

VOLUME - IA

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Hiring of Agency for production of Required Grade
of Geopolymer Concrete for road works at
2X800MW SINGRULI STPP STAGE-III,
SONEBHADRA, UTTAR PRADESH, INDIA.

BHARAT HEAVY ELECTRICALS LIMITED



TECHNICAL CONDITIONS OF CONTRACT (TCC)

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Chapter - I: PROJECT INFORMATION

Sl. No.	Description	Details
1	Project Title	2X800MW SINGRAULI STPP (STAGE-III)
2	Customer	National Thermal Power Corporation Limited (NTPC Limited)
3	Location	Singrauli STPS is located in Sonebhadra district of Uttar Pradesh. The project is located at 118 km towards South of District Head Quarters Robertsganj and is well connected by State Highway SH-5A.
4	Nearest Airport	The nearest airport is Lal Bahadur Shastri International Airport, Varanasi at a distance of about 220km from project site.
5	Access By Road/Major Cities	<p>Nearest National Highway NH-39 is at a distance of about 5km from the project.</p> <p>The nearest major town is Robertsganj, which is approx. 118km from the project. Nearest major city is Renukoot, located at a distance of 60km to the project.</p> <p>The nearest railway station is Shaktinagar at 3Km. Other nearby Important Stations are Renukoot Junction about 60 Km, Mirzapur Station about 198 Km, Mughal Sarai Junction About 196 Km and Varanasi Cantt About 202 Km.</p>
6	Temperature	Meteorological data from nearest observatory is placed as a Annexure-II (Attached)
7	Seismic Zone	As per Annexure-E of NTPC Technical Specifications, Section-VI, part-B (Attached).
8	Wind Speed	Meteorological data from nearest observatory is placed as a Annexure-II.

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Chapter - I: PROJECT INFORMATION

1.0	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. All costs for and associated with site visits shall be borne 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	VOID																		
1.7	<p>Bidders may fix up their site visit in consultation with below mentioned contact person:</p> <table><tr><td colspan="2">Bidders may fix up their site visit in consultation with below mentioned contact person:</td></tr><tr><td>Name:</td><td>Deepak Gangle</td></tr><tr><td>Designation:</td><td>Sr. Manager</td></tr><tr><td>Email:</td><td>gangle@bhel.in</td></tr><tr><td>Ph no:</td><td>9425601995</td></tr><tr><td>Name:</td><td>Priyanka</td></tr><tr><td>Designation:</td><td>Sr. Manager</td></tr><tr><td>Email:</td><td>priyanka.com@bhel.in</td></tr><tr><td>Ph no:</td><td>9871754521</td></tr></table>	Bidders may fix up their site visit in consultation with below mentioned contact person:		Name:	Deepak Gangle	Designation:	Sr. Manager	Email:	gangle@bhel.in	Ph no:	9425601995	Name:	Priyanka	Designation:	Sr. Manager	Email:	priyanka.com@bhel.in	Ph no:	9871754521
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Chapter – II: SCOPE OF WORKS

2.0	Scope of Works:
2.1	<p>Hiring of Agency for Production of Required Grade of Geopolymer concrete (GPC) for Road Works at 2X800MW SINGRUALI STPP STAGE-III.</p> <p>The scope of work for above mentioned package shall include but not limited to following major works:</p> <ol style="list-style-type: none"> a. Procurement, Supply, Storage of Geopolymer concrete ingredients: <ul style="list-style-type: none"> • Approved quality fine & coarse aggregates, • Fly-ash (to be collected from location within existing operating plant/from existing fly ash silos near plant boundary). Fly ash produced by coal-based power stations of NTPC, will be issued free of cost for the production of Geo-polymer concrete on 'as is where is' basis. • Sodium Silicate. • Sodium Hydroxide. • Approved quality of GGBFS. The properties of GGBFS shall be as per IS 16714:2018. • Chemical admixtures like super-plasticizer, retarder, shrink-reducing compound, evaporation reducer etc. b. Procurement, Supply, storing, of approved quality of PC based water reducing admixtures shall be in the scope of the bidder. c. Establishment of Design mix of various grades of Geopolymer Concrete as per IRC 44:2017 or equivalent Standard shall be in the scope of the agency. d. Mix shall be done through movable batching plant. Alternatively, mixing of geo-activator solution may have to be mixed in transit mixer instead of batching plant. The design mix of GPC shall be ensured from third party reputed institute who has already executed GPC mix design. e. Setting up of Civil Laboratory as detailed in the tender and conducting various tests at site as per FQP. f. Relevant tests to ascertain the required physical and chemical properties of the Geo-polymer concrete ingredients. g. Construction and development of storage tanks and mixing tanks for both Sodium Hydroxide & Sodium Silicate in line with the Technical Specification.
2.2	Mix design for all grades of Geopolymer concrete shall be carried out from a reputed laboratory/third party institute as approved by BHEL / NTPC. Contractor may add admixture in line with relevant code as advised by BHEL time to time without any additional cost.
2.3	This specification covers all the requirements, described hereinafter for use of Geopolymer Concrete in road and pavement works, and shall include all

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	<p>incidental items of work not shown or specified but reasonably implied or necessary for the completion of the work.</p> <p>IRC 44:2017, IRC 15:2011 & IS-16714:2018 shall form a part of this specification and shall be complied with unless permitted otherwise.</p> <p>All quality standards & other technical requirements shall be strictly adhered by the bidder. All works under this specification, unless specified otherwise, shall conform to the latest revision of Indian Standard/IRC Specifications, Codes of Practice and technical specification for Geopolymer concrete. In case any particular aspect of work is not covered under technical Specification/IRC/ IS standards, any other specification as directed by the BHEL Engineer shall be followed.</p>
2.4	<p>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 on basis of mutual agreement. 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.</p>
2.5	<p>Minimum 3(three) months stock of raw material including admixture are to be maintained all time, considering an average GPC requirement of 1000 - 1500 cum per month.</p> <p>Separate shed for storage of admixtures and other ingredients of GPC is to be constructed. Shed should be spacious and of good quality material having weather proof storage facilities. Proper marking and demarcation should be there for differentiating different storage sheds. Regular inspection of storage sheds will be done by BHEL/Customer for their adherence with the storage specification.</p> <p>Separate tanks having adequate capacity are to be constructed with fencing and a lockable gate for preparation of Sodium Hydroxide and Sodium Silicate solution. These tanks shall be provided with acid-alkali resistant lining and covered with GI sheet. Each tank shall be fitted with a chemical resistant pump of suitable capacity and dual valve in the discharge line for recirculation (to enable mixing) and also for transferring the Geo-Activator solution to mixer. This connection pipe from Pump discharge to batching plant mixer shall be HDPE of suitable Diameter.</p>
2.6	<p>Monthly, Weekly and daily requirement of Geopolymer concrete shall be finalized with designated representative of BHEL suitably and production/supply to be made accordingly. Records of such requirements shall be properly maintained.</p>
2.7	<p>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.</p>

