silos of Suitable capacities as decided by Engineer in charge. Silos Capacities shall be finalized mutually.
9.4.4	The empty cement bags duly accounted for against issue shall be the contractor's property and the same shall be disposed as per statutory regulation prevailing in the project.
9.5	**Issue and Return of Cement, Reinforcement Steel, MS Round Bar (Earthing Rod) and Structural Steel.** **Refer Chapter-VI "Material Handling, Storage & Preservation" of SCC**
9.6	**Consumption and Wastage of Cement, Reinforcement Steel, Structural Steel and MS Round Bar (Earthing Rod):** **Refer Chapter-VI "Material Handling, Storage & Preservation" of SCC**
9.7	**Recovery of Materials (Penal Rates):** If wastage exceeds the specified limit, the recovery of excess wastage shall be made from monthly RA Bills as per following penal rates (excluding GST):
9.7.1	

Sl. No.	Materials	Penal Rate (Rs.)
1	Cement (PPC)	5500/- per MT
2	Cement (OPC)	6500/- per MT
3	Reinforcement Steel / Earthing Rod	60,000/- per MT
5	Structural Steel (Plates, Rolled Sections etc.)	70000/- per MT
6	Structural Steel Gratings	1,20,000/- per MT

9.7.2	**Penal Rate will be 1.05 times the actual cost to BHEL or Rate mentioned in Table 9.7.1 above, whichever is higher, shall be imposed.**

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter-X: BOQ CUM RATE SCHEDULE AND % WEIGHTAGE OF INDIVIDUAL ITEMS

This Chapter consists of Part A & Part B of Volume II "Price bid":

Description	Remarks
PART A: Instructions to the Bidders	Instructions
PART B: % weightage of individual items of Schedule of quantity	BOQ CUM RATE SCHEDULE
PART C: Total Price for entire scope of Work	This part is implanted in the E- Procurement portal entitled as "Part-C of Vol-II Price Bid".

Part A:	**Instructions to the Bidders**
1.	**Bidders shall quote Total Price for Package 2A in Rupees in VOL II PRICE BID at BHEL E-procurement Portal.** Any other entry elsewhere in the offer of the bidder shall be treated as Null and Void. The total value shall be automatically calculated on E-portal.
2.	BHEL has fixed the % weightages of individual items of BOQ Cum Rate Schedule w.r.t. the total price of Price Bid Vol-II.
3.	Based on the pre-fixed weightages and quantities in the BOQ cum Rate Schedule, item rate of individual items shall be derived by BHEL. This item rate shall be rounded off up to two decimal places and shall be used to calculate the total amount of an item.
4.	For the convenience of bidders, BHEL has issued an excel sheet with all requisite formulae as detailed above. **However, this excel sheet shall not form part of contract document. Further, this sheet should not be uploaded at the e-Portal.**
5.	Bidders to note that this is an '**Item rate contract**'. Payment shall be made for the actual quantities of work executed at the Unit rate arrived at as per serial no. 3 above.
PART B:	% weightage of individual items of BOQ CUM RATE SCHEDULE w.r.t. the total price (as quoted by the bidder in "Part C of Vol-II-Price Bid")- attached separately.

11.0 Following Drawings and technical Specifications shall be the part of this tender:

SL. NO.	Document
11.1	**Following specifications/ documents shall be integral parts of this tender:**
11.1.1	SECTION-B:PROJECT INFORMATION
11.1.2	SECTION-C: CUSTOMER CONTRACT SPECIFIC TECHNICAL REQUIREMENTS
11.1.3.	SECTION-D: GENERAL TECHNICAL REQUIREMENTS
11.1.4	SPECIFICATION FOR ERECTION & COMMISSIONING OF 265/25T DOUBLE GIRDER TG HALL EOT CRANES (SPECIFICATION NO. **PE-TS-546-501-A502, Rev.0**)
11.1.5	GENERAL LAYOUT ARRANGEMENT OF WORKER'S ESTABLISHMENT FOR BHEL'S PROJECT-SITE **(ANNEXURE-1A)**
11.1.6	STANDARD GUIDLINES FOR WORKER'S ACCOMODATION/ESTABLISHMENT AT BHEL'S PROJECT SITES **(ANNEXURE-A)**
11.1.7	NTPC SAFETY RULES
11.1.8	SHED FOR CONSTRUCTION WORKERS AND O & M WORKERS DRAWING
11.1.9	CLIMATOLOGICAL TABLE
11.1.10	SEISMIC DESIGN CRITERIA
11.1.11	WIND DESIGN CRITERIA
11.1.12	TECHNICAL SPECIFICATION FOR AC & VENTILATION DUCT
11.1.13	TOPOGRAPHICAL SURVEY DRAWING
11.2	**Following Tender stage specifications, drawing & documents are provided for bidder's information and reference purpose only. Final drawings, specifications shall be provided to successful bidder after award of contract.**
11.2.1	PLOT PLAN-SCOPE AREA MARKING
11.2.2	INDICATIVE BOI VENDOR LIST- LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL.