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2.8	Production of Geopolymer concrete shall be done through movable batching plant /Ajax Fiori.
2.9	The quoted price shall include all material, equipment, fixtures, labor, construction plant, temporary works and everything whether of permanent or temporary nature necessary for the completion of job in all respects.
2.10	<p><u>Royalty & other fees:</u></p> <p>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.</p> <p>The Contractor shall pay and indemnify the Employer against any default in payment of Royalties or Seignorage Fee or Cess or other charges by the Contractor or the agency from which the Contractor purchases soil/earth, sand, stone/aggregates, metals, minerals or minor minerals.</p> <p>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.</p>
2.11	<p><u>Setting Up of Laboratory Works:</u></p> <p>The contractor shall set up laboratory in the close vicinity of the work site as per required field QA & QC laboratory set up and as the directions of engineer-in-charge. The laboratory shall be equipped with latest testing equipment in sufficient number to carry out all the tests as required under the contract. The contractor should ensure that the equipment is available well in advance of starting of the work to avoid stoppage of work on this account. All the tests shall be carried out by the contractor in the presence of the Engineer's representative and a joint record of all observations and results thereof shall be maintained, and available with the Engineer.</p> <p>The testing laboratory shall be well equipped with all the necessary testing equipment (set-up, instruments etc.) required for the testing of Geopolymer</p>

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	concrete constituents like aggregates, admixtures, water, fly-ash, GGBFS, Sodium Hydroxide, sodium silicate etc. as required as per approved FQP.
2.12	<p><u>QUALITY ASSURANCE & QUALITY CONTROL</u></p> <p>INSPECTION & FIELD QUALITY ASSURANCE</p> <p>a) Contractor shall carry out all activities conforming to the approved Field Quality Plan (FQP) & technical instructions as revised from time to time. ‘Total Quality’ shall be the watchword of the work and contractor shall strive to achieve the quality standards, procedures laid down by BHEL. He shall follow all the instructions as per BHEL and quality standards as stated in technical specification attached at Section C or elsewhere in the contract. Contractor shall provide the services of quality assurance engineer as per the relevant clauses</p> <p>b) Preparation of quality assurance log sheets and protocols with customer / consultants / statutory authority, NDE records, testing & calibration records and other quality control and quality assurance documentation as per BHEL engineer’s instructions, is within the scope of work / specification. These records shall be submitted to BHEL / customer for approval from time to time.</p> <p>c) The protocols between contractor and customer / BHEL shall be made for correctness of procured materials, procedures, at each stage, generally as per the requirement of customer / BHEL. This is necessary to ensure elimination of errors and to avoid accumulation and multiplication of errors.</p> <p>d) A daily log book (with proper indexing) should be maintained by every supervisor / engineer of contractor, for respective area of work and inspection details of various equipment, etc. This log book shall be always accessible to BHEL engineers.</p> <p>e) Any re-laying or re-termination of cables / re-erection of instruments / recalibration of instruments etc. required due to contractor's mistake and found at any stage inspection, shall be carried out by the contractor at no extra cost. Repair / rectification procedure to be adopted to make any job acceptable shall be subject to the approval of BHEL.</p> <p>f) Weekly Quality Review Meeting at site shall be organized by BHEL to discuss quality issues and next week’s inspection plans. Site in-charge of the contractor along with QAEs of the contractor must be present in the meeting with closure report of the issues raised by BHEL in the previous meetings.</p> <p>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.</p>

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2.13	<p><u>Field Quality Assurance:</u></p> <p>The contractor shall be responsible for day-to-day quality checks for GPC and other materials in line with approved Field Quality Plan (FQP) 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 approved by BHEL/CUSTOMER.</p>
2.14	<p><u>OPEN SPACE FOR OFFICE & STORAGE: -</u></p> <ul style="list-style-type: none"> a) Open spaces for material storage yard & construction of temporary site office shall be allocated as made available by the customer / BHEL free of cost. b) Construction of necessary stores and storage of materials shall be in contractor's scope. BHEL shall provide available space as received from customer on mutually agreed basis. Security of stores & work place shall be in Contractor's scope. c) Space for construction of Separate tanks having adequate capacity for preparation of Sodium Hydroxide and Sodium Silicate solution and storage of same shall be made available by BHEL free of cost as and where available. d) Contractor has to make his own arrangements for labour colony including Electricity and water for the labour colony. e) When the Work is completed all such temporary structures and facilities shall be removed from the Site and the area shall be restored to its original condition.
2.15	<p><u>DEWATERING</u></p> <p>Contractor shall ensure at all times that his work area & approach / access roads are free from accumulation of water, so that the materials are safe and the operation of plant / progressive delivery schedule are not affected. No separate claim in this regard shall be admitted by BHEL. No separate payments for dewatering of subsoil, surface water or catchments water, if required, at any time during execution of the work including monsoon period shall be considered by BHEL.</p>
2.16	<p><u>SITE ORGANISATION: -</u></p> <p>The contractor shall maintain a site organization of adequate strength in respect of manpower, construction machinery and other implements at all time for smooth execution of the contract headed by a competent SITE-IN-CHARGE for site operations with sufficient level of authority to take site decisions. The vendor will submit organization chart (showing the name of SITE-IN-CHARGE) with individual bio-data indicating various levels of experts to be posted for supervision and execution, quality, material management, planning, safety, etc. The organization shall be reinforced from time to time, as required to make up</p>

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slippage (if any) from the schedule without any commercial implication to BHEL. The organization chart is to be submitted within 10 days from the date of LOA.

Following man-power (minimum) having RMC Operation background to be deployed at site by the successful vendor for their day to day supervision etc.

- a) Qualified safety officer (exclusive for safety supervision in shift work) – 01 No.
- b) Quality Engineer & Quality Assistant: -
 - 01 No. Graduate Engineer (Minimum 3 years' Experience)
 - 02 Nos. Quality assistants (Diploma in Civil Engineering)

Deputation of above man-power shall be jointly decided at site in line with requirement.

Engineer / supervisor for other functions like store & purchase, material management, finance, administration etc. are to be provided as per site requirement and not considered above. The technical staff deployed as above shall preferably have the experience of handling the Geopolymer concrete ingredients considering the hazardous chemical properties of Sodium hydroxide and sodium silicate. All due precautions to be ensured by the contractor for safe handling of GPC ingredients.

In the event of non-deputation of engineer/ supervisor by the bidder as per agreed schedule at site, BHEL shall reserve the right to deduct Rs. 40000/- per man-month for Engineer, Rs. 30000/- per man-month for the supervisor / safety officer / Assistant from RA bills. Further induction of manpower regarding site supervisor & site engineer will be decided at site as per requirement without any financial implication.

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.

The contractor should also submit to BHEL for approval a list of T&Ps along with their fitness certificates. The tools & tackles shall not be removed from site without written permission of BHEL. All the vehicles, T&Ps brought to site shall have all valid documents as required in line with the statutory requirements and guidelines.

Parallel working of all batching plants is envisaged. Hence every batching plant should have independent Batching Plant operator and adequate supporting staff shall be available round the clock to cater all the batching plants and quality / safety functions as per BHEL requirement. However, with prior intimation phase wise routine maintenance shall be allowed.

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2.17	<p><u>PLANNING, MONITORING & PROGRESS REPORTING:</u></p> <p>The contractor shall properly plan for supply of Geopolymer concrete as per BHEL requirement. Periodic progress reviews on the entire activities of execution in respect of supply of Geopolymer concrete will be held as per site requirement. These meetings will be attended by reasonably higher officials of the contractor and will be used as a forum for discussing all areas where progress needs to be speeded up. The contractor shall be further responsible for ensuring that suitable steps are taken to meet various targets decided upon such meetings.</p> <p>Proper reporting of Geopolymer concrete supplied on daily, weekly & monthly basis shall be submitted to BHEL.</p> <p>Reporting of stock of materials shall be done on daily basis to BHEL site.</p> <p>The contractor's site office must have basic facilities of computer/printer/computer operators/communications like E-mail, and phone facility within a month from LOI.</p>
2.18	<p><u>Construction Power (Chargeable):</u></p> <ol style="list-style-type: none">1. Construction power shall be made available to the Contractor at 415 V feeders of LT substation located at single point near the site at a distance of approx. 500M on chargeable basis. Further distribution shall be arranged by the contractor at his own cost and services. Contractor shall be responsible for fulfilment of all requirements including statutory requirements in this regard. <p>In case, BHEL is not able to provide construction power due to any reason whatsoever, contractor should make his own arrangement for the same without any cost and time implication to BHEL.</p> <ol style="list-style-type: none">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. 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. 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.

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4. 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.
5. 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.
6. Contractor shall be well equipped with back-up power supply arrangement like DG set etc. to tackle situations arising due to failure of supplied power, so as to ensure continuity in Operation of Batching Plant etc. that are underway at the time of power failure or important activities planned in immediate future.
7. 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.
8. **Contractor is advised to maintain the calibrated energy measuring instruments and use their system as efficiently as possible to maintain the HT side input energy meter reading and LT side outgoing energy meter reading to sub-contractors as equal.**
9. 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.
10. The charges for the actual energy consumed by the bidder (Energy Charges along with fixed charges as applicable) shall be recovered by the BHEL based on prevalent rate of DISCOM and type of connection used.

General:

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 will have to provide at his own cost necessary calibrated energy meters (tamper proof, suitably housed in a weather proof box with lock & key arrangement) at point of power supply along with calibration certificate from authorized/ accredited agency for working out the power consumption. In case of recalibration required for any reason the necessary charges including replacement by calibrated meters is to be borne by the contractor. Supply of electricity shall be governed by Indian

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	<p>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.</p> <p>Contractor to arrange calibrated energy meter (tamper proof, suitably housed in a weather proof box with lock & key arrangement) for office and this construction power at office is chargeable as per applicable tariff rates.</p>
2.19	<p><u>Construction Water:</u></p> <p>BHEL may provide water supply (at single point source) for construction purpose on chargeable basis as and when made available by customer. However, contractor shall make alternate arrangement of construction water till the same is made available by BHEL. Contractor has to make arrangement of further distribution and metering of water at his own cost. No extra payment shall be made under this account. Rate of water charges shall be as levied by customer (NTPC) at 2X800 MW Singrauli Stage-III Site.</p> <p>The Contractor should make arrangement 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.</p> <p>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.</p>
2.20	MATERIAL
2.20.1	<p>Fly Ash (to be collected from location within existing operating plant/from existing fly ash silos near plant boundary).</p> <p>Fly ash produced by coal-based power stations of NTPC, will be issued free of cost for the production of Geo-polymer concrete on 'as is where is' basis.</p> <p>Note: It will be contractor's responsibility to ensure required chemical and physical properties of the fly ash in line with <u>IS 3812 (Part-1):2013</u>. Transportation and handling of fly-ash will be in contractor's scope.</p>
2.20.2	<p>During execution of work, all requisite approved quality materials viz. aggregates, sand, admixtures, Sodium hydroxide, Sodium Silicate, Ground Granulated Blast Furnace Slag (GGBFS) and consumables/materials required for the work shall be procured & supplied by the contractor in timely manner and is deemed to be inclusive in the quoted price. BHEL shall not supply any materials for this work unless otherwise noted.</p>

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2.20.3	All the materials are to be handled by contractor and contractor will be solely responsible for safe custody of the same.
2.21	VOID
2.22	VOID
2.23	<u>HEALTH, SAFETY & ENVIRONMENT</u> All necessary arrangement for protection of health, environment and safety at contractor's work area 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 (NTPC) specifications as applicable for execution of works. Safety rules and guidelines of BHEL and NTPC are provided elsewhere.
2.24	HEIRARCHY
2.24.1	In case of any conflict/deviations amongst various documents, the order of precedence shall be as follows: <ol style="list-style-type: none">1. BOQ Items in BOQ Cum Rate Schedule2. Technical Conditions of Contract (TCC)3. Customer technical Specification-Section C4. Relevant IRC and IS codes (latest).