NOTES:

- Contractor has to make him well conversant with the Technical Specifications of Customer (Section-C) and BHEL (Section-D). In case of ambiguity between BHEL's and Customer's specification, Customer's specification shall prevail.
- Above documents have been uploaded Separately.

BHEL-CPC **Annexure-I**

Typical Field Laboratory Equipment List:- (Applicable for only Package 2A)

Sl. No.	Equipment Name	Min. Quantity	Reference Indian Standard for Test/ Equipment	Brief Specifications
General Laboratory Equipment				
1	Digital Weighing Balance	1	IS 9281	Capacity: Minimum 2000g, Readability: 0.1g
2	Digital Weighing Balance 5kg, 10kg, 30kg & 100 kg	1 each	IS 9281	Readability: 1g
3	Drying Oven & Crucibles/Sample Containers	1/8 nos	-	Chamber size - 24" x 24" x 36" Temp. range: Up to 200°C Container sizes: 25 mm dia;50 mm dia; 75 mm dia; 80 mm dia; 100 mm dia.
4	Hot Plate	1	IS 2720	
5	Water Bath/Automatic temperature control curing tank	1	IS 516 / Ref. IS 9013	Temperature control: ± 1°C for curing of Cement cube.
6	Marsh Cone	1	D6910	MOC: Steel
7	Sieve Set (IS)	1 set	IS 460, IS 383, IS 2386	Complete set of standard sieves
8	Sieve Shaker	1	-	Electric, with adjustable time and amplitude
9	Measuring Jars: Borosilicate glass	1 each	-	Graduated, 50 ml, 100 ml,250 ml, 500 ml, 1000 ml capacity
10	Spatulas	2	-	Stainless steel
11	Wash Bottles	2	-	Plastic, with distilled water
12	Funnels	1 each	ISO 4798	Borosilicate Glass, dia.25mm, 50mm, 75mm,100mm
13	Filter Paper	As required	-	Qualitative, different grades
14	Digital thermometer	2	-	-50 °C to 300 °C
15	Stop Watches	2	-	Digital, with lap timer function
16	Outside Micrometer	2	-	Range: 0-25mm Accuracy: ±0.002mm Resolution: 0.001mm
17	Vernier Caliper	2	-	Range: 0-600mm & 0-300mm Accuracy: ±0.02mm

Sl. No.	Equipment Name	Min. Quantity	Reference Indian Standard for Test/ Equipment	Brief Specifications
				Resolution: 0.02mm
18	Mercury Thermometers	2	IS 2480 P-1	Glass, -10°C to 250°C
19	Inside Micrometer	2		Range: 25-100mm & 100-750mm Accuracy: ±0.002mm Resolution: 0.001mm
20	Splitting Machine	1	IS 516	Capacity: Suitable for splitting concrete cubes
21	Glass Rods	4	-	Stirring rods
22	Glass / Poly carbonate sheet	2	-	15mm Thk.
Soil Testing Equipment				
23	Rapid Moisture Meter	2 nos	IS 12175	
24	Liquid Limit Apparatus	1	IS 2720 (Part 5)	Complete set including casagrande cup
25	Plastic Limit Apparatus	1	IS 2720 (Part 5)	Glass plate and porcelain dish
26	Compaction/Proctor test Apparatus (Standard and Modified Proctor)	1 each	IS 2720 (Part 8)	Complete set including rammer, moulds, and other accessories
27	For relative density / density index of cohesion less soil	1 set	IS 2720 (Part 14)	Electrically heated, temperature control
28	Sand Replacement Mould / Sand Pouring Cylinder	1 set	IS 2720 (Part 28)	To check Dry density by sand replacement method
29	Pycnometer / Specific Gravity Bottles	3	IS 2720 (Part 3)	Glass, calibrated, 01L capacity
30	California Bearing Ratio (CBR) Apparatus	1	IS 2720 (Part 16)	Complete set including mould and loading frame
31	Hydrometer: 1.2 -1.3 Hydrometer: 1.0 -1.2 Hydrometer: 1.0 -1.1	1 set each	-	For specific gravity check of liquid.
32	Soil permeability test apparatus.	1 set	IS 2720 (Part 17)	For permeability test of soil.
33	Core Cutter	1 set (6 nos.)	IS 2720 (Part 29)	Various sizes for different soil samples
Concrete Testing Equipment				
34	Le Chatelier Flask & mould	1 set	IS 4031 (Part 3) / IS 5514.	Glass, 50 ml
35	Pan Type Concrete Mixer	1	-	Min. 40L capacity