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – III: FACILITIES IN THE SCOPE OF CONTRACTOR/BHEL (SCOPE MATRIX)

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)	Yes		Location will be finalized after joint survey with owner.
b	Open space for storage (as per availability)	Yes		Location will be finalized after joint survey with owner.
c	Open space for labour colony (as per availability)		Yes	Contractor has to make his own arrangements for land, shelter and transportation of labours as per requirement.
d	Labour Colony with internal roads, sanitation, complying with statutory requirements		Yes	Construction Plan shall be approved by BHEL
e	Construction of bidder's office, canteen and storage building including supply of materials and other services		Yes	
f	Bidder's all office equipment, office / store / canteen consumables		Yes	
g	Canteen facilities for the bidder's staff, supervisors and engineers etc		Yes	
h	Firefighting equipments like buckets, extinguishers etc		Yes	
i	Fencing of storage area, office, canteen etc of the bidder		Yes	
3.2	Electricity:			
3.2.1	Electricity for construction purposes 3 Phase 415/440 V			

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Chapter – III: FACILITIES IN THE SCOPE OF CONTRACTOR/BHEL (SCOPE MATRIX)

Sl. No	Description PART I	Scope		Remarks
		BHEL	Bidder	
a	Single point source	Yes		Construction Power will be provided at single point source on chargeable basis as and when made available at site, however contractor has to deploy DG Sets at no extra cost to BHEL 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.
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.2.2	Electricity for office, stores, canteen, living accommodation of the bidder's staff, engineers, supervisors etc. of the bidder. (Chargeable)			
a	Single point source	Yes		Same as Sl. No. 3.2.1 a
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.3	Water Supply:			Contractor has to make his own arrangements.
3.3.1	For all purposes:			
a	Making the water available at single point		Yes	

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Chapter – III: FACILITIES IN THE SCOPE OF CONTRACTOR/BHEL (SCOPE MATRIX)

Sl. No	Description PART I	Scope		Remarks
		BHEL	Bidder	
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		Yes	
b	For construction work (execution of the lighting work/ arrangements) 1. At office/storage 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	
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	

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Chapter – IV: T&PS AND MMES TO BE DEPLOYED BY CONTRACTOR

4.0	TOOLS & PLANTS (TO BE PROVIDED BY CONTRACTOR)	
4.1	Tentative list of T&P to be deployed by contractor for successful completion of work is detailed below. It may be noted that the list is not exhaustive and is only for general guidance. The contractor is required to provide all necessary T&Ps measuring instruments & handling equipment (calibrated) to maintain work progress for timely completion of total work as per contract. In case of project requirement, some activities may have to pre-pone, in such cases the contractor may have to deploy additional T&Ps. Quoted rate shall be inclusive of such emerging requirements. However, contractor shall submit deployment plan of all T&P along with tender bid.	
4.2	Following Major T&Ps to be deployed by contractor within the indicated time from date of LOA.	
	Major T&P items	Tentative Time from date of LOA
4.2.1	Mobile Batching Plant /Ajax Fiori (01 no.)	Within 25 days (Mobilization, Installation & Commissioning)
4.2.3	1 No. 40'0" x 8'0" or 2 Nos. 20'0" x 8'0" office Porta Cabin or equivalent.	Within 25 days
4.2.4	Storage Sheds and Underground Tanks for Storage and Mixing of Sodium Hydroxide and Sodium Silicate	Within 30 days
4.2.4	2 Nos. Pay loader	Within 30 days
4.2.5	Dumper (min 1 nos)	Within 30 days
4.2.6	DG set 125 KVA (min 1 nos)	Within 30 days
4.2.7	Testing Lab	Within 45 days
4.2.8	Concrete compressive strength testing moulds- 50 Nos.	Within 30 days
4.2.9	Drinking water tank – 1000 lit.	Within 30 days
4.2.10	Self-priming water pump 5HP (diesel / electric)	Within 30 days
4.2.11	Welding rectifier	As per requirement
4.2.12	Portable fire extinguishers as below: Soda acid – 2 sets. Dry chemical powder – 2 sets CO2 – 2 sets. Water & sand bucket (4 buckets in one stand) – 2 sets. Fire hose with nozzle (50 M length) – 2 sets	Within 30 days
4.3	In the event of any failure on the part of the contractor to deploy T & P to sustain desired work progress, BHEL may at his discretion also terminate the contract on this ground and take out any or whole amount of the contract from the scope of the contractor. In the event of failure of contractor to deploy necessary and sufficient T&P/ IMTEs to maintain work progress, BHEL will be at liberty to arrange the same from any of BHEL site/ other agency & charges along with 5%	

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Chapter – IV: T&PS AND MMES TO BE DEPLOYED BY CONTRACTOR

	overheads shall be deducted from contractor's RA bill. Decision of BHEL in this regard will be final & binding on contractor.
4.4	Batching Plant shall not be more than 3-year-old. All the batching plants shall maintain adequate spares to cater immediate day to day maintenance. Contractor shall submit relevant papers of major T&Ps for verification of BHEL prior to dispatch of the same.
4.5	<p>T&P shown in the above-mentioned list are tentative based on planned progress requirement, construction schedule and material availability at site. It is to be reviewed and mutually agreed with CM, BHEL site periodically from time to time for mobilization of major T&Ps, and the same have to be adhered to. No change will be permitted without written approval of Construction Manager, BHEL site.</p> <p>Further requirement will be reviewed time to time at site and contractor will provide additional T&P/equipment to ensure completion of entire work within schedule time without any financial implication to BHEL. All other T&Ps shall be provided by the contractor without any extra cost to BHEL. Vendor will give advance intimation & certification regarding capacity etc. prior to dispatch of heavy equipment.</p>
4.6	All T&P and all IMTEs, which are required for successful and timely execution of the work covered within the scope of this tender, shall be arranged and provided by the contractor at his own cost in working condition.
4.7	In the event of non mobilisation of any T&P by the successful bidder and as a result progress of work suffered, BHEL reserves the right to deduct suitable amount from the dues of the bidder, with assigning reasons thereof on market Rate.
4.8	<p><u>MMEs / MMRs</u></p> <p>To be finalized as per site requirement.</p>
4.9	It is understood that towards end of contract period, the requirement of GPC will taper down. If the completion period is extended for reasons not attributable to the vendor and the daily requirement reduces considerably than in such condition the vendor may be allowed to demobilize part of equipment with mutual discussion and approval by BHEL Site In-charge.

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ANNEXURE- A LIST OF EQUIPMENTS FOR CIVIL SITE LABORATORY

SL NO.	NAME OF TEST	NAME OF EQUIPMENT	SIZE OF EQUIPMENT	IS REF.
1	VOID			
2	Abrasion value test	Los Angles Abrasion testing machine	Standard	IS 2386
3	Aggregate Impact value test	Aggregate Impact value testing machine.	Standard	IS 9377
4	Aggregate crushing value test	Crushing value apparatus	Standard	IS 2386
5	Flakiness index	Thickness gauge for measuring flakiness index.	Standard	IS 2386
6	Elongation Index	Elongation gauge	Standard	IS 2386
7	Bulk density, voids and bulking apparatus	Measuring cylinders	3, 5,10 & 15 liters cylinders	
8	Ready mix concrete Compressive test	Digital Compressive Testing Machine.	2000KN capacity	IS 2505
9	VOID			
10	Ready mix concrete Cube Testing	Ready mix concrete Cube Mould	150x150x150mm, minimum 120 Nos.	IS 10086
11	Workability of ready mix concrete	Slump cone	Standard, minimum 04 nos	IS 456
12	Specific gravity of aggregates	Pycnometer	Standard, at least 02 nos	IS 383
13	VOID			
14	Course aggregate Sieve analysis (Ready mix concrete & Road Works)	Sieve set	450mm dia GI Frames Size: 125 mm, 90 mm, 75 mm, 63 mm, 53 mm, 40 mm, 20 mm, 16 mm, 12.5 mm, 10 mm, 4.75 mm, Pan and cover (2 Sets)	IS 383
15	Fine aggregate sieve analysis	Sieve set	200 mm dia Brass sieves; Size 4.75 mm, 2.36 mm, 1.18 mm 600 micron, 300	IS 383

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			micron, 150 micron, 75 micron, 75 micron, Pan and cover (2 Sets)	
16	Seive Shaker	Motorised Sieve shaker	Mfg. Catalogue	
17	Silt content check	Sand silt content beaker	Standard	

Process Control Accessories				
Sl	Description of Equipment	Specification	Size / No.	
1	Hot air oven	Temperature range 50° C to 300° C	600 x 600 x 600 mm (min. size)	
2	Electronic balance	600g x 0.01g, 10Kg and 50 kg	3 nos.	
3	Physical balance	5 kg capacity	Loose weights up to 5 kg	
4	Thermometer	Temperature 0°C to 50°C	1 No. Digital & 2 Analogue.	
5	Measuring jars	100ml, 200ml, 500ml & 1000 ml	2 nos. set of each size	
6	Gauging trowel	100mm & 200 mm with wooden handle	4 nos.	
7	Spatula	100mm & 200 mm with long blade wooden handle	2 nos. each size	
8	Stainless steel scoop	2 kg and 5 kg	2 nos. each	
9	Digital pH meter	0.1 least count	02 nos.	
10	GI tray	600 x 450 x 50 mm, 450 x 300 x 40 mm, 300 x 250 x 40 mm	02 nos. each	
11	Electric mortar mixer	0.25 CUM capacity.	01 no	

Note: Above list is tentative for bidder's guidance only. Any other equipment if required for successful execution of any work covered under the scope shall be arranged by the contractor. Make of all testing equipment and process control accessories shall be BHEL/Customer approved brands.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – V: T&PS AND MMES TO BE PROVIDED BY BHEL

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

BHEL shall not provide any T&Ps for this scope of work.

All T&Ps required for handling of items / materials to be arranged by bidder.

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Chapter – VI: TIME SCHEDULE

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 plan to start production within stipulated timelines unless instructed by BHEL to differ start of work in writing.

The date of start of work shall be reckoned as the LOA date of the contract. However, the date of start may be reviewed and changed accordingly by Construction Manager / Site-in-Charge / Project Manager of BHEL with recorded reasons in the KOM (Kick of Meeting).

6.2 Schedule of Completion:

Supply of Geopolymer concrete: within 34 (Thirty-four) months from date of start of work. Supply shall be regulated as per the site requirement.

The entire work under the scope shall be successfully completed in all respect as per BHEL requirement.

Milestones for completion of works shall be as under:

Sl. No.	Activity	Schedule of completion
6.2.1	Approved Design Mix for Geopolymer DLC (M10) and Geopolymer PQC (M35)	Within 60 days from the date of LOA
6.2.2	Geopolymer concrete Production grade M10 (DLC) for Priority road	Within 7 days from the date of intimation given by BHEL In- charge for readiness of DLC laying
6.2.3	Geopolymer concrete Production grade M35 (PQC) for Priority road	Within 7 days from the date of intimation given by BHEL in- charge for readiness of PQC laying
6.2.4	Geopolymer concrete Production grade M10 (DLC) for other than priority roads	Within 10 days from the date of intimation given by BHEL in- charge for readiness of DLC laying
6.2.3	Geopolymer concrete Production grade M35 (PQC) for other than priority roads	Within 10 days from the date of intimation given by BHEL in- charge for readiness of PQC laying

Note-

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Chapter – VI: TIME SCHEDULE

1. The contractor shall plan his work in such a manner so as to meet the overall project schedule, in consultation with BHEL Engineer.
2. In case of any failure in supply of daily/weekly/monthly target of Geopolymer Concrete supply, BHEL reserves the right to arrange the required Geopolymer Concrete. Any additional cost towards the arrangement of Geopolymer Concrete shall also be recovered from the running bills of the bidder along with 5% overheads.

6.3 Mobilization Schedule

The contractor shall necessarily arrange all the required resources to start the work at the earliest as per schedule given below:

Sl. No.	Activity	Schedule of completion from the date of LOA
6.3.1	Readiness for the production of-Geopolymer concrete (DLC) of Grade M10 including mobilization of necessary resources.	45 Days
6.3.2	Readiness for the production of-Geopolymer concrete (PQC) of Grade M35 including mobilization of necessary resources.	50 Days

6.3.3 Penalty for delay in Mobilization: Since time is the main essence of the contract, the mobilization by bidder is to be made within the time limit prescribed as above. In case contractor fails to mobilize within the period specified in the contract, BHEL will reserves the right to levy penalty at the rate of 0.5% (half percent) of the awarded contract value for each week of delay or part thereof without prejudice to any other right, relief or compensation due to BHEL under any other conditions of the contract subject to a maximum limit of **5% of awarded contract value**.