Sl. No.	Equipment Name	Min. Quantity	Reference Indian Standard for Test/ Equipment	Brief Specifications
36	Cube Moulds (150 mm)	48/180 nos for TG raft	IS 516/ 10086	Steel/ PVC, with tight-fitting lids
37	Cube Moulds for cement testing (70.6mm)	12	IS 4031/ 10086	Steel/ PVC, with tight-fitting lids
38	Compression Testing Machine with Automatic Pace Rate Controller	02	IS 516/ 14858	Capacity 2000 kN, suitable for 50, 70.6, 100 mm and 150 mm cubes
39	Slump Cone	04	IS 1199/7320	Metal, complete set/with tamper
40	Digital Rebound Hammer	01	IS 5816	Suitable for concrete surface hardness testing
41	Vicat Apparatus with Deskpot	02	IS 4088/ 5513	Complete set for determining Cement consistency/setting time.
42	Vibrating Machine for Cement Cube	01	IS: 4031 & 10080	For Cement cube sampling for compressive strength check.
43	Cube Moulds for concrete testing (100mm)	12	IS 516/ 10086	Steel/ PVC, with tight-fitting lids
44	Cube Moulds for sand mortar testing (50mm)	12	IS 516/ 10086	Steel/ PVC, with tight-fitting lids
45	Alkali Mortar Bar Moulds	As required	IS 2386 P-7	Steel, with tight-fitting lids
46	Mould for Flexure Test of concrete (150x150x700) mm	06	IS: 516	Mould to cast concrete beam for Flexure strength check.
47	Flexure Test Machine	01	IS: 516	For Flexure strength check.
48	Concrete Penetrometer	1	IS: 8142	For concrete setting time test
49	Concrete permeability test apparatus	01	IS: 3085	For permeability test of concrete
50	Accelerating Curing Tank	01	IS: 9013	To check rapid compressive strength of concrete equivalent to 28 days.
51	Alkali mortar bar testing equipment as per ASTMC-1260 including digital length comparator scale.	01	ASTMC-1260	To check ASR content.
52	Compaction Factor Apparatus	1	IS 1199/ 5515	Complete set for determining concrete workability
Road Testing Equipment				
52	Specific Gravity Balance	1	IS 2386/ ASTM D-70	For determining specific gravity of bitumen

Sl. No.	Equipment Name	Min. Quantity	Reference Indian Standard for Test/ Equipment	Brief Specifications
53	Impact Value test Equipment	1	IS: 2386- P4	For Impact Value test of Aggregate
54	Aggregate Crushing Value Apparatus	1	IS: 2386 P-4	
55	Los Angeles Machine	1	IS: 10070 & IS 2386	For Abrasion value check of Aggregate.
56	Liquid limit – Cone penetrometer	01	IS: 2720 (Part-5)	For liquid limit check of cohesion less soil.
57	Penetration Apparatus	1	IS 1203	Complete set for determining bitumen penetration
58	Softening Point Apparatus	1	IS 1205	Ring and ball type
59	Ductility Apparatus	1	IS 9381	Complete set for determining bitumen ductility
60	Marshall Stability Apparatus	1/ Third party lab test.	ASTM D1559-T-62	Complete set for determining bitumen mix stability
61	Bitumen Extractor	1	ASTM D 2172/ IRC:SP 11	Soxhlet type Centrifuge type (electric operated- for field/lab tests) with Benzene/similar fluid.
62	Length & Thickness Gauge	1	IS: 2386 P-1	For Elongation & Flakiness index check of Aggregate
63	DLC Vibrating Hammer	01		For DLC Cube filling
64	Concrete cube mould Vibrating Table	01	IS: 2514	For Compaction of concrete in moulds.
65	Density Cylinder (5 kg, 10kg, 15kg, 20 kg , 30kg)	1 set		For Density check of aggregates
Other Equipment				
66	UPV Machine	1/ Third party test.	IS 13311/ 516	For determining concrete quality through UPV
67	Pile Integrity Tester (PIT)	1/ Third party test.	IS 14893	
68	Paint Thickness Gauge (DFT, WFT)	1 each		Digital, with various measurement ranges (upto 4mm)
69	pH Meter	1	pH Meter/ IS: 2711	Accuracy: ±0.02 pH units Resolution: 0.01 pH units Probe material: Glass
70	RT Film Viewer	1	As per ASTM E1390	For RT film interpretation

Sl. No.	Equipment Name	Min. Quantity	Reference Indian Standard for Test/ Equipment	Brief Specifications
			or equivalent	
71	UCI Hardness Tester	1	UCI test as per ASTM A1038-19, DIN 50159 1,2-2021	repeatability 5% uncertainty max. 4%
72	Portable PMI Machine	1	Portable X-Ray fluorescence type	Analysis of Stainless and Alloy Steels
73	Digital Torque Wrench	11	for up to M36 class 10.9 bolts	for up to M36 class 10.9 bolts
74	Bolt Tension Indicator / Calibrator		for up to M36 class 10.9 bolts	for up to M36 class 10.9 bolts
75	L-Box, V-Box, Screen, etc	APR		

- All brands shall be BHEL/Customer approved brands.
- As per Requirement (APR)