6.3.4 In case of delay in mobilization of bidder, for reasons not attributable to BHEL, the 'Penalty clause' shall be enforced, unless extension of mobilization schedule is granted by BHEL.

6.4 COMPLETION OF WORK AND COMMENCEMENT OF GUARANTEE PERIOD

6.4.1 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, labour 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.

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Chapter – VI: TIME SCHEDULE

- 6.4.2 Guarantee period for the work done shall be Three (3) months from the date of supply of last lot of Geopolymer concrete along with submission of accepted test results of ready-mix concrete specimens.
- 6.4.3 The contractor will be responsible for the quality of Geopolymer concrete supplied, quality of materials / design of Geopolymer concrete. In case the geopolymer concrete fail to give the required strength, the cost of re-test, demolition, re-work & other cost / charges shall be recovered from the vendor. Decision of Engineer in this regard is final & binding on the vendor.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VII: TERMS OF PAYMENT

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.
7.1.1	Documents required for RA Bill: <ul style="list-style-type: none">• 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.• HR/IR compliance documents:<ul style="list-style-type: none">i. Wages payment sheet as per applicable minimum wages.ii. Proof of PF contribution submission.iii. Proof of ESI/ WC contribution submissioniv. Proof of Bonus payment as per Bonus Act if applicable.v. Proof of EL payment if applicable.vi. Any other statutory document if applicable. Documents required for Final Bill: 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: <ul style="list-style-type: none">• 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 etc.• Final Material re-conciliation statement duly approved by BHEL.• Indemnity Bond as per prescribed format.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VII: TERMS OF PAYMENT

	<ul style="list-style-type: none">• Deviation statement showing the difference between the actuals and as per the contract.• Final Delay Analysis.												
7.2	<p>PRICE VARIATION CLAUSE/ESCALATION</p> <p>ESCALATION / PRICE VARIATION CLAUSE shall be applicable as detailed below:</p> <p>-</p> <p>In order to take care of variation in cost of execution of work on either side, due to variation in the index of Aggregate, Labour & Diesel, Price Variation Formula as described herein shall be applicable</p> <p>85% component of Contract Value shall be considered for PVC calculations and remaining 15% shall be treated as fixed component. The basis for calculation of price variation in each category, their component, Base Index, shall be as under:</p> <table><tr><th>Category</th><th>Index</th><th>Component (K)</th></tr><tr><td>Aggregates</td><td>Monthly index numbers for STONE, CHIP as per Office of the economic Adviser. (website: http://eaindustry.nic.in/home.asp)</td><td>60</td></tr><tr><td>Labour (All Categories)</td><td>MONTHLY ALL-INDIA AVERAGE CONSUMER PRICE INDEX NUMBERS FOR INDUSTRIAL WORKERS' published by Labour Bureau, Ministry of Labour and Employment, Government of India. (Website: labourbureau.nic.in)</td><td>10</td></tr><tr><td>Diesel</td><td>Monthly index numbers for HSD as per Office of the economic Adviser. (website: http://eaindustry.nic.in/home.asp)</td><td>15</td></tr></table> <p>Payment / recovery due to variation in index shall be determined on the basis of the following notional formula without any initial absorption, in respect of the identified components viz Aggregates, Labour & Diesel.</p>	Category	Index	Component (K)	Aggregates	Monthly index numbers for STONE, CHIP as per Office of the economic Adviser. (website: http://eaindustry.nic.in/home.asp)	60	Labour (All Categories)	MONTHLY ALL-INDIA AVERAGE CONSUMER PRICE INDEX NUMBERS FOR INDUSTRIAL WORKERS' published by Labour Bureau, Ministry of Labour and Employment, Government of India. (Website: labourbureau.nic.in)	10	Diesel	Monthly index numbers for HSD as per Office of the economic Adviser. (website: http://eaindustry.nic.in/home.asp)	15
Category	Index	Component (K)											
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Chapter – VII: TERMS OF PAYMENT

	$P = K \times R \times (X_n - X_o) / X_o$ <p>Where,</p> <ul style="list-style-type: none"> ➤ P = Amount to be paid / recovered due to variation in the Index for Aggregates, Labour & Diesel ➤ K = Percentage component applicable for Aggregates, Labour & Diesel. ➤ R = Value of work done for the billing month ➤ X_n = Revised Index for Aggregates, Labour & Diesel for the billing month under consideration. ➤ X_o = Index for Aggregates, Labour & Diesel as on the Base date.
7.2.1	PVC shall not be payable for the ORC amount, Supplementary/Additional Items, Extra works. However, PVC will be payable for items executed under quantity variation of BOQ items under originally awarded contract.
7.2.2	Base date shall be calendar month of the 'last date of submission of Tender'
7.2.3	The contractor shall furnish necessary monthly bulletins in support of the requisite indices from the relevant websites along with his Bills.
7.2.4	The contractor will be required to raise the bills for price variation payments on a monthly basis along with the running bills irrespective of the fact whether any increase/decrease in the index for relevant categories has taken place or not. In case there is delay in publication of bulletins (final figure), the provisional values as published can be considered for payments and arrears shall be paid/recovered on getting the final values.
7.2.5	<p>PVC shall be applicable for the entire original contract period plus the extended period, i.e. for the complete execution period, as follows:</p> <p>For PVC computation of the nth month:</p> <p>Let the cumulative delay attributable to the Contractor is D_n in the nth month as per Form-14.</p> <p>Considering R_n as the billing value for the nth month, PVC for the nth month shall be calculated as follows:</p> <ol style="list-style-type: none"> a) PVC for the portion of R_n for an amount of D_(n-1) shall be payable as per indices for the (n-1)th month. b) PVC for the balance portion of R_n shall be payable as per indices for the nth month <p>In case D_(n-1) is greater than R_n, then entire R_n shall be payable as per indices for the (n-1)th month and the balance portion of D_(n-1) shall be adjusted from R_(n+1) of the (n+1)th month and will be payable as per indices for the (n-1)th month. The</p>

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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	<p>above process shall be continued for subsequent month(s) also till full D(n-1) is consumed.</p> <ul style="list-style-type: none">i) For milestones mentioned in the contract, PVC shall be applicable as per average of the indices from the month of base date till the month of execution of milestone.ii) PVC shall not be applicable for time extension provided for the delays solely attributable to the contractor. No PVC is payable during the period of Provisional Time Extension till grant of final time extension. Applicability of PVC will be decided at the time of grant of final time extension.iii) The total amount of PVC shall not exceed 15% of the cumulatively executed contract value. Executed contract value for this purpose is exclusive of PVC, ORC, Supplementary/Additional Items and Extra works except items due to quantity variation <p>Note: Work Planning in F-14 format to be meticulously done as per Clause 2.9 of this GCC.</p>
7.3	<p>SECURED RECOVERABLE ADVANCES:</p> <p>Interest Free Secured Mobilization Advance as per GCC Clause No. 2.13 will be payable under exceptional circumstances on certification of BHEL Construction Manager at Site. Interest Free Mobilization Advance shall be disbursed in specifically mentioned stages of major resource mobilization as specified hereunder:</p> <ul style="list-style-type: none">1. For Mobilization and Installation of Mobile Batching Plant - 2.0%2. For Mobilization of other required T&Ps to start the work - 1.5%3. For Installation and Erection of Site Infrastructure by contractor i.e. site office and quality lab. - 1.5% <p>Note:</p> <ul style="list-style-type: none">1. BHEL Site-CM 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.

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Chapter – VIII: TAXES AND DUTIES

8.0	TAXES & DUTIES
8.1	<p>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.</p> <p>However, provisions regarding GST on output supply (goods/service) and TDS/TCS as per Income Tax Act shall be as per following clauses.</p>
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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VIII: TAXES AND DUTIES

8.2.8	<p>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: -</p> <ol style="list-style-type: none"> Supply of goods and/or services have been received by BHEL. Original Tax Invoice has been submitted to BHEL. Contractor/ Vendor has submitted all the documents required for processing of bill as per contract/ purchase order/ work order. 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. 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. 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. 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 permit, 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/alterd/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 Contractor'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

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VIII: TAXES AND DUTIES

	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	<p><u>Variation in Taxes & Duties:</u></p> <p>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.</p> <p>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 contractor only and within the contractual delivery period only.</p> <p>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.</p>
8.3	<p><u>Income Tax:</u></p> <p>TDS/TCS as applicable under Income Tax Act, 1961 or rules made thereunder shall be deducted/collected from contractor's bill.</p>

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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VIII: TAXES AND DUTIES

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

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Chapter – VIII: TAXES AND DUTIES

	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.

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CHAPTER-IX: BOQ CUM RATE SCHEDULE AND WEIGHTAGE OF INDIVIDUAL ITEMS

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

<u>CONTENTS</u>	
Description	Remarks
PART A:	Vol-II Price Bid Total Price for entire scope of Work (Implanted in the E- Procurement portal entitled as “Vol-II Price Bid”).
PART B:	PREAMBLE, ‘BOQ CUM RATE SCHEDULE’, WEIGHTAGE FOR AMOUNT OF INDIVIDUAL ITEMS OF BOQ CUM RATE SCHEDULE (ATTACHED SEPARATELY)

<u>Instructions to the Bidders</u>	
1.	<u>Bidders shall quote Total Price for the entire scope of work in Rupees in VOL II PRICE BID at BHEL E-procurement Portal.</u> 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.	Contract Value based on the price quoted by Bidder in Price Bid shall be as per Part-B.
3.	BHEL has fixed the weightages as in “Part-B” for the amount of individual items of BOQ Cum Rate Schedule w.r.t. the total value quoted in price-bid.
4.	Based on the pre-fixed weightages, amount of individual items shall be derived by BHEL. This amount shall not be rounded off.
5.	Based on the quantities of individual item and the amount arrived in Sl. No. 4 above, 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.
6.	Bidders to note that this is an <u>‘Item rate contract’</u> . Payment shall be made for the actual quantities of work executed at the Unit rate arrived at as per serial no. 5 above.

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Chapter-X : TECHNICAL SPECIFICATIONS

10.0	Technical Specifications
10.1	The design mix of concrete shall be ensured from a third-party reputed institute who has already executed Geopolymer concrete mix design in the past. The mix design shall be carried out as per IRC 44:2017. The workability of GPC shall be as per IRC 15:2011.
10.2	MATERIAL REQUIRED FOR GEOPOLYMER CONCRETE Geo-Polymer Concrete is a special type of concrete where no cement is used unlike conventional cement concrete. Major ingredients of Geo-polymer concrete are as below: <ul style="list-style-type: none">• Aggregates (Coarse and fine)• Water• Fly Ash• Ground Granulated Blast Furnace slag• Sodium Silicate• Sodium Hydroxide• Chemical admixtures like super-plasticizer, retarder, shrink-reducing compound, evaporation reducer etc. All materials whether to be incorporated in the work or used temporarily for the construction shall conform to the relevant IS/IRC Specifications unless stated otherwise and be of best approved quality.
10.2.1	Aggregates: a) Coarse Aggregate: Coarse aggregate for concrete shall be crushed stones chemically inert, hard, strong, durable against weathering of limited porosity and free from deleterious materials. It shall be properly graded. It shall meet the requirements of IS: 383. b) Fine Aggregate: Fine aggregate shall be hard, durable, clean and free from adherent coatings of organic matter and clay balls or pellets. Fine aggregate in concrete shall conform to IS: 383. For plaster, it shall conform to IS: 1542 and for masonry work to IS: 2116.

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Chapter-X : TECHNICAL SPECIFICATIONS

	Petrographic examination and Alkali aggregate reactivity test for aggregates (Coarse and fine) shall be carried out through approved laboratory as per requirement.
10.2.2	<p>Water:</p> <p>Water for use in Concrete shall be clear and free from injurious oils, acids, alkalis, organic matter, soluble silts or other deleterious substances which may cause corrosion, discoloration, efflorescence etc. Normally potable water is found to be suitable. Generally, IS: 3550 will be followed for routine tests. Acceptance test for water shall be as per IS: 3025, and Table-1 of IS: 456. The pH value of water shall generally be not less than 6.</p>
10.2.3	<p>Fly-ash:</p> <p>Fly ash is a fine, powdery byproduct of burning coal in power plants and other industrial processes. It's collected from exhaust gases and is primarily composed of silica, alumina, and iron oxide.</p>
10.2.4	<p>GGBFS:</p> <p>Ground Granulated Blast Furnace Slag (GGBFS), is a byproduct of iron production. It's produced by quenching molten blast furnace slag and then grinding it into a fine powder. GGBFS is a glassy, granular material composed of silicates and aluminosilicates of calcium and other bases.</p>
10.3	<p><u>Quality Control:</u></p> <p>Contractor shall establish and maintain quality control for different items of work and materials as may be directed by the Engineer to assure compliance with contract requirements and maintain and submit to the Engineer records of the same.</p> <p>The quality control operation shall include but not be limited to the following items of work:</p> <ol style="list-style-type: none"> 1. Admixture: Type, quantity, physical and chemical properties that affects strength, workability and durability of concrete. For air entraining admixtures, dosage to be adjusted to maintain air contents within desirable limits. 2. Aggregate: Physical, chemical and mineralogical qualities. Grading, moisture content and impurities. 3. Water: Impurities tests. 4. Fly-ash – chemical & other physical tests shall be in bidder's scope. 5. GGBFS – All relevant tests are in bidder's scope.

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Chapter-X : TECHNICAL SPECIFICATIONS

	<p>6. Sodium Hydroxide & Sodium Silicate – All relevant tests are in bidder's scope.</p> <p>7. Grades of Geopolymer Concrete: Usage and mix design, testing of all properties.</p> <p>8. Batching & Mixing: Types and capacity of plant, concrete mixers and transportation equipment as per customer Technical Specification.</p>
10.4	Void
10.5	<p><u>Installation:</u></p> <p>All installation requirements shall be in accordance with applicable IRC & IS codes and as supplemented or modified herein or by other best possible standards where the specific requirements mentioned in this section of the specification do not cover all the aspects to the full satisfaction of the Engineer.</p>
10.6	Void
10.7	<p><u>Sampling and Testing of Materials:</u></p> <p>a) The method of sampling for testing of construction materials and work / job samples shall be as per the relevant IS / standards / codes and in line with the requirements of the technical specifications / quality plans. All samples shall be jointly drawn, signed and sealed wherever required, by the Contractor and the engineer or his authorized representative.</p> <p>b) The Contractor shall carry out testing in accordance with the relevant IS / standards/codes and in line with the requirements of the technical specifications/quality plans. Where no specific testing procedure is mentioned, the tests shall be carried out as per the best prevalent engineering practices and to the directions of the Engineer. All testing shall be done in the presence of the engineer or his authorized representative.</p> <p>c) Before execution of any work the Contractor shall conduct full scale suitability tests on various construction and building material such as fine and coarse aggregates, admixtures, GGBFS, Chemicals, supplementary cementations materials and construction water to ascertain their suitability for use. The test samples for such full-scale testing shall be jointly sampled and sealed by the BHEL/Customer and Contractor, thereafter these shall be sent to the concerned laboratory through the covering letter signed by field quality assurance (FQA) representative of BHEL/Customer.</p> <p>d) Concrete mix design shall be conducted from reputed government / autonomous laboratories / organizations/ NITs/ IITs/ Other reputed</p>

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-X : TECHNICAL SPECIFICATIONS

	<p>testing laboratories/ Third party institutes as approved by customer/ BHEL.</p> <p>e) The Contractor shall timely initiate the action with regard to the evaluation of aggregates and other building material including concrete mix design, so as to ensure completion of these tests before start of works at site, thereby not affecting any project work.</p> <p>f) The test reports and recommendations for suitability of the materials including concrete mix design shall be promptly submitted by the Contractor to BHEL before start of work.</p>
10.8	<p>Sampling and testing of Geopolymer Concrete</p> <p>The sampling of Geopolymer concrete, making the test specimens, curing and testing procedure etc. shall be in accordance with IRC 44:2017 & IRC 15:2011.</p> <p>It shall be the sole responsibility of the contractor to provide GPC of required strength and workability at the pouring site.</p> <p>GPC work if found unsuitable for acceptance and shall have to be dismantled, replacement is to be done by the Contractor as per specification to the satisfaction of BHEL.</p> <p>No payment for the dismantled concrete, in the dismantled portion shall be made.</p> <p>In the course of dismantling, if any damage is done to the relevant formwork, reinforcement, embedded fixtures, adjacent structures etc., the same shall be made good at the cost of the contractor and suitable recovery along-with overheads @ 5% shall be done from contractor's due payments/RA bills.</p>
10.9	<p>Laboratory and Field Testing:</p> <p>The field laboratory for QA and QC activities shall be established and installed with the adequate facilities to meet the requirement of envisaged day to day tests during execution of the work. This should be in line with the technical specifications for QA (Quality assurance) Civil works attached separately.</p>

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Chapter-XI : CUSTOMER SPECIFICATIONS

Following Technical Specifications shall be integral parts of this tender

(attached separately):

- SECTION-C: CUSTOMER CONTRCT SPECIFIC TECHNICAL REQUIREMENTS
- CUSTOMER TECHNICAL SPECIFICATIONS FOR QUALITY ASSURANCE OF CIVIL WORKS.
- PLOT PLAN (TENDER STAGE DRAWING FOR BIDDER'S INFORMATION ONLY. FINAL PLOT PLAN SHALL BE PROVIDED TO THE SUCCUESSFUL BIDDER AFTER AWARD OF WORK).

NOTES:

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

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter-XII : ANNEXURES

Annexure-I

CONFIRMATION/DECLARATION

(To be typed and submitted in the Letter Head of the Company/Firm of Bidder)

To,

(Write Name & Address of Officer of BHEL inviting the Tender)

Dear Sir/Madam,

Sub: DECLARATION REGARDING SUBMISSION OF CREDENTIALS AS MENTIONED AT B3.2 OF THE PQR

Ref: NIT/Tender Specification No:

I/We, _____ declare that, I/We shall engage a specialist for supervision of geopolymer concrete production work from the BHEL/Customer approved design mix approving 'laboratory / third party institute' as mentioned at Clause No.B.3.2 of the PQR, before commencement of work.

In case, I/We fail to comply as mentioned above, BHEL shall be entitled to take any contractual action.

Sign. of the AUTHORISED SIGNATORY
(With Name, Designation and Company seal)

Place:
Date: