BHARAT HEAVY ELECTRICALS LIMITED

PROJECT ENGINEERING MANAGEMENT, NOIDA

Date-26-Mar-24

CORRIGENDUM- 02

PROJECTs	**:**	**2 X 800 MW NTPC LARA TPP STAGE-II**
PACKAGE	**:**	**COOLING TOWER - Induced Draft Cooling Towers (IDCT)**
ENQUIRY NO	**:**	**PE/PG/LAR/E-7421/2023 Dated-1-Mar-24**
SUBJECT	**:**	**CHANGE OF TENDER ID + PRE-BID CLARIFICATION + DUE DATE EXTENSION**

Type of Corrigendum			
Technical Corrigendum -	☑	Commercial Corrigendum -	☑

Bidders are requested to go through the following -

- Tender ID of the subject NIT at https://eprocurebhel.co.in/nicgep/app: has been changed and the new Tender ID will be as: 2024_BHEL_33529_**2** instead of 2024_BHEL_33529_**1**.
- Due date is **15.04.2024 (01.00PM).** Bid opening shall be done at **15.04.2024, 05.00 PM.**
- Please find **Annexure A to Corrigendum 02 for Financial PQR**. Bidders are requested to comply the same while quoting for this tender enquiry.
- Please find **Annexure B to Corrigendum 02 for clarification** by BHEL against all pre-bid queries raised by prospective bidders. Bidders are requested to comply the same while quoting for this tender enquiry.
- Please find **Amendment 1 to Technical Specification**. Bidders are requested to comply the same while quoting for this tender enquiry.
- Please find **Annexure C** to **Corrigendum 02** for Make in India Local Content Certificate format. Bidders are requested to comply the same while quoting for this tender enquiry.
- Clause no 30 of Page 3 of 10 of NIT shall be read in place of Clause no 2.17 of Annexure III of NIT

All the other terms and conditions of the tender enquiry remain unchanged. All the bidders are requested to quote accordingly.

Yours faithfully,

For and on behalf of BHEL

Digitally signed by SUMEET SAHAY
DN: c=IN, postalCode=201301, st=UTTAR PRADESH, street=GAUTAM BUDDHA NAGAR, l=GAUTAM BUDDHA NAGAR, o=BHARAT HEAVY ELECTRICALS LTD., ou=MANAGER, serialNumber=7c872f832df17391f51d401438ee810f6cd2ebdc173b4740de3721b84bbd274e, pseudonym=83753559bead4bc2a678cd624fff6c5d, 2.5.4.20=1535cc8aa56d40a3d06d3c77368225f762dd2a710650ceb42afc288195d58c19, email=SSAHAY.BHEL@GMAIL.COM, cn=SUMEET SAHAY
Date: 2024.03.26 12:34:18 +05'30'

SUMEET SAHAY
Manager/BOP

ANNEXURE A TO CORRIGENDUM- 02
FINANCIAL PQR

	PRE - QUALIFYING REQUIREMENTS
PROJECT:	2 X 800 MW NTPC LARA TPP STAGE-II
PACKAGE:	COOLING TOWER IDCT

CRITERIA FOR EVALUATION - FINANCIAL :

	Amount (in Rs.)
Average annual financial turnover during the last Three Financial Years should not be less than Rs.Thirty Seven Crore Eighty Six Lakh only	37,86,00,000.00

Notes:-

a) The bidder has to submit financial accounts (audited, if applicable comprising of Audit report, Balance Sheet, Profit & Loss A/c Statement and Notes/Schedules pertaining to Turnover/Sales/Revenue), for last three years (or from the date of incorporation, whichever is less) as on tender due date to review the above criteria. In case the incorporation of vendor is less than 3 years, average annual financial turnover shall be calculated based on available information as below:-

i) If the accounts are available for <= 1 Financial Year, the Average Annual Turnover shall be calculated based on available information divided by 1 (One).

ii) If the accounts are available for >1 but < = 2 Financial Years, the Average Annual Turnover shall be calculated based on available information divided by 2 (Two).

iii) If the accounts are available for >2 but <= 3 Financial Years, the Average Annual Turnover shall be calculated based on available information divided by 3 (Three).

b) Foreign bidder is to submit a latest report from reputed third party business rating agency like Dun & Bradstreet, Credit reform etc. in addition to the documents mentioned at point (a) above for review of above criteria.

c) Other Income shall not be considered for arriving at Annual Turnover/Sales.For evaluation purpose,turnover figure excluding taxes shall be considered.

d) For evaluation of foreign bidder, exchange rate (TT selling rate of SBI) as on scheduled date of tender opening (Part-I bid in case of two part bid) shall be considered.

e)Bidder who is 50% or above subsidiary of any other company including those registered outside India and does not meet any of the above Financial Criteria, such bidder may be qualified based on credentials of its holding company provided such holding company meets the above PQR criteria. In such case, the Bidder would be required to furnish a Letter of Support from its Holding Company, pledging unconditional and irrevocable financial support for the execution of the Contract by the Bidder in case of award.

f)In cases where audited results for the last financial year as on the date of Techno Commercial bid opening are not available, a Certificate would be required from CEO/CFO stating that the financial results of the Company are under audit as on the date of Techno-commercial bid opening and are not available.

BHARAT HEAVY ELECTRICALS LIMITED
PROJECT ENGINEERING MANAGEMENT, NOIDA

ANNEXURE -B TO CORRIGENDUM- 02

BHEL'S CLARIFICATION TO THE PRE BID QUERIES

Sr. No.	Document	Clause no.	Page no.	Subject	Query	BHEL Response
1	Pre-qualifying requirements				The financial pre-qualifying requirement is not provided. We request for following financial pre-qualifying criteria. We request for accepting the **parent company financial turnover criterion**, in case of a majority share held by a parent company. This is the norm for enhancing bid responses and many public sector companies such as BPCL and HPCL are accepting the same. As an added provision, in case of a consortium bidding with Indian civil partner, the criterion of **combined turnover** of lead partner and civil partner can be considered, provided the technical criterion is met by the lead partner based on the credentials of	Please refer Annexure A for Financial PQR

					his parent company.	
2	Technical specification for IDCT, book 1 of 2. Spec. no. PE-TS-508-165-W001, Rev. 00	5	7 of 195	Inlet air louvers	We would like to design the cooling tower without inlet air louvers and provide extended basin with spray catcher to prevent water from splashing outside. Please confirm your acceptance.	Noted. Please also refer cl no. 4.5 at page no 31 of 195 of tender specification.
3	Technical specification for IDCT, book 1 of 2. Spec. no. PE-TS-508-165-W001, Rev. 00	16.2	8 of 195	Vibration monitoring system	Please inform the number of sensors / probes to be considered for making provision in the equipment where the sensors / probes will be fixed.	Please note vibration transducers shall be provided for gearbox of Cooling Tower FAN (X/Y).
4	Technical specification for IDCT, book 1 of 2. Spec. no. PE-TS-508-165-W001, Rev. 00	14	12 of 95	Piling	We request that piling and pile caps, if any be excluded from cooling tower bidder's scope. We shall carry out pile design and provide layout drawing.	Not acceptable. Cooling tower bidder's scope shall be as per Tender specification.
5	Technical specification for IDCT, book 1 of 2. Spec. no. PE-TS-508-165-W001, Rev. 00	18	12 of 95	Sizing of hot water distribution system	We request to accept maximum velocity of 2.5 m/sec for sizing the hot water distribution system.	Not acceptable. Bidder to follow tender specification.
6	Technical specification for IDCT, book 1 of 2. Spec. no. PE-TS-508-165-W001, Rev. 00	2.20	20 of 195	Evaporation loss	The maximum permissible evaporation loss of 1.6% is stringent. We request to accept the maximum permissible evaporation loss of 1.8%.	Bidder to refer Amendment no 1.
7	Technical specification for IDCT, book 1 of 2. Spec. no. PE-TS-508-165-W001, Rev. 00	4.2.5	22 of 195	MOC of fan cylinder / recovery stack – Pultruded FRP / GRP	The FRP fan cylinder / recovery stack is not manufactured using pultrusion process. Hand lamination method is used to manufacturing FRP	Noted. However, same shall be subject to NTPC acceptance during detailed engineering.

					fan cylinder / recovery stack. Please confirm your acceptance.	
8	Technical specification for IDCT, book 1 of 2. Spec. no. PE-TS-508-165-W001, Rev. 00	4.5	22 of 195	MOC of access ladder – Heavily galvanised (610 gm/ sq.m) in accordance with IS: 2629 with corrosion resistant protective coating Surface preparation in accordance with IS:6129.	We request that the MOC of access ladder for FRP cooling tower should be of pultruded FRP. Please confirm your acceptance.	Noted. However, same shall be subject to NTPC acceptance during detailed engineering.
9	Technical specification for IDCT, book 1 of 2. Spec. no. PE-TS-508-165-W001, Rev. 00	4.6	22 of 195	MOC of handrail - Heavily galvanised and should be applied one coat of zinc chromatic primer and two coats of synthetic enamel paint.	We request that the MOC of handrail for FRP cooling tower should be of pultruded FRP. Please confirm your acceptance.	Noted. However, same shall be subject to NTPC acceptance during detailed engineering.
10	Technical specification for IDCT, book 1 of 2. Spec. no. PE-TS-508-165-W001, Rev. 00	4.9	22 of 195	Louvers – bidder's proven practise.	During detail engineering stage, we may use extended basin with spray catchers provided at basin top. We may not provide louvers at air inlet level. Please confirm your acceptance.	Noted. Please also refer cl no. 4.5 at page no 31 of 195.
11	Technical specification for IDCT, book 1 of 2. Spec. no. PE-TS-508-165-W001, Rev. 00	4.01.00	28 of 195	MOC of fill supports – SS 316	In case of trickle grid, the fill supports will be of pultruded FRP. Please confirm your acceptance.	Noted. However, same shall be subject to NTPC acceptance during detailed engineering.
12	Technical specification for IDCT, book 1 of 2. Spec. no. PE-TS-508-165-W001, Rev. 00	4.01.00	28 of 195	MOC of handrail. Others – refer civil specifications	We request that the MOC of handrail for FRP cooling tower should be of pultruded FRP at all levels. Please confirm your acceptance.	Noted. However, same shall be subject to NTPC acceptance during detailed engineering.

13	Technical specification for IDCT, book 1 of 2. Spec. no. PE-TS-508-165-W001, Rev. 00	3	135 of 195	Approved makes of fan assembly – cooling tower	We request you to approve M/s. Coolflo Engineers Pvt Ltd. They are one of the reputed makes of cooling tower fans and have supplied fans for NTPC projects in the past. Please find attached their experience list.	Sub-vendor approval shall be taken up with NTPC during detailed engineering.
14	Technical specification for IDCT, book 1 of 2. Spec. no. PE-TS-508-165-W001, Rev. 00	14	150 of 195	Testing of cooling tower fan	We understand that the performance test of the cooling tower fan will be conducted at site during the course of performance test. Please confirm if our understanding is correct.	Noted. Same shall be subject to NTPC acceptance during detailed engineering.
15	Technical specification for IDCT, book 2 of 2. Spec. no. PE-TS-508-165-W001, Rev. 00	5	3 of 138	Standards for design of FRP cooling towers	Indian standards are not available for design of FRP cooling towers. Official copies of relevant CTI codes will be submitted. Please confirm your acceptance.	Noted. Official Copies (in paper format) of all relevant standards pertaining to analysis and design of FRP towers used in design shall be submitted to BHEL.
16	Technical specification for IDCT, book 2 of 2. Spec. no. PE-TS-508-165-W001, Rev. 00	10.6	8 of 138	Plastering of internal surface of all water retaining structures	Plastering of internal surface of cooling tower basin and cold water channel is not a standard practise. We request you to relax this requirement.	Bidder to comply with tender specification requirement
17	Technical specification for IDCT, book 2 of 2. Spec. no. PE-TS-508-165-W001, Rev. 00	7.00.0	37 of 138	Soil data	We request you to share the topographical survey drawing for variation in existing ground level at the cooling tower location and FGL. Further, please inform if the site will be handed over to the successful bidder on as is	Topographical survey drawings are enclosed in Amendment no 1. Site will be handed over to successful bidder on as is where is basis. Backfilling in IDCT area has to be done till the required FGL of RL 207. Bidder is required to backfill

					where is basis or graded site upto FGL of 207.0 m will be handed over.	the excavated footprint outside IDCT upto RL207M. Inside IDCT, bidder is required to consider backfilling level upto bottom of IDCT basin slab.
18	Technical specification for IDCT, book 2 of 2. Spec. no. PE-TS-508-165-W001, Rev. 00	7.00.01	37 of 138	Successful bidder to carry out his own detailed soil investigation	Increase in design quantities as a result of variation between soil investigation report shared with tender documents and detailed soil investigation conducted after award of contract would be charged extra by contractor. Please confirm your acceptance.	Owner (NTPC) has already carried out detailed geotechnical investigation of the area. Relevant portion of the report and foundation system/geotechnical data are enclosed (Refer Amendment no 1). This will supersede the data provided earlier. Further, based on this report BHEL has already finalised with NTPC the soil bearing capacities to be considered in the IDCT area for design. Refer Page 130/138 of the specification. Bidder is not expected to carry out any soil investigation.
19	Technical specification for IDCT, book 2 of 2. Spec. no. PE-TS-508-165-W001, Rev. 00	7.00.02	37 of 138	Borelog details	We request you to provide the borelog details of locations specific to both the cooling towers.	Relevant borelog details specific to cooling towers are already enclosed as Annexure-A at page 116 of 138. Also, refer amendment no 1.
20	Technical specification for IDCT, book 2 of 2. Spec. no. PE-TS-508-165-W001, Rev. 00	7.03.01	42 of 138	Treatment of foundations / underground structures	Please confirm whether the excavated soil is suitable for backfilling.	Excavated soil in general is suitable for backfilling except that black cotton soil will not be considered for backfilling.
21	Technical specification for IDCT, book 2 of 2.	7.07.03	45 of 138	Geotechnical investigation work	The list of agencies acceptable for carrying out	Bidder is not expected to carry out geo-technical

	Spec. no. PE-TS-508-165-W001, Rev. 00				geotechnical investigation is not available. We request you to provide the same.	investigation as the bearing capacities are already provided in specification.
22	Technical specification for IDCT, book 2 of 2. Spec. no. PE-TS-508-165-W001, Rev. 00	10	130 of 138	Soil bearing capacity for IDCT 3 & 4	The SBC's provided are for 25 mm, 40 mm and 75 mm settlement criteria in soil. Please confirm if we can adopt 75 mm settlement criteria for designing the raft foundation.	75 mm settlement can be used only for raft foundation resting on soil. For isolated/ strip footings, 40mm settlement will be used.
23	NIT	32	3 of 10	Reverse auction	The process of RA has led to bidders going overboard and cutting on the bid prices, resulting in financially unviable bids, which in turn lead to executional hazards and failure of contractor. Many reputed public sector companies have done away with RA as a regular practice. This effect is very profound in cooling tower industry. We request to remove reverse auction from the bidding process.	NIT terms will prevail. Kindly comply the same.
24	Technical specifications: PE-TS-508-165-W001 rev-00	16 of 195	39.10	Comprehensive Annual Maintenance service (AMS) for analyser instruments and profibus instruments.	We request BHEL to exclude the same from our scope, as these are bought-out items for us and BHEL can enter into AMS directly with the approved suppliers.	The referred clause about AMS is deleted from the tender specification.
25	Technical data - Part - A (mechanical)	20 of 195	2.16	Minimum elevation of top of water level in hot water distribution duct with	Kindly clarify if this criteria is mandatory as we feel that the cooling tower designer should be given the option	Bidder to follow tender specification. Also refer amendment no 1.

				respect to FGL: 13.0	based on his design.	
26	Technical data - Part - A (mechanical)	21 of 195	2.17	Maximum limit on total fan power consumption per cooling tower for the cooling fans at fan motor inlet terminals: 3240 KW	Please clarify if there is any credit for quoting with lesser power consumption than 3240 KW. If yes, please specify the loading value per KW.	No credit shall be given for quoting lesser Aux Power. Further please also refer Amendment no 1.
27	Technical data - Part - A (mechanical)	21 of 195	4.1.5	4.1 For RCC Induced draught cooling tower. Fan cylinder / recovery stack: RCC	We request BHEL to accept FRP recovery stack in case of RCC cooling tower, as it would save considerably on the construction time.	Bidder to follow tender specification.
28	Technical data - Part - A (mechanical)	22 of 195	4.6	Handrail shall be of heavily galvanised…	We presume that this is applicable only in case of RCC cooling towers. Kindly confirm.	Bidder to follow tender specification.
29	Technical data - Part - A (mechanical)	22 of 195	4.8	Fill support: SS 316 grid	Please note that as per our design, the fills shall be stacked on the RCC / Pultruded FRP beams, as the case may be. Hence there is no separate requirement of SS316 grid. Kindly confirm.	Noted. However, same shall be subject to NTPC approval during detailed engineering.
30	Technical data - Part - A (mechanical)	23 of 195	5.1	Performance parameters: Cold water temperature: 32 deg.C	We presume that an allowance of 0.3 deg.C shall be permitted towards instrument tolerances. Kindly confirm.	No tolerance is allowed.
31	Technical section section - VI, part B, sub-section A-15 CW system	11 of 43 & 25 of 195	3.6	All cells shall be identical.	We presume that all cells shall be of single inlet, including the end cells. Kindly confirm.	Bidder's understanding is correct.
32	Technical section section - VI, part B, sub-section A-15 CW system	12 of 43 & 26 of 195	3.12 (iv)	Calculations for arriving at the power consumption	As per our understanding, fulkerson's method of calculations is	Bidder to follow tender specification.

					not applicable. Kindly confirm.	
33	Sub-vendor list	135 of 195	3	Fan assembly - cooling tower	We request you to add Parag fans to the list, as the list is limited to 2 -3 vendors only.	Sub-vendor approval shall be taken up with NTPC during detailed engineering.
34	NIT	01 of 10	11	Earnest Money Deposit	The EMD amount of Rs.3 crore is on the higher side. Kindly re-visit and waive / reduce the same.	NIT terms will prevail. Kindly comply the same.
35	NIT	01 of 10 & 09 of 10	14 & 50	Only class I supplier (with local content 60% and above) Bidders to provide a certificate from statutory auditor giving the percentage of local content.	Please note that certification by a statutory auditor for future supplies is generally not being accepted by most of the auditor's. Hence we shall self-certify the same instead of statutory auditor. Kindly confirm that it is acceptable.	NIT terms will prevail. Kindly comply the same.
36	NIT	01 of 10	19	Prequalification document : Financial PQR - Yes	We notice that the financial PQR is missing in the documents uploaded in the portal. Kindly furnish the same.	Please refer Annexure A for Financial PQR
37	NIT	01 of 10	21	Delivery schedule : PG test: 2 months from BHEL clearance after respective unit COD	This clause is generic in nature and we request BHEL to give a cut-off date from mechanical completion beyond which the payment towards PG test milestone shall be released, in case of delay due to reasons not attributable to supplier.	NIT terms will prevail. Kindly comply the same. Also refer “note” of clause no 9.2.1 of GCTC of GCC BOP.
38	NIT	02 of 10	27	Tender evaluation	As per this clause, reinforcement steel and cement is free issue by BHEL. We request BHEL to provide the datum	Bidder to follow tender specification.

					value for both RCC and pultruded FRP towers, as being provided for other BHEL tenders.	
39	NIT	03 of 10	28	Payment terms for civil works : 10% on successful completion of PG test and handing over to customer….	We request BHEL to release the payment against this milestone, in case of delay in conducting PG test, due to reasons not attributable to bidder, beyond 6 months from mechanical completion.	NIT terms will prevail. Kindly comply the same.
40	NIT	03 of 10	28	Payment terms for vendors qualified as medium enterprises as per MSMED act:	As per the latest MSMED act, the payment shall be released within 45 days for medium enterprises. Kindly confirm.	Please refer clause no 9.5 of GCTC of GCC BOP
41	NIT	01 of 10	9	Due date & time for offer submission	The timeline is too short. Considering the package size, we request you to extend the bid submission date to 19th April 2024.	Please refer Corrigenda 01 for the same.
42	Tender notice_3_Technical PQR	01 of 13	4.3.1	The bidder / its sub-vendor should have designed, constructed and commissioned atleast 1 number induced draft cooling tower in RCC or pultruded FRP construction….	As per our understanding, in case of Pultruded FRP cooling tower option, the word "construction" refers to construction of RCC cold water basin, channel, foundation also. Kindly confirm if our understanding is correct.	This shall be subject to NTPC approval based on credentials submitted by bidder.
43	Annexure - VII PVC payment terms and conditions	01 of 4	--	PVC shall be applicable only, during the extended period of contract (if any)….	As per this clause, we understand that PVC would be applicable after expiry of contractual completion period. We request BHEL to accept for PVC	NIT terms will prevail. Kindly comply the same.

					clause during actual contractual period also.	
44	1	4 of 7	21	Inspection agency : Cat 1 - Inspection shall be done jointly or separately by NTPC and BHEL or BHEL's TPIA	The inspection visit charges of NTPC/BHEL/BHEL's TPIA shall be borne by BHEL and not by us. Kindly confirm.	Confirmed
45	3	1 of 13	4.3.1	The bidder/ its sub-vendor should have designed, constructed and commissioned at least one (01) number Induced Draught Cooling Tower in RCC or Pultruded Fiberglass Reinforced Plastic (FRP) Construction of capacity not less than 13000 m3/hr which should have been in successful operation for atleast one (1) year.	Generally RCC construction works such as cold water basin, channel, sump etc. required for Pultruded FRP super structure cooling towers are being executed by client/client's civil contractor and not by the cooling tower vendor. We presume that the word "constructed" means "construction of FRP super structure" in case of FRP structure cooling tower and not civil construction works. Kindly clarify.	This shall be subject to NTPC approval based on credentials submitted by bidder.
46	4	7 of 195	2.1	Two (2) numbers manually operated butterfly valves with limit switch of size 2800 NB mm for each of the Cooling towers for isolating the hot water riser/header to the cooling tower along-	We could not find Valve Material Specifications (VMS) for riser and 2800 NB valve in the tender enquiry specifications and request BHEL to share the same alongwith their Pre-bid clarifications.	MOC of BFVs are already indicated in the specification (refer cl no. 4.18 at page 22 of 195).

				with valve supports.		
47	4	7 of 195	4	sludge pumps 01 nos. of 150 cum/hr capacity for each sludge sump,	1) We request BRHEL to provide a) Head of sludge pump, b) Process data sheet of pump including standard to be followed, material of construction, approved vendor list etc. 2) We presume that one common sludge pump can be used for both Unit#1 & Unit#2 cooling towers of Stage II.Kindly confirm. 3) Kindly define cooling tower vendor's terminal point for sludeg disposal system.	1) Head and other parameters shall be finalized during detailed engineering. MOC is given in specification. 2. 1 no sludge pump to be provided for each sludge sump. 2 nos sludge sumps are to provided for each CT. 3. The bidder shall terminate sludge pump discharge pipe work at a distance of 10 M from sludge pit.
48	4	7 of 195	5	Inlet air louvers for each cooling tower.	As per PDF page no. 31 of 195 under clause no.4.5, louvers are not required in case of over dimensioning the cold water basin. We shall adopt the design of over dimensioning of cold water basin and hence there shall not be any inlet air louvers. Please note.	Noted.
49	4	7 of 195	7	Screens and Stop log gates along with guides embedded in concrete shall be provided at the outlet of cold water basin	As per Plot plan PDF page no.74 of 195, the cold water outlet shall be at one of the cooling tower and hence transverse and longituidnal partitions are not required at cold water basin curb level. Kindly confirm.	No partitions are required.

50	4	7 of 195	12	Counter flanges, bolts, nuts & gaskets for all piping connections in the scope of bidders and also at terminal points.	The diameter of CW piping at terminal point shall be approx. 4000 mm and this will be placed at under ground level. Hence there shall not be any flanges at terminal point of CW piping. Kindly clarify.	Welding of bidder's CW pipe at terminal point with BHEL's CW pipe is in bidders scope.
51	4	7 of 195	14	Carrying out performance test of one of the Cooling Tower through CTI (Cooling Technology Institute-USA) approved/listed testing agency. Carrying out performance test of balance cooling towers by the contractor following the same procedure as approved for testing by CTI agency.	The cost for testing of cooling towers through CTI approved agency is significant and there is an uncertainty in visits of these agencies's to India. As per NIT, clause no.21, vide page no.1 of 10, PG test tobe completed within two (2) months from BHEL Clearance after respective Unit COD and conducting the performance testing of cooling towers through CTI approved agency within this stipulated time is not possible. Hence we propose to conduct the performance guarantee testing of cooling towers by our representative itself and if BHEL still insists for Third party agency other than CTI approved agency, then we can utilise the services of third party agency (of our choice)	Bidder to follow the tender specification.

					approved by NTPC for one cooling tower out of two cooling towers. We request BHEL to review our query and accept the same.	
52	4	7 of 195	15.1	One set of special tools & tackles required for maintenance of equipment & accessories in the cooling towers.	1) We request BHEL to specify the list of special tools & tackles with quantity. 2) We also request BHEL to confirm whether we can consider one set of special tools & tackles common for cooling towers for two units of 2 x 800 MW.	Bidder has to consider the special tools and tackles as per their design requirement.
53	4	15 of 195	39.2	Complete Field Intrumentation for monitoring and operation of IDCT package be provided by bidder.	We shall consider the items mentioned in sl.no.39.3.1. to 39.3.4. under page no.15 of 195, in our scope. Kindly confirm.	Bidder to follow the tender specification.
54	4	16 to 17 of 195	39.10', 39.12	Bidder to provide Comprehensive Annual Maintenance Services (AMS) for three (03) years after warranty period for the Analyser instruments and Profibus instruments of IDCT.	We shall not be able to provide Comprehensive Annual Maintenance Services (AMS) for three (03) years after warranty period for the Analyser instruments and Profibus instruments of IDCT.	Bidder to refer amendment no 1.
55	4	19 of 195	2.1	No. of Cooling Towers required : One (01) per unit viz. Total two (02) nos for station	We request BHEL to confirm whether two (2) cooling towers per Unit can be offered instead of one (1) per unit. ie) same number of cooling towers	Bidder to follow the tender specification.

					exists at NTPC Lara, Stage -I	
56	4	19 of 195	2.3	Type : RCC/FRP Induced draught Cooling tower	We presume that the cooling tower vendor can opt the type / super structure of cooling tower of their choice. ie.) RCC/FRP. Kindly clarify.	Bidder is free to choose the type of CT i.e RCC / FRP based on their qualification as per technical PQR.
57	4	20 of 195	2.15	Maximum CW Pumping head permissible, viz. static head plus frictional losses as below: - Static head w.r.t. FGL - Frictional losses within bidder's T.P. with 10% margin : 15.3 MWC	Considering the circulating water flow , duty conditions (cooling range, approach), fill type, plan area available, it would not possible to design the cooling tower with pumpig head of 15.3 MWC. We request BHEL to review and provide the minimum pumping head value of 18.3 MWC and confirm this value.	Bidder to refer amendment no 1.
58	4	20 of 195	2.15	Maximum CW Pumping head permissible, viz. static head plus frictional losses as below: - Static head w.r.t. FGL - Frictional losses within bidder's T.P. with 10% margin : 15.3 MWC	We shall consider the static head w.r.t.FGL, pressure drop across the spray nozzles and the friction losses across riser pipe upto FGL & riser isolation valve only. As per tender notice_4, technical specifications vide PDF page no.8 of 195, the terminal point of cooling tower is 10 mtr. away from edge of CT basin wall. ie.) length of HW header shall be approx. 270 mtr. The friction loss across HW header, bends and Tees at HW header shall be	Bidder to refer amendment no 1.

					significant and we shall not include these values while calculating CW pumping head.Kindly clarify.	
59	4	20 of 195	2.16	Minimum elevation of top of water level in hot water distribution duct with respect to FGL : 13 Mtr.	This value shall be as per our standard design. Please note.	Bidder to refer amendment no 1.
60	4	20 of 195	2.16	No. of spare Cells : Four (4)	We presume that the number of spare cell shall be two (2) per unit of 800 MW and total number of spare cell shall be four (4) for 2 units (2 X 800 MW). Kindly confirm.	Bidder to provide 4 (four) nos spare cells per CT.
61	4	20 of 195	2.20'	Maximum permissible Evaporation loss : 1.6%.	Considering the design relative humidity of 50% mentioned in sl.no.2.13 under page no. 19 of 195 and the design duty conditions such as cooling range, approach etc, it would not be possible to design the cooling tower with maximum permissible evaporation loss of 1.60%.. The evaporation loss shall be more than 1.60%. Please note.	Bidder to refer amendment no 1.
62	4	20 of 195 and 33 of 195	2.21 & 4.8	Maximum permissible drift loss : 0.001%.	This value (0.001%) is too low and we can offer the maximum permissible drift loss value of 0.005% . Please note.	Bidder to follow the tender specification.
63	4	20 of 195	2.23	Maximum permissible	As per Plot plan vide PDF page	Bidder to follow the tender specification.

				Cooling Tower Plan dimensions at FGL (excluding staircase & pavement) : 250 mtr. x 40 mtr.	no.74 of 195, the dimensions are mentioned as 250 mtr. x 45 mtr.. Kindly confirm the maximum permissible width is 45 mtr. or 40 mtr. c	
64	4	20 of 195	2.23	Maximum permissible Cooling Tower Plan dimensions at FGL (excluding staircase & pavement) : 250 mtr. x 40 mtr.	If we opt for two (2) cooling towers each for 800 MW unit. (total four cooling towers for Unit#1 & Unit#2), then what is the maximum permissible dimensions tobe considered ? What should be the distance tobe considered for these cooling towers ?	Bidder has to consider one no CT only for each unit of 800 MW.
65	4	20 of 195	4.1.5.	Fan cylinder / Recovery stack : RCC	In case of RCC structure cooling tower, we intend to consider hand moulded FRP, which offers uniform tip clearnace and improves fan efficiency. Kindly confirm the material of construction of fan cylinder / Revcovery stack.	MOC shall be as per tender specification.
66	4	21 of 195	4.2.2,4.2.3	Casing, cell partition walls : Pultruded FRP	Casing and cell parition walls shall be of FRP sheet and not Pultruded FRP. Please note.	Noted. However, same shall be subject to NTPC acceptance during detailed engineering.
67	4	22 of 195	4.2.5.	Fan cylinder / Recovery stack : Pultruded FRP	Recovery stack shall be of hand moulded FRP and not Pultruded FRP. Please note.	Noted. However, same shall be subject to NTPC acceptance during detailed engineering.
68	4	25 of 195	3.3	Provide spare cells (minimum	If we opt for two (2) cooling towers	Bidder to follow the tender specification.

				four per tower) in the cooling tower	each for 800 MW unit. (total four cooling towers for Unit#1 & Unit#2), then how many spare cell need tobe considered for each cooling tower ?	
69	4	25 of 195	4.15.	Fans	There is no specific mentioning of requirement of anti-reverse rotation device for fan in the specifications and hence we shall not consider anti-reverse rotation device for fan. Please note.	Tender specification is clear. Bidder to follow the same.
70	4	41 of 195	2.6. b)	VFD (if applicable)	There is no specific mentioning of requirement of VFD in the specifications. We presume that VFD is not applicable for the cooling tower fan drive electric motor and hence we shall not consider VFD, in our scope of supply. Please note.	VFD is not applicable.
71	4	73 of 195	Annexure II	CL. of trash rack	As per page no.23 of 195 vide clause no.4.25, the screens (SS 304, 10 X 10 mesh) are tobe provided by cooling tower vendor and there is no specific mentioning of any trash rack. Hence we shall not consider any trash rack in our scope of supply and please note the same. If trash rack is required, then we	Bidder to refer amendment no 1.

					request BHEL to provide the details with specifications.	
72	4	74 of 195	Annexure III / Co-ordinates and battery limits	No. of Cooling Towers : 2 (IDCT - 3 and IDCT - 4)	We request BHEL to confirm whether two (2) cooling towers per Unit can be offered instead of one (1) per unit shown in Annexure III. ie) same number of cooling towers exists at NTPC Lara, Stage -I	Bidder has to consider one no CT only for each unit of 800 MW.
73	4	135 of 195	Sub vendor list	3. Fan assembly - Cooling tower	We have own manufacturing facility for cooling tower fans and installed fans at many plants which are working satisfactorily. We have also successfully carried our scaled down test model of fan for one of the recent project. We shall consider our own manufactured fan and request BHEL to accept our request.	Make of Fan shall be as sub-vendor list. Acceptability of fan make other than listed shall be subject to NTPC approval during detailed engineering stage.
74	5	6 of 138	5.9.	Detailed geo-technical Investigation report shall be made available to the successful bidder during contract engineering stage.	During Post order, we shall obtain the detailed geo-technical Investigation report from BHEL and shall not carry out any soil investigation . We shall carry out the detail engineering based on the available detailed report. Please note.	Bidder understanding is correct. Please also refer amendment no 1.
75	5	7 of 138	10.3. & 10.4.	Epoxy phenolic coating shall be applied on internal surfaces of the RCC water retaining	We request BHEL to provide a) the detailed specifications for Epoxy phenolic coating & two component	Coating/ painting specifications mentioned in page 16 of 138 shall be followed. Refer Annexure-G at page 114 of 138.

				structures in line with customer specification. All concrete surfaces shall be provided with two component transparent polyamide cured epoxy sealer coating (having solid by volume minimum 40% ±2%) of minimum 50 micron DFT. Surface to be coated shall be absolutely dry, clean and dust free	transparent polyamide cured epoxy sealer coating, b) coating/ painting procedure, c) vendor list for coating/painting etc. alongwith their Pre-bid clarifications.	
76	5	17 of 138	5.17.00.01. k.	All concrete surfaces in direct contact with water/ water spray/moist air shall be applied with Moisture Compatible Corrosion Resistant Coating System or its equivalent as specified in Annexure-G.	We find coating / painting specifications in page 7 and 16 of 138 which are contradictoty. We request BHEL to kindly confirm the specifications tobe followed for RCC cold water basin, channel and RCC super structure for better clarity and understanding.	Coating/ painting specifications mentioned in page 16 of 138 shall be followed. Refer Annexure-G at page 114 of 138.
77	5	7 of 138 & 17 of 138	10.3. , 10.4. &5.17.00.01. k.	The design of staircase, switchgear building, control room/RIO room, transformer and trestle foundation, storm water drain shall be as per IS: 456 (2000).	The design and construction of switchgear building, control room/RIO room, transformer and trestle foundation, storm water drain are not included in our scope of work. Please note.	Switchgear building, control room/RIO room, transformer and trestle foundation is not in bidder scope. However, connecting the discharge from IDCT roof to the nearest storm water drain will be in bidder scope.

78	5				We find civil specifications for cooling tower and other packages such as FGD,buildings etc. We shall consider the specifications and scope applicable to cooling tower only and not for other other packages. Please note.	Bidder's scope is applicable for Cooling Tower only.
79	13			Price adjustment	For FRP cooling towers, the cost of FRP materials (structural members, cladding, fan stack, header pipes etc.) are significant and there is no price adjustment mentioned for FRP. We request BHEL to kindly review and include price adjustment for FRP also.	Price adjustment given in NIT includes the FRP component.
80	14	1 of 10	19	Financial PQR - YES	We could not find Financial PQR in the tender enquiry specifications and kindly share the same if applicable.	Please refer Annexure A to Corrigenda 01
81	14	1 of 10	28	Payment Terms for Design & Engineering Charges*, Main Supply, Mandatory Spares and E&C shall be as per GCC-BOP Rev 00.	We could not find GCC in the tender enquiry specifications and request BHEL to share the same alongwith their Pre-bid clarifications.	Please download the same from bhelpem website- https://pem.bhel.com/Documents/GCC/BOP%20GCC.PDF
82	4	8 of 195	16.1	LCP for Sludge pumps and any other	Kindly provide detailed specifications / data sheet for LCP and sludge pumps. We also request	MOC and technical parameters of Sludge Pumps are given in specification. The bidder shall

					BHEL to provide the battery limit for this scope.	terminate sludge pump discharge pipe work at a distance of 10 M from sludge pit. LCP of reputed make shall be provided by bidder.
83	4	13 of 195	23	However, for concrete encased steel pipes running below road, minimum thickness of CW pipe shall be 20 mm.	Kindly confirm a) whether any concrete encased CW steel pipes are tobe laid below road at cooling tower area or not b) If 20 mm thick CW pipes are tobe considered running below road, then which diameter onwards this thickness (20 mm) is tobe considered.	Road may not be applicable in CT battery limit.
84	4	13 of 195	1	Vendor list for pipes of diameter more than 2800 mm upto 3600 mm	We find only two vendors (Ratnamani & Capacite structures Pvt. Ltd.) for this higher pipe diameter. We request BHEL to provide minimum three (3) vendors for pipes of diameter more than 3600 mm diameter upto 4000 mm diameter.	Approval of additional sub-vendor approval shall be taken up with NTPC during detailed engineering.
85	4	134 to 145 of 195		Sub vendor list	We didn't find sub vendor list valves, drift eliminators, PVC pipes, flanges, pipe fittings, hardware and gasket etc. and request BHEL to provide the same alongwith their Pre-bid clarifications.	make of items for which sub-vendor list is not given, shall be decided during detailed engineering.
86	4	60 of 195	34	Vertical sludge pump & motor (Optional Item)	Kindly confirm whether vertical sludge pump & motor are included	Type of sludge pump shall be as per specification.

					in cooling tower vendor's basic scope or not, as the same is mentioned as an optional item.	
87	14	1 of 10	9	Due date for offer submission : 22-03-2024.	Considering the quantum and nature of work involved in preparation of comprehensive bid as per the specifications, we request BHEL to kindly extend the submission of bid upto 22-04-2024 and confirm the same.	Please refer Corrigenda 01
88	14	9 of 10	50	Bidders are required to provide the following along with the part-1 bid: (i) Provide a certificate (in line with attached draft) from statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.	We find a draft letter for local content (vide Tender notice 3 under page no. 4 of 10) tobe submitted in bidder's letter head and the same will be provided by us in our letter head alongwith our bid. We didn't find any draft certificate format which is tobe issued by Statutory auditor / Charterted accountant. Hence we shall not provide any certificate from Statutory auditor / Charterted accountant.	Please refer Annexure C of Corrigenda 01
89	GCC	26 of 86	Supply payment / 9.2.1.	Payment of 80% of basic price of materials supplied, as per approved billing	**We request BHEL to consider the following :** 1) 10% advance along with LOI and 2) balance 70% of basic price of materials	NIT terms will prevail. Bidders are requested to comply the same.

				schedule, along with 100% freight, taxes and duties (as applicable), shall be paid against receipt of material (receipted LR) at site on pro-rata basis.	supplied, as per approved billing schedule, along with 100% freight, taxes and duties (as applicable), shall be paid against receipt of material (receipted LR) at site on pro-rata basis, within thirty (30) days from the date of submission of invoices.	
90	GCC	26 of 86	Supply payment / 9.2.1.	10 % of basic price of materials supplied shall be released against (2.5% against each activity) the completion of: (a) Trial run of the system/ package; (b) Successful completion of the PG test/ demonstration test of the system/ package, as applicable; (c) Submission of final documents, e.g. Asbuilt drawings, O&M manual etc. as applicable and (d) Liquidation of Punch Point.	**We request BHEL to consider the following** : 5% of basic price of materials supplied shall be released against completion of mechanical erection on pro-rata basis. 5% of basic price of materials supplied against successful completion of the PG test & submission of final documents, e.g. Asbuilt drawings, O&M manual.	NIT terms will prevail. Bidders are requested to comply the same.
91	GCC	27 of 86	Erection & commissioning payment / 9.3.	80% (Eighty percent) of contract E&C price along with taxes (as applicable) shall be released on prorata erection of item/ material,	**We request BHEL to consider the following :** 1) 10% advance alongwith LOI and 2) balance 70% on pro-rata basis within thirty (30) days from the date of submission of invoices.	NIT terms will prevail. Bidders are requested to comply the same.

				on submission of protocol, duly signed by BHEL site official(s)/ customer, as per approved billing schedule.		
92	GCC	27 of 86	Erection & commissioning payment / 9.3.	10 % (Ten percent) of contract E&C price along with taxes (as applicable) shall be released against (2.5% against each activity) (a) Trial run of the system/ package; (b) Successful completion of the PG test/ demonstration test of the system/ package, as applicable; (c) Submission of final documents, e.g. As-built drawings, O&M manual etc. as applicable and (d) Liquidation of Punch Point and handing over.	**We request BHEL to consider the following** : 5% of basic price of E&C shall be released against completion of mechanical erection on pro-rata basis. 5% of basic price of materials supplied against successful completion of the PG test & submission of final documents, e.g. Asbuilt drawings, O&M manual.	NIT terms will prevail. Bidders are requested to comply the same.
93	GCC	27 of 86	Release of payment / 9.5.	Vendors shall submit billing documents for payment directly to BHEL. Payment will be released within 60 days after submission of complete documents as	We request BHEL to release within thirty (30) days after submission of complete documents	NIT terms will prevail. Bidders are requested to comply the same.

				per clause no 9.6.2 9.6.5 below or as per order/ contract (45 days for vendors qualified and registered as Micro or Small as per MSMED Act).		
94	GCC	31 of 86	Guarantee for Plant / Equipment / 12.1.	Guarantee period for packages (excluding mandatory spares) shall be as stipulated in Special Conditions of Contract or otherwise, 12 calendar months from the date of handing over of the system Unit wise/Lot-wise/Stage-wise/Set-wise/ system wise (as applicable) to customer / BHEL, OR PG test of system (if applicable), whichever is later.	We can offer a guarantee period of twelve (12) calendar months from the date of commissioning or eighteen (18) months from the date of supply of major items, whichever is earlier and request BHEL to agree our proposed guarantee period.	NIT terms will prevail. Bidders are requested to comply the same.
95	GCC	36 of 86	Delayed delivery / 16.1.b.	LD on Supply and E&C- Purchaser reserves the right to recover from the Seller/ Contractor, as agreed liquidated damages and not by way of penalty, a sum equivalent to half (½) percent and applicable GST thereon, of	We request BHEL to consider LD on Supply and E&C a sum equivalent to half (½) percent of the total contract price (main supply and E&C) excluding GST per week or part thereof, subject to a maximum of five (5) percent of the total contract price (main supply and E&C) excluding GST	NIT terms will prevail. Bidders are requested to comply the same.

				the total contract price (main supply and E&C) excluding GST per week or part thereof, subject to a maximum of ten (10) percent of the total contract price (main supply and E&C) excluding GST,	and confirm the same.	
96	Technical Specification No. PE-TS-508-165-W001		Detailed Scope Cl. 5	1 of 2	Please note air inlet louvers shall be decided by bidder based on their proven practise as indicated in technical data 4.9.	Noted. Please also refer cl no. 4.5 at page no 31 of 195.
97	Technical Specification No. PE-TS-508-165-W001		Detailed Scope Cl. 15.3	2 of 2	We understand that only the first and second fill of lubricants as required has to be supplied by us. Kindly confirm.	The requirement is clearly mentioned in the tender specification.
98	Technical Specification No. PE-TS-508-165-W001		Detailed Scope Cl. 17.3	2 of 2	Please provide the terminal point distance of sludge discharge piping from the sludge pit.	The bidder shall terminate sludge pump discharge pipe work at a distance of 10 M from sludge pit.
99	Technical Specification No. PE-TS-508-165-W001		Electrical scope Cl. 5	1 of 2	We understand that no power / control cabling is in Bidder's scope within the battery limit. Kindly confirm.	For Power cables, control cables and screened control cables, refer S. No. 3 of “ELECTRICAL SCOPE BETWEEN BHEL AND VENDOR” . For Cabling material (Cable trays, accessories & cable tray supporting system), refer S. no. 5 of “ELECTRICAL SCOPE BETWEEN BHEL AND VENDOR
100	Technical Specification No.		Electrical scope Cl. 8	1 of 2	All supply items that goes below	For Below grade grounding, refer S.

	PE-TS-508-165-W001				ground has to be provided by BHEL. Only installation will be in our scope and no supply of items below ground is envisaged by us. Kindly confirm.	no. 8 of "ELECTRICAL SCOPE BETWEEN BHEL AND VENDOR"
101	Technical Specification No. PE-TS-508-165-W001		Electrical scope Cl. 9	1 of 2	Motor make shall be as per the sub vendor list.	Noted.
102	Technical Specification No. PE-TS-508-165-W001		Electrical scope Cl. 11	2 of 2	BHEL to clarify whether power distribution box for fan motor is required.	Please follow tender specification.
103	Technical Specification No. PE-TS-508-165-W001		Technical data - Part A - Mechanical S.no. 3.4	3 of 5	Please note type of gearbox shall be spiral bevel cum helical. Kindly confirm.	Type of gearbox shall be as per tender specification.
104	Technical Specification No. PE-TS-508-165-W001		Technical data - Part A - Mechanical S.no. 4.2.2	3 of 5	Casing of pultruded FRP structure shall be corrugated FRP. Kindly confirm.	Noted. However, same shall be subject to NTPC acceptance during detailed engineering.
105	Technical Specification No. PE-TS-508-165-W001		Technical data - Part A - Mechanical S.no. 4.2.3	3 of 5	Cell partition wall shall be corrugated FRP.	Noted. However, same shall be subject to NTPC acceptance during detailed engineering.
106	Technical Specification No. PE-TS-508-165-W001		Technical data - Part A - Mechanical S.no. 4.5	4 of 5	Access ladder shall be FRP/MSHDG. Kindly confirm.	Noted. However, same shall be subject to NTPC acceptance during detailed engineering.
107	Technical Specification No. PE-TS-508-165-W001		Technical data - Part A - Mechanical S.no.	2 of 5	Please note enhancement of fill KaV/L at 2% for every 1 m is highly optimistic and gives smaller tower size which may fail in the CTI performance test. Please clarify whether the enhancement has to be considered as	"The value specified is the maximum limit. Bidders may choose lower value or no-enhancement in the rain zone as per their design to meet the tower performance."

					per the tender stipulation.	
108	Technical Specification No. PE-TS-508-165-W001		Technical data - Part A - Mechanical S.no. 2.20	2 of 5	Please note evaporation loss from the cooling tower will be due to 1. Required cooling 2. Inlet relative humidity. To achieve required cooling, the evaporation of water has to happen. And for a specific duty evaporation loss for the required cooling is fixed. Hence the only other variable with which we can get different evaporation loss is inlet relative humidity. The evaporation loss in this case would be 1.75 % and hence achieving 1.6% is impractical. Kindly delete this clause.	Bidder to follow tender specification. Please also refer Amendment no 1.
109	Technical Specification No. PE-TS-508-165-W001		Technical data - Part A - Mechanical S.no. 2.16	2 of 5	Minimum elevation of hot water distribution duct shall be decided by the bidder. Kindly confirm.	Bidder to follow tender specification and amendment no 1.
110	Technical Specification No. PE-TS-508-165-W001		Technical data - Part A - Mechanical S.no. 2.24	2 of 5	Fill plan area shall be decided by the bidder. Please confirm.	Fill plan area specified in tender specification is minimum. Bidders may choose higher fill plan area.
111	Technical Specification No. PE-TS-508-165-W001		General	4 of 5	Please clarify whether riser pipe supports are required for pultruded FRP cooling tower, since the same is	For pultruded FRP cooling tower, riser pipe supports are required.

					not mentioned in the tender specification.	
112	Technical Specification No. PE-TS-508-165-W001		General	4 of 5	Please clarify whether rubber expansion bellows are required for pultruded FRP cooling tower, since the same is not mentioned in the tender specification.	Requirement of REJ for pultruded FRP cooling tower is mentioned in the technical specification.
113	Tendernotice_4		ANNEXURE-II C.T BASIN Drawing		As per drawing, Elevation of basin at side is mentioned as(-) 3.75m and Elevation at centre is (-) 4.0 m. Kindly confirm the correct Basin Invert Level.	The basin invert level at centre is EL(-) 4.0M. The EL(-)3.75M shown is elevation of mud-sil and not the invert level elevation.
114	Tendernotice_5		10		As per page 130 of 138, AREA 10 represents IDCT # 3 & 4 Location. Kindly confirm	Please refer Amendment no 1 for location of IDCT.
115	Tendernotice_5		Cooling Tower Basin Clause 5.17.00.01		As per this clause "the beams are provided into the water, the same shall be designed for un-cracked section as per IS:3370." However as per latest version i.e IS 3370-2021, there is no mention of uncracked design. Kindly confirm whether we shall follow latest IS 3370 code.	As mentioned in NTPC specificaion, design has to be carried out as per IS-3370:2009.
116	Tendernotice_5		Cooling Tower Basin Clause 5.17.00.02(b)Design Criteria		The clause mentioned is IS 3370(Part 2)2009. Kindly confirm whether we shall follow latest IS 3370 code.	As mentioned in NTPC specificaion, design has to be carried out as per IS-3370:2009.
117	Technical Specification No.		Section VI / Part B of Bid Doc No CS-4540-001A-2	49 of 120	Painting Of Cooling Tower	Bidder query is not clear as the clause

	PE-TS-508-165-W001		/ Sub Section D-1-7 / Clause No 5.17.01.01 (B)		Kindly mention the painting requirements of the following areas (a) Cooling Tower surface in contact with earth (b) Inside of Basin (c) Inside of Superstructure (d) Outside of Basin (e) Outside of Superstructute	quoted (Section VI / Part B of Bid Doc No CS-4540-001A-2 / Sub Section D-1-7 / Clause No 5.17.01.01 (B)) is not available in the spec.. However, specification clauses are clear with respect to painting to be followed.
118	Notice Inviting Tender		28 (i-a)	3 of 10	Please confirm that BHEL shall release 5% of the civil work payment against site mobilization and not linking it with installation of the T&P as per Annexure - II. Please confirm.	NIT terms will prevail. Bidders are requested to comply the same.
119	Notice Inviting Tender		32	3 of 10	BHEL to delete Reverse auction clause as this is a EPC based contract.	NIT terms will prevail. Bidders are requested to comply the same.
120	Notice Inviting Tender		35	5 of 10	Please clarify the refund of performance security 10% of the contract value that will be paid initially.	Please refer clause 11 of GCTC of GCC BOP
121	Special Conditions of Contract		ANNEXURE-E	--	Price Adjustment Clause / PVC should be applicable for entire duration of contract period. This is standard for all NTPC contracts. Moreover, PVC should not be limited to Plastic, Steel & Electrical Equipment and Labour components only. PVC should be worked out based on NTPC formula and Contractor	NIT terms will prevail. Bidders are requested to comply the same.

					should be allowed to furnish the list along with assigned co-efficients for items on which PVC should be applicable. This is in line with standard NTPC specification.	
122	Special Conditions of Contract		General	--	Following provisions need to be incorporated in SCC / NIT: (a) Timeline for approval of drawing / documents should be available. (b) Provision of Change Order should be incorporated. (c) Provision towards extension of time should be made available. (d) Formal Contract Agreement format is required for our review & comments, if any. (e) Order of precedence should be available.	NIT terms will prevail. Bidders are requested to comply the same.
123	General Conditions of Contract		9.0	6 of 31	For the trial run and PG test payment against Supply and Erection & Commissioning, In case Trial run/PG test / demonstration test of the cooling tower(s) cannot be completed within one year after completion of commissioning of cooling tower(s), for reasons not attributable to the contractor, BHEL	NIT terms will prevail. Bidders are requested to comply the same.

					shall release payment towards PG Test / demonstration test of the cooling tower(s) against existing performance secuity that would have been submitted as per NIT clause 35 of page 5 of 10. PLease confirm.	
124	General Conditions of Contract		12.0	12 of 31	The guarantee period shall be 12 months from the date of handing over of cooling tower or 18 months from the date of last major despatch whichever is earlier. Please confirm.	NIT terms will prevail. Bidders are requested to comply the same.
125	General Conditions of Contract		33.0	24 of 31	Arbitration should be by joint arbitration procedure as per Arbitration & Conciliation Act, 1996 and as amended thereafter.	NIT terms will prevail. Bidders are requested to comply the same.
126	Clause no. 14 **TECHNICAL SPECIFICATIONS**	**DETAILED SCOPE:-** 14- Carrying out performance test of one of the Cooling Tower through CTI (Cooling Technology Institute-USA) approved/listed testing agency. Carrying out performance test of balance cooling towers by the contractor following the same procedure as approved for testing by CTI agency.		It is specified that one of the IDCTs must be tested by any of the CTI licensed testing agencies and the other tower by the Contractor himself. In this regard, please confirm that both the tests shall be conducted, and results published as per the CTI code ATC-105 as specified at Clause 1.1, Technical Data – Part A (Mechanical)		Bidder's query is not clear.
127	Clause No. 15 **GENERAL TECHNICAL REQUIREMENT** Sl No.6, 16 **WATER ANALYSIS (Annexure-I)**	15. The quality of water in CW system shall be Clarified water. The COC in CW System shall be '5'. Water analysis is enclosed in 'Compliance drgs'. 6. Ca hardness is 862.5 ppm as CaCO3.		It is mentioned that clarified water with a COC of 5 will be supplied to the IDCT. And the circulating water quality report shows that the Ca hardness is 862.5 ppm as CaCO3. This is very hard water that will necessarily cause scaling on fill, pipe, nozzle and duct surfaces. Scaling on heat transfer and nozzle spray surfaces will affect the thermal		Bidder to note that suitable provision to control scaling/ corrosion, microbiological growth is envisaged for

	TECHNICAL SPECIFICATION	16. Biological Oxygen Demand (BOD)- 5mg/L.	performance of the IDCT and scaling inside the distribution pipes will reduce the water flow through the IDCT over a period depending on COC control and maintenance measures. It is necessary to add scale inhibitors to the circulating water to protect the heat transfer surfaces and other IDCT internals. Please confirm that a suitable water treatment program to control scaling will be implemented. Further, the BOD of 5 is just on the border and any brief loss of control over the quality of circulating water will result in microbiological activity that will foul the heat transfer surfaces in no time. Please confirm that a suitable biocide will be added to the circulating water to prevent microbial activity. This is because the fill performance can be guaranteed only when the circulating water quality is good.	condenser by BHEL.
128	Clause No 42.1 **GENERAL TECHNICAL REQUIREMENT TECHNICAL SPECIFICATION**	Bidder shall submit 3D Parametric model of the cooling tower area within terminal points compatible with SP3D library.	Cooling Tower companies are not into 3D modelling as it is essentially the EPC contractor's scope to check for crisscrossing plant facilities, either over or underground, especially piping runs. Whereas the cooling tower Contractor's scope is well defined with boundaries and as such there is very little piping involved. In any case all the plant facilities running within cooling tower scope boundary will have to be notified by the EPC contractor. Despite the above, Cooling Towers can be 3D modelled for information to the Client but not in plant modelling or smart piping software, etc. The cooling tower 3D model files, if necessary, can be provided only in *.dgn or *.sat formats. The client may check compatibility of these files with their SP3D software.	Bidder to note that E3D software as a plant design platform is being used by BHEL. Hence, model of IDCT must be editable within the E3D software.
129	Clause No. 2.5 **TECHNICAL DATA-PART-A (MECHANICAL)**	Fill Type- Non-clogging type fills like modular splash/trickle grid/ turbo splash or splash type fills like V-bar splash/splash grid.	This clause essentially specifies that the fills are to be of non-clogging type. The examples for the non-clogging type of fills given are Modular Splash/Trickle Grid/Turbo-Splash or Splash Fills like V bar and Splash Grid. In the above context, please note that there are no fills that are non-clogging. All fills, whether modular film or modular splash or splash will choke/foul	Film fills are not acceptable.

			depending on circulating water quality and local environment. Hence, certain types of fills can be termed "low clogging" type, if the circulating water quality is conducive and certainly not "non-clogging" type. Modular fills mean those fills that are in module form, i.e. pack form. And there are low-clog film fills just like low-clog splash fills. Hence, if the fills are necessarily required to be in modular form and of low clogging type, please clarify whether low-clog type modular film fills are also acceptable. The off-set fluted modular film fills like OS21 of Brentwood, Y20 of Cooldeck/SPIG, etc are some of the examples under this category.	
130	Clause No. 2.13 **TECHNICAL DATA-PART-A (MECHANICAL)**	Design Ambient Relative Humidity- 50% Fill Zone KaV/L can be enhanced to @2% per 1 metre of air inlet to account for contribution of rain zone subject to maximum limit of - 15%	The specification permitting 2% addition of KaV/L for every meter of air inlet height subject to a max of 15% is erroneous and we presume that it is by oversight. The contribution of rain zone in IDCTs is very minimal as the air travel distances are short and air velocities are high compared to that in NDCTs. As the pressure drop in the rain zone is relatively low (because of short travel distance of air) in IDCTs, any small addition of KaV/L here will overpredict the thermal performance of the IDCT. Designers will unknowingly undersize the IDCTs utilizing this clause that will create contractual problems post the PG test. There is no such KaV/L addition from rain zone is the Fulkerson method that is usually specified by BHEL. Moreover, this will become a complicated matter when the performance equations of certain modular splash fills obtained through in-house lab testing include end effects, i.e. already includes KaV/L contribution from rain and spray zones. These end effects cannot be separated, if the test data acquired through the lab is not available separately for each of the heat transfer zones in the IDCT. Hence, it is prudent to remove this clause to avoid confusion and involuntary undersizing of the IDCT. Once this clause is removed, the overall KaV/L demand will be met only from	The value specified is the maximum limit. Bidders may choose lower value or no-enhancement in the rain zone as per their design to meet the tower performance.

			the fill and spray zone, which is easy to cross check. The aux power consumption permitted is quite high in this project and hence, removal of the rain zone KaV/L will make no difference to the design.	
131	Clause No. 2.2**TECHNICAL DATA- PART-A (MECHANICAL)**	Maximum Permissible Evaporation Loss- 1.6%	The evaporation loss is a result of the thermal design that is performed for a set of design duty conditions specified in the tender. There is no way one can control the evaporation loss for a given set of duty conditions comprising of water flow, range, approach and type of fill (very little variation with fill type; it's the thermal duty that determines this loss).	Refer amendment no 1.
132	Clause No. 2.2 **TECHNICAL DATA-PART-A (MECHANICAL)**	Whether the fills are easily installable & removable- Yes	The specification calls for easily installable and removable fills. In this context please note that the V bar type of splash fill is the most difficult to install and remove. Does this mean that the V bar type of fill is not permissible in this project?	Bidder to follow tender specification.
133	Clause No. 4.25 **TECHNICAL DATA-PART-A (MECHANICAL)**	Screen- SS 304 10X10 Mesh with Heavily Galvanised (as per IS: 2629) carbon steel frame and supports	The guide frames for gates and screens are to be in SS 304 and the screen itself is in SS 304. If such is the requirement, the screen frame cannot be in carbon steel. Hence, please correct it to SS 304.	Bidder to follow tender specification.
134	Clause No. 4.06.01 **TECHNICAL REQUIREMENTS**	The non- clogging type fills shall be in modular form. These fills are to be mechanically assembled without use of any adhesives. Assembling by other proven method(s) is also acceptable. The fill shall be freely rested and bottom supported to prevent any sagging and damage.	This clause specifies that the non-clogging type of fills shall be in modular form. As stated above, off-set fluted low-clog fills are also in modular form. Please review and let us know whether low-clog modular off-set film fills are permissible. This clause further states that the fills are to be assembled into modules by Mechanical means without the use of adhesives. In this context, please note that adhesives for gluing fills and drift eliminators were used in the olden days but not after the arrival of various solvents that can bond the sheets chemically through heat fusion. Solvent/chemical bonding is a proven method all over the world and scores of towers are operating in India for the last 20 years or more with solvent bonded fills and drift eliminators. The chemical/solvent evaporates in the bonding process leaving no residue.	Tender specification is clear in this regard.

			Hence, please confirm that solvent bonded modular fills are permissible.	
135	Clause No. 4.8 **TECHNICAL REQUIREMENTS**	**Drift Eliminators:-** The drift eliminators shall be designed to keep the drift loss to a maximum of 0.001% of total water in circulation. The drift eliminators shall be of profile type and gluing is not allowed. The air pressure drop across the eliminators shall be kept to a minimum by providing proper number of airflow direction changes across the eliminators.	It is specified that the drift eliminators are to be of Profile type. Please note that the profile type of drift eliminators cause a higher pressure drop compared to a cellular drift eliminator. Cellular drift eliminators can be sealed properly at column junctions and around pipes, whereas the profile types cannot. Hence, cellular drift eliminators are better from a thermal design point of view. Please confirm. Further, the method of jointing the cellular drift eliminators will be solvent/chemical bonding and not gluing. Please confirm.	Bidder to follow tender specification.
136	Clause No. 5.17.00.01 **TECHNICAL REQUIREMENTS**	Cooling tower cells shall consist of RCC columns, beams and walls. The spacing of columns shall be minimum 4000 mm c/c. Inclined bracings shall not be provided between the columns.....	Cooling Tower cells shall consist of RCC/ FRP Columns, beams and walls. It's a bad idea to have bracings on the air inlet sides. However, there is no harm in using bracings in the transverse direction as they do not form an obstruction to air flow. Please confirm that bracings can be adopted in areas other than the air inlet faces.	Bidder to follow tender specification.
137	Clause No. 28 **NIT**	**Payment Terms for Civil works shall be as follows:-** (ii) Ten percent (10%) of contract value of civil works along with taxes (as applicable) shall be released by Site authorities/ Region on successful completion of PG/ Demonstration test(s) and handing over system/package to Customer/BHEL, as applicable.	We request to not hold Ten percent (10%) of contract value of civil works along with taxes (as applicable) shall be released by Site authorities/ Region on successful completion of PG/ Demonstration test(s) and handing over system/package to Customer/BHEL, as applicable against submission Equivalent Bank Guarantee before 1st RA bill	NIT terms will prevail. Bidders are requested to comply the same.
138	Clause no. 28 **NIT**	Clause no 9.5 (excluding notes) of GCTC of GCC BOP Rev. 00 shall be read as- "Vendors shall submit billing documents for payment directly to BHEL. Payment will be released within days as mentioned below after submission of complete documents as per clause no 9.6.2 – 9.6.5: a. 90 days for non MSME as per MSMED Act b. 45 days for vendors qualified and registered as Micro and Small	• We request you to release the payment within 30 days as we are medium enterprises as per MSMED Act.	NIT terms will prevail. Bidders are requested to comply the same.

		Enterprises MSEs as per MSMED Act c. 60 days for vendors qualified as Medium Enterprises as per MSMED Act."		
139	Clause no. 16.2.1 (a)**GCC**	**DELAYED DELIVERYLD on mandatory spares portion** where delivery for mandatory spares is defined separately in the NIT. LD shall be applicable @ ½ percent and applicable GST thereon, of the total mandatory spares portion contract value excluding GST per week or part thereof, limiting to 10% of total contract value of mandatory spares excluding GST	Please revise clause: **LD on mandatory spares portion** where delivery for mandatory spares is defined separately in the NIT. LD shall be applicable @ ½ percent and applicable GST thereon, of the total mandatory spares portion contract value excluding GST per week or part thereof, limiting to ***five (5) percent*** of total contract value of mandatory spares excluding GST.	NIT terms will prevail. Bidders are requested to comply the same.
140	Clause no. 16.2.1 (b) **GCC**	**LD on Supply and E&C-** Purchaser reserves the right to recover from the Seller/ Contractor, as agreed liquidated damages and not by way of penalty, a sum equivalent to half (½) percent and applicable GST thereon, of the total contract price (main supply and E&C) excluding GST per week or part thereof, subject to a maximum of ten (10) percent of the total contract price (main supply and E&C) excluding GST, if E&C completion of the package is delayed beyond the contractual completion date or extension thereof as per the period stipulated in the Order/ Contract. Liquidated Damages will not be deducted from supply payment for delay in supply.	Please revise clause: Purchaser reserves the right to recover from the Seller/ Contractor, as agreed liquidated damages and not by way of penalty, a sum equivalent to half (½) percent and applicable GST thereon, of the total contract price (main supply and E&C) excluding GST per week or part thereof, subject to a maximum of ***five (5) percent*** of the total contract price (main supply and E&C) excluding GST, if E&C completion of the package is delayed beyond the contractual completion date or extension thereof as per the period stipulated in the Order/ Contract.	NIT terms will prevail. Bidders are requested to comply the same.
141	Clause no. 16.2.1 (c) **GCC**	**LD on service portion** (PG test, O&M, AMC, etc.) where delivery for services are defined separately in the NIT. LD shall be applicable @ ½ percent and applicable GST thereon, of the total service portion contract value excluding GST per week or part thereof subject to a maximum of ten (10) percent of the total contract value of service portion excluding GST.	Please revise clause: **LD on service portion** (PG test, O&M, AMC, etc.) where delivery for services are defined separately in the NIT. LD shall be applicable @ ½ percent and applicable GST thereon, of the total service portion contract value excluding GST per week or part thereof subject to a maximum of ***five (5) percent*** of the total contract value of service portion excluding GST.	NIT terms will prevail. Bidders are requested to comply the same.
142	Clause no. 30.1 **GCC**	Force Majeure event means an event beyond the control of the parties to the contract including but not limited to war, Military operations of any nature, Act of God, earthquakes, floods, fire, quarantine restrictions, acts of public enemy,	Please include pandemic and endemic also in Force Majeure event.	It will be governed by Govt of India guidelines

		blockades, civil war, explosion, epidemics, insurgency, change in law or government policy etc.		
143	Clause no. 30.3 **GCC**	If it is agreed between the parties that a Force Majeure event has occurred and its effect continues for a period of 36 months, then either party shall be free to cancel the contract. However, if the effect of such event ceases within this period of 36 months, the performance of the obligations put on hold shall be resumed immediately.	Please change the clause to "If it is agreed between the parties that a Force Majeure event has occurred and its effect continues for a period of **3 months**, then either party shall be free to cancel the contract. However, if the effect of such event ceases within this period of 3 months, the performance of the obligations put on hold shall be resumed immediately."	NIT terms will prevail. Bidders are requested to comply the same.
144	Clause no. 10.0 **GCC**	**RECOVERY OF OUTSTANDING AMOUNT** ii. Dues payable to Seller against other contracts including SDs, BGs in the same Region/Unit/Division of BHEL. iii. Dues payable to Seller against other contracts including SDs, BGs in the different Region/Unit/Division of BHEL.	Please delete these clauses. This contract has to be treated independent of other contracts.	NIT terms will prevail. Bidders are requested to comply the same.
145	Clause no. 12.4 **GCC**	This shall not be applicable on the recoveries arising out of Risk and Cost, recoveries made by Customer from BHEL on account of Contractor, any other type of recoveries for workmanship, material, T&P etc. due from the contractor.	Please delete this paragraph. The maximum liability should be limited to total contract value.	NIT terms will prevail. Bidders are requested to comply the same. Also note that clause no-27.0 of GCTC of GCC-BOP (relating to risk and cost) is not applicable for this tender as per NIT clause no 37 page 7 of 10
146	**ANNEXURE-VII** **GCC**	**A) PAYMENT TERMS** Payment will be released generally within 60 days after receipt of material/ services and complete documents as per order/ contract (45 days for vendors qualified and registered as micro or small as per MSMED Act) Loading will be done for vendors seeking earlier payment w.r.t. above, for the value and the period of deviation as per Clause 17.0 of 'Instructions to Bidders'.	We request you to release the payment within 30 days as we are medium enterprises as per MSMED Act.	NIT terms will prevail. Bidders are requested to comply the same.
147	Clause no. 33.2**GCC**	**ARBITRATION**Except as provided elsewhere in this Contract, in case amicable settlement is not reached between the Parties, in respect of	The number of arbitrators shall be three. Each party shall appoint their Arbitrator and the two appointed Arbitrators shall thereafter appoint the	NIT terms will prevail. Bidders are requested to comply the same.

		any dispute or difference; arising out of the formation, breach, termination, validity of execution of the Contract; or, the respective rights and liabilities of the Parties; or, in relation to interpretation of any provision of the Contract; or, in any manner touching upon the contract, then, either Party may, by a notice in terms of Section 21 of Arbitration & Conciliation Act in writing to the other Party commence arbitration. The notice shall as far as possible contain the particulars of all claims to be referred to arbitration. The arbitration shall be conducted by Sole Arbitrator to be appointed mutually by the Competent Authority of BHEL (purchaser) & Seller within the statutory period as applicable. As far as practicable, names of 2 or more persons shall be forwarded to the Seller for seeking consent of the Seller to one of the names proposed for appointment as arbitrator in the case. If the parties fail to agree on the name of Sole Arbitrator, then appointment shall be made as per the provisions of section 11 of the Arbitration & Conciliation Act……	Presiding arbitrator. The work being construction related, it is agreed to appoint construction domain experienced Arbitrator to enable better understanding of the issues and early disposal of the issues.The place of arbitration shall be New Delhi. New Delhi law shall apply. ORAs per the latest honorable Supreme Court Judgement ***QUOTE: "A Party interested in the outcome of the award loses the right to appoint the Arbitrator"***In view of the above it is suggested that we may select a neutral Arbitrator though **IITArb** (Indian Institute of Technical Arbitrators) or **ICA** (Indian Council of Arbitration) or through court.	
148	Clause no. 39.0 **GCC**	**HOLD ON CONTRACT EXECUTION CASES OTHER THAN FORCE MAJEURE** In case of uncertainty regarding lifting of HOLD on contract execution relating to any activity put by Buyer/BHEL (because of any reason other than Force Majeure) or by end customer (cancellation or hold on project), the contract/Purchase Order may be short closed by Buyer/BHEL after 3 years from date of imposition of HOLD without prejudice to any claim of either party with regard to the executed portion of the contract. However, all future obligations of the Buyer and Seller with respect to the contract/Purchase Order shall come to end in case of such short closure.	Please change the clause to "In case of uncertainty regarding lifting of HOLD on contract execution relating to any activity put by Buyer/BHEL (because of any reason other than Force Majeure) or by end customer (cancellation or hold on project), the contract/Purchase Order may be short closed by Buyer/BHEL after ***6 (six) months*** from date of imposition of HOLD without prejudice to any claim of either party with regard to the executed portion of the contract. However, all future obligations of the Buyer and Seller with respect to the contract/Purchase Order shall come to end in case of such short closure."	NIT terms will prevail. Bidders are requested to comply the same.
149	Clause no. 46 (iv) **GCC**	The rate of interest applicable for the above advances shall be the base rate of State Bank of India prevailing	Please change the clause to "The rate of interest applicable for the above advances shall be the base rate of State	NIT terms will prevail. Bidders

		on the date of release of advance plus 6%, and such rate will remain fixed till the total advance amount is recovered.	Bank of India prevailing on the date of release of advance plus 2%, and such rate will remain fixed till the total advance amount is recovered."	are requested to comply the same.
150	Clause no. 1 **ANNEXURE-V** **GCC**	**(RISK AND COST CLAUSE)** BHEL reserves the right to terminate the contract or withdraw portion of work and get it done through other agency, at the risk and cost of the contractor after due notice of a period of 14 days' by BHEL in any of the following cases……..	Please change the clause to "BHEL reserves the right to terminate the contract or withdraw portion of work and get it done through other agency, at the risk and cost of the contractor after due notice of a period of **30 days'** by BHEL in any of the following cases……."	Clause no-27.0 of GCTC of GCC-BOP(related to risk and cost) is not applicable for this tender as per NIT clause no 37 page 7 of 10
151	Clause no. 1.1 **ANNEXURE-V** **GCC**	**Risk & Cost Amount against Balance Work:** Risk & Cost Amount against Balance Work shall be calculated as follows: Risk & cost amount = [(A-B) + (A x H/100)] Where, A = Value of Balance scope of work (*) as per rates of new contract B = Value of Balance scope of work (*) as per rates of old contract being paid to the contractor at the time of termination of contract i.e., inclusive of PVC & ORC, if any. H = Overhead Factor to be taken as 5	Please revise: Risk & Cost Amount against Balance Work shall be calculated as follows: Risk & cost amount = [B + H/100] Where, A = Value of Balance scope of work (*) as per rates of new contract B = Value of Balance scope of work (*) as per rates of old contract being paid to the contractor at the time of termination of contract i.e., inclusive of PVC & ORC, if any. H = Overhead Factor to be taken as 5	Clause no-27.0 of GCTC of GCC-BOP(related to risk and cost) is not applicable for this tender as per NIT clause no 37 page 7 of 10
152	Clause no. 2 **ANNEXURE-V** **GCC**	**Recoveries arising out of Risk & Cost and LD or any other recoveries due from Contractor** Without prejudice to the other means of recovery of such dues from the seller recoveries from the seller on whom risk & cost has been invoked shall be made from the following: a) Dues payable to the seller against other contracts, SDs, BGs in the same Region/Unit/ Division of BHEL. b) Dues payable to the seller against different contracts, SDs, BGs in the same Region/Unit/ Division of BHEL	Please delete these clauses. This contract has to be treated independent of other contracts.	Clause no-27.0 of GCTC of GCC-BOP(related to risk and cost) is not applicable for this tender as per NIT clause no 37 page 7 of 10
153	**ANNEXURE-VII** **GCC**	**C) LIQUIDATED DAMAGES** If maximum limit asked for is on Undelivered portion – 10% value of the total quoted ex works price & freight (excluding GST). If maximum limit asked for is less than 10% of contract value loading shall be to the extent to which not agreed by bidder (at offered value).	We request you to change maximum Liquidated damages to be **5%** of the contract value.	NIT terms will prevail. Bidders are requested to comply the same.

154	**ANNEXURE-XII** **GCC**	8. COOLING TOWER-IDCT - Final bill shall be paid after successful PG test completion.	Please revise clause: Final bill to be released after successful completion of IDCT. BHEL will be having the Performance Bank Guarantee which can be released after successful PG test or Defect Liability Period.	NIT terms will prevail. Bidders are requested to comply the same.
155	Clause no. 12.4 **GCC**	Decision of Purchaser with regard to Seller/ Contractor's liability and the amount involved, if any, payable by Seller/ Contractor under the guarantee shall be final, conclusive and binding. This shall not be applicable on the recoveries arising out of Risk and Cost, recoveries made by Customer from BHEL on account of Contractor, any other type of recoveries for workmanship, material, T&P etc. due from the contractor.	Please revise the clause as below: • Any decision of Purchaser which the Seller/Contractor does not agree with shall be, at the Seller's discretion, submitted to the dispute resolution mechanism, i.e. the Purchaser's decision shall not be final, conclusive and binding • Maximum liability specified herein to be applicable to the whole contract, not just in relation to the Guarantee as per clause 12 • Please insert the following: *Neither party shall be liable to the other, under any legal or equitable theory of recovery or otherwise by law, including for liability arising by way of indemnity, in contract or in tort (including negligence) or otherwise, for any special, exemplary, punitive, moral, and/or indirect or consequential loss or damage whatsoever, or for any loss of profit or revenue, loss of production, loss of use of the works (or part thereof), loss of any contract, or any claims for any type of loss or damage of a type referred in this section under any contract with a third party and which arises as a result of the other party's breach of this Contract.*	NIT terms will prevail. Bidders are requested to comply the same.
156	Clause no. 14.1**GCC**	Purchaser's nominated Inspection Agency shall have at all reasonable times access to Seller/ Contractor's premises or works and shall have the power at all reasonable times to inspect drawings of any portion of the work or examine the materials and workmanship of the plant/ equipment/ stores during their manufacture, and if part of the plant/ equipment/ stores is manufactured at other premises, the Seller/ Contractor shall arrange for inspection, examination and testing by the Inspection Agency as if the plant/ equipment/ stores is	Please add the following wording at the end of the clause: Notwithstanding the above, such inspection shall be subject to the following: (i) the Purchaser shall give the Seller reasonable prior notice of its intention to inspect. (ii) inspection shall only take place during normal business hours. (iii) the Purchaser shall comply with the Seller health and safety guidelines. (iv) the Purchaser shall not delay and/or disrupt the Seller nor issue any instruction to the Seller during any such inspection, and(v) the Purchaser will be accompanied by a member of the Seller's personnel at all times during the inspection.	NIT terms will prevail. Bidders are requested to comply the same.

		manufactured on the Seller/ Contractor's premises.		
157	Clause no. 16**GCC**	DELIVERY FAILURE AND TERMINATION / LIQUIDATED DAMAGES	Please add following:These liquidated damages shall be the only damages due from the Seller for delay and shall be the Seller's sole liability and the Purchaser's sole remedy for delay,	NIT terms will prevail. Bidders are requested to comply the same.
158	Clause no. 31.0 **GCC**	Seller/ Contractor shall fully indemnify and keep indemnified the Purchaser against all claims /losses/damages/demands/expenses of any nature of whatsoever nature arising during the course and out of the execution of this Order/ Contract on in connection of this contract.	Please add the following wording to the clause: "to the extent that such claims /losses/damages/demands/expenses arise solely and exclusively our of or by reason of the Seller's performance of its obligations under the contract and is attributable to negligent acts or omissions of the Seller, its personnel, officers, agents or subcontractors."	NIT terms will prevail. Bidders are requested to comply the same.
159	Clause no. 32.3 **GCC**	Seller/ Contractor shall continue to perform the order/ contract, pending settlement of dispute(s).	Please add the following wording to the clause: "unless the dispute is related to non-payment by the Purchase to the Seller in which case the Seller, at its discretion, shall be entitled to suspend performance of the order/contract"	NIT terms will prevail. Bidders are requested to comply the same.
160	Clause no. 43 **GCC**	a) If the completion of work as detailed in the scope of work gets delayed beyond the contract/ completion period, the seller/ contractor shall request for an extension of the contract and BHEL at its discretion may extend the contract as per procedure prescribed in clause 43.0 (b), (c) & (d).	Please add the following wording at the end of clause: *Notwithstanding the foregoing, Seller shall be entitled to an extension of the time for completion if and to the extent that it is or will be delayed in the progress and/or completion of the works or of a portion thereof by the dates stated in the schedule and/or the achievement of the time for completion by any of the following causes: (i) as a result of an error or fault found in the information and documentation provided by Purchaser, (ii) any delay, impediment or prevention caused by or attributable to Purchaser, its personnel or representatives or other contractors, if any, performing works at the same site, (iii) any change in law affecting the works, (iv) Force Majeure in accordance with clause 30, or (v) a cause of delay giving an entitlement to extension of time under this Contract.	NIT terms will prevail. Bidders are requested to comply the same.
161	Clause no. 44 **As per GCC BOP Rev 0.**	OVER RUN CHARGES : OVER RUN CHARGES (Only for E&C contract): - This shall be applicable only for Erection and commissioning (E&C) contract:	OVER RUN CHARGES should be applicable on complete package. Total Over Run Compensation shall be limited to 20% of the cumulatively executed contract value till the Month.	NIT terms will prevail. Bidders are requested to comply the same.

162	Clause no. 4.2 **GCC**	**OTHER TAXES & LEVIES** All taxes/ duties/ Cess / seignior age fee other than GST shall be deemed to be included in the Ex-Works prices.	BOCW cess to be provided extra. Please also clarify about new taxes.	Please refer NIT clause no 38 page 7 of 10
163	Clause no. 20 **SCC** **NIT**	In case of foreign vendors, quoted prices & Dispatches shall be on C & F Port Kolkata Basis and Taxes & Duties in the country of dispatch shall be borne by Foreign vendor.	We understand that upcoming project enjoy Mega Power Plant status. Please confirm if custom duties are exempted for import of Cooling Towers fills, etc.. Please also confirm custom duties are exempted for import of construction equipment like tower crane and other equipment.	Please refer NIT clause no 23 page 2 of 10
164	Clause no. 5.2 **GCC**	**STAUATORY VARIATION** No other variations such as on Custom Duty, exchange rate, minimum wages, prices of controlled commodities, any other input etc. shall be payable by the purchaser unless specifically agreed upon.	The revision in minimum wages and price impact due to minimum wages should be compensated.	NIT terms will prevail. Bidders are requested to comply the same.
165	**ANNEXURE-VII** **PRICE ADJUSTMENT-PVC payment terms & conditions**	The total amount of PVC payable shall not exceed 10% of the BASIC contract value for respective order.	We request you to increase the limit of PVC to 25%.	NIT terms will prevail. Bidders are requested to comply the same.
166	**ANNEXURE-VII** **PRICE ADJUSTMENT-PVC payment terms & conditions**	**C. PRICE VARIATION COMPENSATION FOR CIVIL WORK PORTION** F = Fixed portion of the contract price which will not be subjected to any adjustment under this formula or otherwise which will be 0.20.	We request you to change the fixed portion to 0.10.	Bidder to follow NIT.
167	**TECHNICAL SPECIFICATIONS**	**GENERAL TECHNICAL REQUIREMENT** **36 BID EVALUATION CRITERIA** 36.5 No benefit will be given to Bidder, in case of reduction in actual quantity of Cement and reinforcement steel with respect to the quantities considered in bid evaluation.	Benefit should be given to Bidder, in case of reduction in actual quantity of Cement & reinforcement steel with respect to the respective quantities considered in bid evaluation.	Bidder to follow tender specification..
168	Clause No. 2.15**TECHNICAL DATA- PART- A (MECHANICAL)**	Maximum CW Pumping head permissible, viz. static head plus frictional losses as below: - 15.3 MWC - Static head w.r.t. FGL - Frictional losses within bidder's T.P. with 10% margin	Whereas the max permissible pumping head w.r.t FGL for the IDCT package is 15.3 mWC the min static head (highest level of water in the HW duct) is specified to be 13 mWC.Why is it necessary to specify the min static head? Designers cannot use excess friction losses in the piping because the limit on velocity of 2 m/s for pipe sizing is already specified. The designer will optimize the static and friction heads to stay within the permissible total head of	Please refer amendment no 1.

			15.3 mWC. Hence, please check and let us know whether the limitation on static head is necessary at all.	
169	**TECHNICAL DATA-PART- A (MECHANICAL)** Clause No. 3.3 **TECHNICAL REQUIREMENTS**	**2.19** No. of Spare Cells- 4 **3.3** Bidder shall provide spare cells (Minimum 4 per tower)	Kindly confirm if 4 no of spare cells are required for each or both IDCT.	4 nos spares cells are required for each CT.
170	Clause no. 14 **TECHNICAL SPECIFICATIONS**	**DETAILED SCOPE:-** 14- Carrying out performance test of one of the Cooling Tower through CTI (Cooling Technology Institute-USA) approved/listed testing agency. Carrying out performance test of balance cooling towers by the contractor following the same procedure as approved for testing by CTI agency.	Please clarify whether the performance tests on the IDCT should be conducted by external CTI approved agencies or Indian third party agencies like IITs or the contractor himself. This is because there are big costs associated with external agencies. And as per the Atmanirbhar Bharat policy of GOI, Indian agencies must be encouraged as they are equally capable and easily accessible.	Bidder to follow tender specification. Please also refer cl no. 7.4, at page no 39 of 195, book 1 of 2.
171	Clause No. 2.01.00 **SECTION-B TECHNICAL REQUIREMENTS**	2) BS 4485- Specification for Water Cooling Towers.	The IDCT civil design for RCC members/structures shall be carried out at per applicable IS codes. No British codes are applicable for IDCT civil/structural designs.	Bidder to note the design will be done by IS:3370-2009. However, BS-4485 will be used for information not available in Indian Standard.
172	Clause No. 4.13.5. **TECHNICAL REQUIREMENTS**	The Vibration measurement sensors shall be mounted on the Gear Box.	Please clarify the locations & Axis of Vibration Sensors required on Gearbox.	Please note vibration transducers shall be provided for gearbox of Cooling Tower FAN (X/Y).
173	Clause No. 7.4 **TECHNICAL REQUIREMENTS**	The Performance test of one of the Cooling Tower shall be carried out by the Contractor through CTI approved/ listed agency in presence of Employer. The testing agency proposed by the Contractor shall be approved by the Employer……	Kindly let us know which are the NTPC Approved and/or Listed Testing Agencies so that we can assess costs and associated conflict of interest, if any with any of the agencies. Also, please let us know whether a bidder's design consultant can conduct the PG test?	The testing agency shall be finalized during detailed engineering and shall be subject to NTPC approval.
174	Clause No. 3 **SECTION A (SCOPE OF WORKS) TECHNICAL SPECIFICATION**	Bidder shall also submit all drawings in AutoCad format alongwith PDF files.	Bidder shall submit all drawings in PDF format only.	Bidder to follow tender specification
175	Clause No. 4.5 **SECTION A (SCOPE OF WORKS) TECHNICAL SPECIFICATION**	The applicability of the provisions for conformity to the various codes and standards stipulated shall be in the following order:	The IDCT civil design for RCC members/structures shall be carried out at per applicable IS codes. No British codes are applicable for IDCT civil/structural designs.	Order of precedence of applicable Codes will be as

		4.5.1 Bureau of Indian Standards 4.5.2 British Standards Institution		mentioned in specification.
176	Clause No. 9.02.01 **SUB SECTION D-1-9** **SECTION VI** **TECHNICAL REQUIREMENTS**	Minimum 1000 mm high (from floor/ roof level) hand railing shall be provided around all floor/roof openings, projections/balconies, walkways, platforms, steel stairs, etc., wherever the height of the building is more than 12m, railing height shall be 1.2m. All handrails and ladder pipes (except at operating floors) shall be 32 mm nominal bore **MS pipes (medium class)** conforming to IS: 1161 and shall be galvanised as per IS: 4736 and finished with suitable paint. All rungs and ladders shall also be galvanised. Minimum weight of galvanising shall be 610 g/sqm.	This is in discrepancy with the following Clauses:- Clause No. 4.6- Technical Specification Part A(Mechanical), where it is mentioned " ***Handrail- Heavily galvanized*** *(610 gm/ sq.m) in accordance with IS: 2629 with corrosion resistant protective coating Surface preparation in accordance with IS:6129."* Clause No 5.17.00.01 (b), where it is mentioned "*Fan Deck slab and all other over ground platforms shall be provided with* ***FRP handrailing***". Clause No 5.17.00.01 (m), where it is mentioned "*Suitable RCC guards rails 300 mm high shall also be provided on both sides of these walkways. Over the guard rails* ***FRP hand railing*** *shall be provided.*". Please clarify the same.	Bidder to consider handrailing MOC in line with NTPC specification.
177	Clause No. 8.06.00 **TECHNICAL REQUIREMENTS**	**GRATING:-** All gratings shall be electroforged types. Minimum thickness of the grating shall be 40 mm for indoor installation and 32 mm for outdoor installation. The opening size shall not be more than 30mmx100mm. The minimum thickness of the main bearing bar shall be 5 mm or as per design requirement whichever is higher. All gratings shall be hot dip galvanised at the rate of 610 g. per sq.m. after surface preparation by means of shot blasting or cleaned by acid pickling.	This is in discrepancy with the Clause No. 5.17.00.01 (m), where it is mentioned " *Permanent walkways at least 1000 mm clear width shall also be provided for access to fan and around gear box with* ***FRP gratings*** *of clear opening size not more than 50 MM x 50 mm and grating thickness of 50 mm on RCC supports at fan deck Level.* " Kindly clarify the same.	Bidder to consider FRP grating in line with NTPC specification.
178	Clause No. 4.27 **TECHNICAL SPECIFICATION-PART A (MECHANICAL)**	4.27- Bolts, Nuts & Other Hardware- **SS 304**	This is in discrepancy with the Clause No. 05.17.00.02 Steel Structure, where it is mentioned " *Nails and all components coming in direct contact with water shall be of stainless steel of* ***SS 316*** *or equivalent*".	Bidder to consider in line with NTPC specification.
179	Clauses 10.01.00 **SUB-SECTION D-1-10,** **SECTION – VI,** **Part - B** **TECHNICAL SPECIFIACTIONS**	**Cement** Fly ash based portland pozzolana cement conforming to IS: 1489 (Part-1) shall be used for all areas other than for the critical structures identified below. Other properties shall be as per IS code. Ordinary Portland Cement (OPC) shall necessarily be used for the following	It is stated that fly ash based PPC or OPC can be used in the project. Please let us know whether BHEL will supply blended cement or is the contractor expected to blend the free issue cement with fly ash on his own	PPC cement will be free issue by BHEL.

		structures. a) Ordinary Portland Cement (OPC) shall necessarily be used for RCC for Chimney shell. b) TG foundation top deck/ Substructure c) Spring supported decks of all machine foundations such as TDBFP/MDBFP		
180	Clause No. 2.24 **TECHNICAL DATA-PART-A (MECHANICAL)**	Minimum Fill Plan area (including standby cells)- 7200 Sqm	The Clause requires a minimum fill plan area of 7200 m2. This is nothing but the tower inside plan area. If this is fixed, then no further optimization is possible because you have restricted the tower length and fan power as well, which means that you are indirectly fixing the number of cells **and also the cost of the IDCT.** It will be in the interest of BHEL to let the bidders decide on the optimal tower plan area depending on the fill type chosen. Otherwise, the IDCT cost is going to be high. Hence, please review and let us know.	Fill plan area specified in tender specification is minimum. Bidders may choose higher fill plan area.
181	Clause No- 3 **ELECTRICAL SCOPE BETWEEN BHEL AND VENDOR**	Power Cables, Control Cables and Screened Control Cables for a) Both end equipment is in BHEL's scope b) Both end equipment is in vendor's scope c) One end equipment in vendor's scope	The scope split mentions only power and control cables; there is no mention of instrument cables. Only one side instruments are in contractor's scope. And as the other end instrument/ equipment is in BHEL's scope, please clarify whether instrument cables will be supplied by BHEL (instrument schedule will be by the contractor). the contractor). As per scope split, only E&C is in contractor's scope wherever only one end equipment is provided.	Supply of instrument cable (screen control cables) is in BHEL scope. Please also refer cl no. 39.11 of General technical requirement.
182	39.3.3 of GTR	1 no Pressure Gauge for each of the Hot Water Riser.	Pressure gauge for each riser pipe may not be required. One gauge for IDCT on header is sufficient. Please check & confirm.	Bidder to follow tender specification.
183	39.3.4 of GTR	1 no Temperature Gauges for each of the Hot Water Riser.	Temperature gauge for each riser pipe may not be required. One gauge for IDCT on header is sufficient. Please check & confirm.	Bidder to follow tender specification.
184	39.9 & 39.12 of GTR	For all profibus devices… AMS for Profibus…	Pl. explain. As per our understanding, DCS & Profibus equipment (OWS / Fibre optic cable etc.,) are not in CTC scope. Pl. clarify.	Bidder to refer Amendment no 1.
185	42.3.1 of GTR			Bidder to note that E3D software

		All the layouts shall be made using computerized 3D modelling system (SP3D)….	Any other 3D model such as Rivet or *.dgn is acceptable instead SP3D.	as a plant design platform is being used by BHEL. Hence, model of IDCT must be editable within the E3D software
186	4.1.5 of TECHNICAL DATA - PART - A (MECHANICAL)	RCC cooling tower: Fan Cylinder/ recovery stack : RCC	Requested to add FRP stack as an option.	Bidder to follow tender specification.
187	4.4 of TECHNICAL DATA - PART - A (MECHANICAL)	Hot water distribution pipes for counter flow cooling tower: PVC (IS 4985 Class 3) / GRP / HDPE (IS 4984 PN6, Grade PE 80) / as per Bidder's proven practice	If bidder's proven experience suggests lesser pressure rating, is it acceptable?	Bidder to follow tender specification.
188	4.8 of TECHNICAL DATA - PART - A (MECHANICAL)	Fill supports: SS316 Grid	Since trickle fill is an option, consider RCC / FRP fill supports.	Noted. However, same shall be subject to NTPC acceptance during detailed engineering.
189	Sl. No. 9 of Tender Notice	Due Date & Time for Offer Submission is 22 March 2024 01 :00 : PM IST	Since it is an EPC contract and lot of supply items involved in this package which are to be obtained quotations from the suppliers, it is requested to extend the bid submission date **for 05 weeks i.e., till 26.04.2024.**	Please refer corrigenda 01
190	Tendernotice_3, Pre- Qualifying Requirements (Technical), Page-1 Clause 4.3.1	As the works of Cooling Tower (IDCT) are specifically completed by few companies, we request you to kindly allow participation as a Consortium Partner for this Bid as this shall allow more competition for the bid. In view of the above, we request you to kindly add the below clause within the clause 4.3.1: 4.3.1.1) In case the reference cooling tower was constructed by a party other than the Bidder himself, the Bidder shall employ a construction agency who has independently executed the construction works of Induced Draught Cooling Tower (IDCT) meeting the requirements of clause 4.3.1 above.		Bidder to follow the NIT.
191	Tendernotice_14, Page-10, Enclosures- Sl. 2) Financial PQR	The List of Enclosures has Sl. (2) Financial PQR, whereas the Financial PQR is not available in the Tender Documents. Kindly confirm if the Financial PQR is not required for this project?		Please refer Annexure A to Corrigenda 01
192	Clause 13, Page 334 of 663	It is specified that one of the IDCTs must be tested by any of the CTI licensed testing agencies and the other tower by the Contractor himself. In this regard, please confirm that both the tests shall be conducted, and results published as per the CTI code ATC-105 as specified at Clause 1.1, Technical Data – Part A (Mechanical) on Page 346 of 663.		Bidder's query is not clear.
193	Clause 15, Page 339 of 663	It is mentioned that clarified water with a COC of 5 will be supplied to the IDCT. And the circulating water quality report on page 399 of 663 shows that the Ca hardness is 862.5 ppm as CaCO3. This is very hard water that will necessarily cause scaling on fill, pipe, nozzle and duct surfaces. Scaling on heat transfer and nozzle spray surfaces will affect the thermal performance of the IDCT and scaling inside the distribution pipes will reduce		Bidder to note that suitable provision to control scaling/ corrosion, microbiological

		the water flow through the IDCT over a period depending on COC control and maintenance measures. It is necessary to add scale inhibitors to the circulating water to protect the heat transfer surfaces and other IDCT internals. Please confirm that a suitable water treatment program to control scaling will be implemented. Further, the BOD of 5 is just on the border and any brief loss of control over the quality of circulating water will result in microbiological activity that will foul the heat transfer surfaces in no time. Please confirm that a suitable biocide will be added to the circulating water to prevent microbial activity. This is because the fill performance can be guaranteed only when the circulating water quality is good.	growth is envisaged for condenser by BHEL.
194	Clause 42.1, Page 344 of 663	Cooling Tower companies are not into 3D modelling as it is essentially the EPC contractor's scope to check for crisscrossing plant facilities, either over or underground, especially piping runs. Whereas the cooling tower Contractor's scope is well defined with boundaries and as such there is very little piping involved. In any case all the plant facilities running within cooling tower scope boundary will have to be notified by the EPC contractor. Despite the above, Cooling Towers can be 3D modelled for information to the Client but not in plant modelling or smart piping software, etc. The cooling tower 3D model files, if necessary, can be provided only in *.dgn or *.sat formats. The client may check compatibility of these files with their SP3D software.	Bidder to note that E3D software as a plant design platform is being used by BHEL. Hence, model of IDCT must be editable within the E3D software.
195	Clause 2.5, Technical Data, Part-A (Mechanical), Page 346 of 663	This clause essentially specifies that the fills are to be of non-clogging type. The examples for the nonclogging type of fills given are Modular Splash/Trickle Grid/Turbo-Splash or Splash Fills like V bar and Splash Grid. In the above context, please note that there are no fills that are non-clogging. All fills, whether modular film or modular splash or splash will choke/foul depending on circulating water quality and local environment. Hence, certain types of fills can be termed "low clogging" type, if the circulating water quality is conducive and certainly not "non-clogging" type. Modular fills mean those fills that are in module form, i.e. pack form. And there are low-clog film fills just like low-clog splash fills. Hence, if the fills are necessarily required to be in modular form and of low clogging type, please clarify whether low-clog type modular film fills are also acceptable. The offset fluted modular film fills like OS21 of Brentwood, Y20 of Cooldeck/SPIG, etc are some of the examples under this category.	Film fills are not acceptable.
196	Clause 2.13, Technical Data, Part-A (Mechanical), Page 347 of 663	The specification permitting 2% addition of KaV/L for every meter of air inlet height subject to a max of 15% is erroneous and we presume that it is by oversight. The contribution of rain zone in IDCTs is very minimal as the air travel distances are short and air velocities are high compared to that in NDCTs. As the pressure drop in the rain zone is relatively low (because of short travel distance of air) in IDCTs, any small addition of KaV/L here will overpredict the thermal performance of the IDCT. Designers will unknowingly undersize the IDCTs utilizing this clause that will create contractual problems post the PG test. There is no such KaV/L addition from rain zone is the Fulkerson method that is usually specified by BHEL. Moreover, this will become a complicated matter when the performance equations of certain modular splash fills obtained through in-house lab testing include end effects, i.e. already includes	The value specified is the maximum limit. Bidders may choose lower value or no-enhancement in the rain zone as per their design to meet the tower performance.

		KaV/L contribution from rain and spray zones. These end effects cannot be separated, if the test data acquired through the lab is not available separately for each of the heat transfer zones in the IDCT. Hence, it is prudent to remove this clause to avoid confusion and involuntary undersizing of the IDCT. Once this clause is removed, the overall KaV/L demand will be met only from the fill and spray zone, which is easy to cross check. The aux power consumption permitted is quite high in this project and hence, removal of the rain zone KaV/L will make no difference to the design.	
197	Clause 2.16, Technical Data, Part-A (Mechanical), Page 347 of 663	Whereas the max permissible pumping head w.r.t FGL for the IDCT package is 15.3 mWC the min static head (highest level of water in the HW duct) is specified to be 13 mWC. The static head will majorly depend on air inlet height and fill height. The fill height in case of modular splash fills like trickle grid will be just half of that splash type fills like V bar and Splash grid. Hence, the static head utilization will depend on the type of fill to be used. Designers should be given the choice of fixing the static head based on design optimization. Also, designers cannot use excess friction losses in the piping because the limit on velocity of 2 m/s for pipe sizing is already specified. In view of the above, please check and let us know whether the limitation on static head is necessary at all.	Refer amendment no 1.
198	Clause 2.2, Technical Data, Part-A (Mechanical), Page 347 of 663	The evaporation loss is a result of the thermal design that is performed for a set of design duty conditions specified in the tender. There is no way one can control the evaporation loss for a given set of duty conditions comprising of water flow, range, approach and type of fill (very little variation with fill type; it's the thermal duty that determines this loss).	Refer amendment no 1.
`199	Clause 3.2, Technical Data, Part-A (Mechanical), Page 348 of 663	The specification calls for easily installable and removable fills. In this context please note that the V bar type of splash fill is the most difficult to install and remove. Does this mean that the V bar type of fill is not permissible in this project?	Bidder to follow tender specification.
200	Clause 4.25, Technical Data, Part-A (Mechanical), Page 350 of 663	The guide frames for gates and screens are to be in SS 304 and the screen itself is in SS 304. If such is the requirement, the screen frame cannot be in carbon steel. Hence, please correct it to SS 304.	Bidder to follow tender specification.
201	Clause 4.06.01, Sub-Section A-15, Page 347 of 663	This clause specifies that the non-clogging type of fills shall be in modular form. As stated above, offset fluted low-clog fills are also in modular form. Please review and let us know whether low-clog modular off-set film fills are permissible. This clause further states that the fills are to be assembled into modules by Mechanical means without the use of adhesives. In this context, please note that adhesives for gluing fills and drift eliminators were used in the olden days but not after the arrival of various solvents that can bond the sheets chemically through heat fusion. Solvent/chemical bonding is a proven method all over the world and scores of towers are operating in India for the last 20 years or more with solvent bonded fills and drift eliminators. The chemical/solvent evaporates in the bonding process leaving no residue. Hence, please confirm that solvent bonded modular fills are permissible.	Tender specification is clear in this regard.
202	Clause 4.8, Sub-Section A-	It is specified that the drift eliminators are to be of Profile type. Please note that the profile type of drift eliminators cause a higher pressure drop compared to a cellular drift eliminator. Cellular drift eliminators can be sealed properly at	Bidder to follow tender specification.

	15, Page 360 of 663	column junctions and around pipes, whereas the profile types cannot. Hence, cellular drift eliminators are better from a thermal design point of view. Please confirm. Further, the method of jointing the cellular drift eliminators will be solvent/chemical bonding and not gluing. Please confirm.	
203	Clause 5.17.00.01, Sub-Section D-1-5, Page 538 of 663	It's a bad idea to have bracings on the air inlet sides. However, there is no harm in using bracings in the transverse direction as they do not form an obstruction to air flow. Please confirm that bracings can be adopted in areas other than the air inlet faces.	Bidder to follow tender specification.
204	Clause 2.24, Page 347 of 663	The clause requires a minimum fill plan area of 7200 m2. This is nothing but the tower inside plan area. If this is fixed, then no further optimization is possible because you have restricted the tower length and fan power as well, which means that you are indirectly fixing the number of cells and also the cost of the IDCT. It will be in the interest of BHEL to let the bidders decide on the optimal tower plan area depending on the fill type chosen. Otherwise, the IDCT cost is going to be high. Hence, please review and let us know.	Fill plan area specified in tender specification is minimum. Bidders may choose higher fill plan area.
205	Electrical Scope split on Page 336 of 663	The scope split mentions of power and control cables. There is no mention of instrument cables. Only one side instruments are in the contractor's scope. And as the other end instrument/equipment is in BHEL's scope, please clarify whether instrument cables will be supplied by BHEL (instrument schedule will be by the contractor). As per scope split, only E&C is in contractor's scope wherever only one end equipment is provided	Supply of instrument cable (screen control cables) is in BHEL scope. Please also refer cl no. 39.11 of General technical requirement.
206	Clause 10.6, Page 530 of 663	It is stated that the internal surfaces of all water retaining structures shall be plastered in line with requirements mentioned in customer specification. There is no plastering required as per NTPC specs and no plastering is applied on RCC surfaces of cooling towers. Hence, please confirm that this clause is not applicable to this package.	Bidder to ensure NTPC specification will prevail.
207	Clause 5.17.00.02, Page 540 of 663	As per this clause the liquid retaining structures are to be designed as per IS 3370, Part 2, which is perfectly alright. However, for limiting the crack width of all other structural members of the IDCT like columns and beams, etc the stress for the reinforcement steel is to be limited to 130 MPa (on all faces) as per clause 4.4.3.1 of IS: 3370 (Part 2): 2009 using the partial safety. This is nothing but a long way of saying that all other structures, whether or not they retain water, have to be designed as uncracked sections. Please let us know why this is required for the entire IDCT. If conservatism is the main aim of the above clause, then structures other than liquid retaining can be designed for a crack width of 0.1 mm. If these are designed with reinforcement stress limitation of 130 MPa, then the entire IDCT is being treated as a liquid retaining structure, which is not the case in reality. Hence, please review the above clause and confirm that crack width limitation can be applied to other than liquid retaining structures/members of the IDCT. Other than liquid retaining structures are not liquid retaining structures; hence, the request.	Bidder to comply with tender specification requirement.

ANNEXURE C TO CORRIGENDUM 02

Letter head of CA/ Statutory auditor / Cost auditor

Ref: …… Date: ……..

To,
Bharat Heavy Electricals Limited
PEM, PPEI Building, Plot No 25,
Sector -16A, Noida (U.P)-201301

Subject: - Certification regarding local content

Reference: Tender Enquiry No-……

Name of Package: ……..

Dear Sir,

We hereby certify that items of …….. (package name) for……(Project Name) offered by M/s ……..(bidder's name) having its works/office at …… has local content of ……..%.

Further, it is also certified that the local content percentage (%) certified above is in line with definition of local content given in point no 2 of Public Procurement (Preference to Make in India), Order 2017-revision, having ref. no. P-45021/2/2017-PP(BE-II) dated 04.06.2020 & 16.09.2020 and M/s …… qualifies as Class-I/Class-II (strike out whichever is not applicable) local supplier.

Details of the location(s) at which the local value addition-

Thanking You,

For (CA/Cost Firm Name with FRN & Seal)

Chartered/Cost Accountants

(name of Member)

(Membership no.)

(UDIN no.)

ANNEXURE C TO CORRIGENDUM- 02

Letter head of Company

Ref: …… Date: ……..

To,
Bharat Heavy Electricals Limited
PEM, PPEI Building, Plot No 25,
Sector -16A, Noida (U.P)-201301

Subject: - Certification regarding local content

Reference: Tender Enquiry No-……

Name of Package: ……..

Dear Sir,

We hereby certify that items of …….. (package name) for……(Project Name) offered by M/s ……..(bidder's name) having its works/office at …… has local content of ……..%.

Further, it is also certified that the local content percentage (%) certified above is in line with definition of local content given in point no 2 of Public Procurement (Preference to Make in India), Order 2017-revision, having ref. no. P-45021/2/2017-PP(BE-II) dated 04.06.2020 & 16.09.2020 and M/s …… qualifies as Class-I/Class-II (strike out whichever is not applicable) local supplier.

Details of the location(s) at which the local value addition-

Thanking You,

Authorised Signatory

2X800 MW LARA STPP STAGE-II

AMENDMENT NO. 1

TO TECHNICAL SPECIFICATION FOR INDUCED DRAFT COOLING TOWER

Specification No. : PE-TS-508-165-W001 (REV. 00)

BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
PPEI BUILDING, SECTOR 16 A
NOIDA - 201301

	TECHNICAL SPECIFICATIONS	SPECN. NO.:	PE-TS-508-165-W001		
	INDUCED DRAFT COOLING TOWER				
	AMENDMENT NO. 1	REV. NO.	0	DATE:	18.03.2024

1.0 With reference to Technical data-Part-A (MECHANICAL) (pages 19 TO 23 OF 195 of book 1 of 2) of Technical Specification, please consider the Specification amended as below:

Cl no.	Clause as mentioned in Technical Specification	Amended Clause
2.15	Maximum CW Pumping head permissible, viz. static head plus frictional losses as below: **15.3 M** - Static head w.r.t. FGL - Frictional losses within bidder's T.P. with 10% margin	Maximum CW Pumping head permissible, viz. static head plus frictional losses as below: **16.0 M** - Static head w.r.t. FGL - Frictional losses within bidder's T.P. with 10% margin
2.16	Minimum elevation of top of water level in hot water distribution duct with respect to FGL: **13M**	Minimum elevation of top of water level in hot water distribution duct with respect to FGL: **13.5 M**
2.17	Maximum limit on total power consumption per cooling tower for the cooling tower fans at fan motor inlet terminals: **3240 KW**	Maximum limit on total power consumption per cooling tower for the cooling tower fans at fan motor inlet terminals: **2600 KW**
2.20	Maximum permissible Evaporation loss: **1.6%**	Maximum permissible Evaporation loss: **1.7%**
4.25	Screen	Trash Rack
5.2	Fan Auxiliary power consumption: **3240 KW**	Fan Auxiliary power consumption: **2600 KW**

2.0 Annexure-A to book 2 of 2 (Bore hole data for IDCT area) is revised as attached as Annexure-A to this amendment. Bore hole location drgawing is also attached.

3.0 Topographical Survey drg (Sheet 1 and sheet 2) is attached.

4.0 The Sub-section-D-1-7 of Technical Specification (book 2 of 2) is revised and attached as 'Revised Sub-section-D-1-7.

5.0 Clause no 39.12, General Technical Requirement, Book 1 of 2 of tender specification regarding "ANNUAL MAINTAINENCE SERVICE (AMS) FOR PROFIBUS INSTRUMENTS' is **deleted.**

2x800 MW LARA STPP STAGE-II

TANK FOR RAIN WATER HARVESTING

DBH-135

TO BE REFER NOTE NO.

PRE-ASSE

483.5W
1453S

445.5W
1513.5S

CT-2B

495W ELECT. SW.GR. 1608S FOR CT

S/S-15

RL(+)203.0

625W
1583.06S

625W
1649S

570.5W
1608S

561.3W
1724.9S

468W
1718S

584.8W
1754.2S

512W
1763.5S

535.8W
1792.8S

404.5W
1851.5

SHED FOR PLANT

MCC

TRUNK DRAIN

45000

~184000

250000

DBH-134

BH-10

L~350m

RL(+)207.0M

DERT-26

LM-08

689.75W
1603.99S

706W
1654S

635W
1654S

S/S-14

5M HEIGHT FENCING
WITH G.I. SHEETS

647W
1696S

644.96W
1704.78S

SUBSTATION

DBH-122

644.96W
1734.78S

PSS-01

250000

DERT-14

3940

DBH-121

BHEL

VENDOR

679.29W
1798.56S

848.61W
1812.04S

DBH-44

DBH-45

DBH-120

L~250m

868.61W
1852.54S

DBH-119

IDCT MCC

DERT-2

TD-2

5M HEIGHT FENCING
WITH G.I.SHEETS

DIVERSION OF TRUNK DRAIN

SPACE FOR AMMONIA STORAGE

BH-2

BH-1

632.37W
1989.23S

LM-09

Drain TD-2

BH-3

DBH-125

813.34W
2024.57S

670.06W
2056.31S

886.714W
1459.802S

846.54W
1485.18S

866.54W
1523.18S

879.86W
1675.06S

836.57W
1655.81S

847.52W
1659.81S

LM-03

LM-04

LM-05

31

46

34

19

20

21

35

IDCT MCC

ISO/IEC 17025:2005 Certified Laboratory (NABL) Certificate No. TC-7134

Soil Profile (BH-2)

Location :	Crushed Coal Stock Pile	Surface Elevation :	RL 211.427 m	Boring Method :	Shell & Auger
UTM Coordinates :	753235 E, 2407880 N	Ground Water Depth :	Not met	Casing Depth :	12.2 m
Survey Coordinates :	1954S, 727W	Termination Depth :	15.45 m (RL 196 m)	Boring Start :	06-Aug-18
				Boring Finish :	07-Aug-18

Depth, m		Sample No.	SPT [1]		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N_f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm^2)	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, ϕ (degrees)	
0.00	0.50	DS1				Very dense brown silty sand with gravel (SM)																		
1.00	1.45	SPT1	56	87																				
2.50	2.95	SPT2	53	67																				
4.00	4.45	SPT3	65	72			5.50																	
5.50	5.95	SPT4	75	75		Hard brown clayey silt, medium plastic (CI)																		
7.00	7.45	SPT5	49	49																				
8.50	8.80	UDS1														1.96	1.72	14.1						
10.00	10.45	SPT6	63	63																				
11.50	11.95	SPT7	72	72																				
13.00	13.45	SPT8	52	52																				
14.50	14.95	SPT9	65	65																				
15.00	15.45	SPT10	89	89			15.45																	

[1] SPT is outside NABL scope.

CENGRS

ISO/IEC 17025:2005 Certified Laboratory (NABL) Certificate No. TC-7134

Soil Profile (BH-10)

Location :	Lagoon-1	Surface Elevation :	RL 205.242 m	Boring Method :	Shell & Auger
UTM Coordinates :	753266 E, 2408325 N	Ground Water Depth :	0.00 m	Casing Depth :	8.1 m
Survey Coordinates :	1506S, 740W	Termination Depth :	15.45 m (RL 189.8 m)	Boring Start :	27-Aug-18
		Ground Water Level :	RL 205.2 m	Boring Finish :	27-Aug-18

Depth, m		Sample No.	SPT [1]		Symbol	SOIL DESCRIPTION	Depth of Strata, (m)	Grain Size Analysis				Atterberg Limits			Shrinkage Limit, (%)	Density and Moisture			Specific Gravity	Shear Tests				Free Swell Index, (%)
From	To		Field Value, N_f	Corrected Value, N"				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid (%)	Plastic (%)	Plasticity Index (%)		Bulk Density (gms/cm^3)	Dry Density (gms/cm^3)	Moisture Content (%)		Type of Test	Confining Pressures, (kg/cm^2)	Cohesion Intercept, 'c' (kg/cm^2)	Angle of Internal Friction, ϕ (degrees)	
0.00	0.50	DS1				Hard brown silty clay, high plastic (CH)																		
1.00	1.45	SPT1	30	30		- with gravel, 0.0 to 1.0 m						66.6	27.6	39.0	14									21
2.50	2.80	UDS1														1.72	1.50	14.7		UC		1.8		
4.00	4.45	SPT2	42	42				0	3	59	38													
5.50	5.80	UDS2																						
7.00	7.45	SPT3	53	53								58.2	25.0	33.2					2.67					
8.50	8.95	SPT4	62	62																				
10.00	10.45	SPT5	73	73				0	6	62	32													
11.50	11.95	SPT6	79	79																				
13.00	13.45	SPT7	92	92																				
14.50	14.92	SPT8	101/ 27cm	-																				
15.00	15.45	SPT9	81	81		- with traces of gravel, 15.0 to 15.45 m	15.45																	

[1] SPT is outside NABL scope.

Project : Geotechnical Investigation For Lara STPP, Stage II, Chhattisgarh. CETEST

Job No : 4607 | Created by : SKD | Created on : 10/11/2022 | Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. DBH119 | Co-ordinates E=−831 N=−1921

Field Test	Nos	Samples	Nos
Penetrometer (SPT)	3	Undisturbed (UDS)	2
Cone (Pc)		Penetrometer (SPT)	3
Vane (V)		Disturbed (DS)	3
		Water Sample (WS)	0

Commencement Date : 21/10/2022
Completion Date : 23/10/2022
Bore Hole Diameter : 150mm / NX.
Level Of Ground : 204.965 M.
Water Struck At :
Standing Water Level : Not found.

DESCRIPTION	SYMBOL	N-VALUE (EACH DIVN. = 15cm)	SAMPLES Ref. No	SAMPLES Depth (m)
0.00m				
			UDS−1	0.50−0.80
Very stiff, reddish brown, clayey silt.			DS−1	1.50
		6 10 14 — 24	SPT−1	2.00−2.45
			DS−2	2.50
2.80m				
			UDS−2	3.00−3.35
Hard, reddish brown, clayey silt.		11 20 24 — 44	SPT−2	3.50−3.95
			DS−3	4.00
		Refusal		
4.50m		100 / 4.0 cm Pentn.	*SPT−3	4.50−4.54
			R1	CR=26%/RQD=0% 4.50 / 5.00
		NX rotary drilling from 4.50m to 20.00m	R2	CR=27% RQD=Nil 6.00
			R3	CR=31% RQD=Nil 7.00
Highly to moderately weathered, light to deep grey, fine to medium grained, fractured rock.			R4	CR=49% RQD=Nil 8.00
			R5	CR=35% RQD=10% 9.00
			R6	CR=55% RQD=45% 10.00
			R7	CR=45% RQD=Nil 11.00
11.00m				
			R8	CR=58% RQD=Nil 12.00
Moderately to slightly weathered, light to deep grey, fine to medium grained, fractured rock.			R9	CR=55% RQD=10%
12.75m				

BH−119/Sheet−1

Project : Geotechnical Investigation For Lara STPP, Stage II, Chhattisgarh.			CETEST
Job No : 4607	Created by : SKD	Created on : 10/11/2022	Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. DBH119 | Co-ordinates E=−831 N=−1921

Field Test	Nos	Samples	Nos
Penetrometer (SPT)	3	Undisturbed (UDS)	2
Cone (Pc)		Penetrometer (SPT)	3
Vane (V)		Disturbed (DS)	3
		Water Sample (WS)	0

Commencement Date : 21/10/2022
Completion Date : 23/10/2022
Bore Hole Diameter : 150mm / NX.
Level Of Ground : 204.965 M.
Water Struck At :
Standing Water Level : Not found.

DESCRIPTION	SYMBOL	N−VALUE (EACH DIVN. = 15cm)	SAMPLES Ref. No	SAMPLES Depth (m)
12.75m				13.00
Moderately to slightly weathered, light to deep grey, fine to medium grained, fractured rock.			R10	CR=65% RQD=Nil
14.00m				14.00
			R11	CR=26% RQD=Nil
				15.00
Highly to moderately weathered, light to deep grey, fine to medium grained, fractured rock.			R12	CR=37% RQD=Nil
				16.00
			R13	CR=48% RQD=Nil
				17.00
			R14	CR=47% RQD=Nil
18.00m				18.00
Moderately to slightly weathered, light to deep grey, fine to medium grained, fractured rock.			R15	CR=53% RQD=Nil
				19.00
			R16	CR=65% RQD=Nil
20.00m				20.00

N.B. − '*' means sample could not be recovered.

Project : Geotechnical Investigation For Lara STPP, Stage II, Chhattisgarh. CETEST

Job No : 4607 | Created by : SKD | Created on : 10/11/2022 | Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. DBH120 | Co-ordinates E=-766 N=-1834

Field Test	Nos	Samples	Nos
Penetrometer (SPT)	4	Undisturbed (UDS)	4
Cone (Pc)		Penetrometer (SPT)	4
Vane (V)		Disturbed (DS)	5
		Water Sample (WS)	0

Commencement Date : 23/10/2022
Completion Date : 25/10/2022
Bore Hole Diameter : 150mm / NX.
Level Of Ground : 205.085 M.
Water Struck At :
Standing Water Level : Not found.

DESCRIPTION	SYMBOL	N-VALUE (EACH DIVN. = 15cm)	SAMPLES Ref. No	SAMPLES Depth (m)
0.00m.				
Reddish brown, clayey silt / silty clay.			UDS-1	0.50-0.75
			DS-1	1.00
1.40m.		7 9 12 (21)	SPT-1	1.50-1.95
			*UDS-2	2.00-2.09
			DS-2	2.09
Very Stiff to hard, reddish brown, clayey silt / silty clay.		10 15 17 (32)	SPT-2	2.50-2.95
			DS-3	3.00
3.80m.			UDS-3	3.50-3.80
			DS-4	4.00
Hard, reddish brown, clayey silt / silty clay.		15 20 23 (43)	SPT-3	4.50-4.95
			*UDS-4	5.00-5.08
			DS-5	5.08
5.50m.		Refusal 100 3.0 cm Penetn.	*SPT-4	5.50-5.53
			R1	CR=28%/RQD=0% 5.50
		NX rotary drilling from 5.50m to 15.00m		6.00
			R2	CR=23% RQD=Nil 7.00
Highly weathered, light to deep grey, fine to medium grained, fractured rock.			R3	CR=48% RQD=46% 8.00
			R4	CR=23% RQD=Nil 9.00
9.00m.			R5	CR=30% RQD=Nil 10.00
			R6	CR=25% RQD=Nil 11.00
Highly weathered, light to deep grey, fine to medium grained, fractured rock.			R7	CR=33% RQD=Nil 12.00
			R8	CR=43% RQD=Nil
12.75m.				

BH-120/Sheet-1

Project : Geotechnical Investigation For Lara STPP, Stage II, Chhattisgarh.			CETEST
Job No : 4607	Created by : SKD	Created on : 10/11/2022	Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. DBH120 | Co-ordinates E=−766 N=−1834

Field Test	Nos	Samples	Nos
Penetrometer (SPT)	4	Undisturbed (UDS)	4
Cone (Pc)		Penetrometer (SPT)	4
Vane (V)		Disturbed (DS)	5
		Water Sample (WS)	0

Commencement Date : 23/10/2022
Completion Date : 25/10/2022
Bore Hole Diameter : 150mm / NX.
Level Of Ground : 205.085 M.
Water Struck At :
Standing Water Level : Not found.

DESCRIPTION	SYMBOL	N−VALUE (EACH DIVN. = 15cm)	SAMPLES Ref. No	SAMPLES Depth (m)
12.75m				13.00
HIghly to moderately weathered, light to deep grey, fine to medium grained, fractured rock.			R9	CR=50% RQD=Nil
14.00m				14.00
Moderately weathered, deep grey, fine to medium grained, fractured rock.			R10	CR=52% RQD=Nil
15.00m				15.00

N.B. − '*' means sample could not be recovered.

Project : Geotechnical Investigation For Lara STPP, Stage II, Chhattisgarh. CETEST

Job No : 4607	Created by : SKD	Created on : 10/11/2022	Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. DBH121 | Co-ordinates E=−720 N=−1776

Field Test	Nos	Samples	Nos
Penetrometer (SPT)	4	Undisturbed (UDS)	3
Cone (Pc)		Penetrometer (SPT)	4
Vane (V)		Disturbed (DS)	4
		Water Sample (WS)	0

Commencement Date : 25/10/2022
Completion Date : 26/10/2022
Bore Hole Diameter : 150mm / NX.
Level Of Ground : 205.256 M.
Water Struck At :
Standing Water Level : Not found.

DESCRIPTION	SYMBOL	N-VALUE (EACH DIVN. = 15cm)	SAMPLES Ref. No	SAMPLES Depth (m)
0.00m.				
			UDS−1	0.50−0.80
			DS−1	1.50
		17		
		5 6 11	SPT−1	2.00−2.45
Very stiff, reddish brown, clayey silt / silty clay.				
			DS−2	3.00
			UDS−2	3.50−3.95
			DS−3	4.50
5.00m.		39		
		12 17 22	SPT−2	5.00−5.45
Hard, reddish brown, silty clay / clayey silt.				
			DS−4	6.00
		43	*UDS−3	6.50−6.60
		13 19 24	SPT−3	6.60−7.05
		Refusal		
7.50m.		100	SPT−4	7.50−7.54 7.50
		4.0 cm Pentn.	R1	CR=34%/RQD=0% 8.00
		NX rotary drilling from 7.50m to 15.00m	R2	CR=25% RQD=Nil 9.00
Highly weathered, light to deep grey, fine to medium grained, fractured rock.			R3	CR=23% RQD=Nil 10.00
			R4	CR=23% RQD=Nil 11.00
11.00m.			R5	CR=28% RQD=Nil 12.00
Highly to moderately weathered, light to deep grey, fine to medium grained, fractured rock.			R6	CR=44% RQD=39%
12.75m.				

BH−121/Sheet−1

Project : Geotechnical Investigation For Lara STPP, Stage II, Chhattisgarh. CETEST

Job No : 4607 | Created by : SKD | Created on : 10/11/2022 | Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. DBH121 | Co-ordinates E=−720 N=−1776

Field Test	Nos	Samples	Nos
Penetrometer (SPT)	4	Undisturbed (UDS)	3
Cone (Pc)		Penetrometer (SPT)	4
Vane (V)		Disturbed (DS)	4
		Water Sample (WS)	0

Commencement Date : 25/10/2022
Completion Date : 26/10/2022
Bore Hole Diameter : 150mm / NX.
Level Of Ground : 205.256 M.
Water Struck At :
Standing Water Level : Not found.

DESCRIPTION	SYMBOL	N−VALUE (EACH DIVN. = 15cm)	SAMPLES Ref. No	SAMPLES Depth (m)
12.75m.				13.00
Highly to moderately weathered, light to deep grey, fine to medium grained, fractured rock.			R7	CR=24% RQD=Nil
				14.00
			R8	CR=38% RQD=Nil
15.00m.				15.00

N.B. − '*' means sample could not be recovered.

BH−121/Sheet−2

Project : Geotechnical Investigation For Lara STPP, Stage II, Chhattisgarh. CETEST

Job No : 4607 | Created by : SKD | Created on : 10/11/2022 | Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. DBH122 | Co-ordinates E=-670 N=-1714

Field Test	Nos	Samples	Nos
Penetrometer (SPT)	8	Undisturbed (UDS)	3
Cone (Pc)		Penetrometer (SPT)	8
Vane (V)		Disturbed (DS)	5
		Water Sample (WS)	0

Commencement Date : 27/10/2022
Completion Date : 28/10/2022
Bore Hole Diameter : 150mm / NX.
Level Of Ground : 205.070 M.
Water Struck At :
Standing Water Level : 8.30 m.

DESCRIPTION	SYMBOL	N-VALUE (EACH DIVN. = 15cm)	SAMPLES Ref. No	SAMPLES Depth (m)
0.00m				
Reddish brown, clayey silt / silty clay with moorum.			UDS-1	0.50-0.75
			DS-1	1.50
1.80m		7 9 12 (21)	SPT-1	2.00-2.45
Very stiff, reddish brown, clayey silt / silty clay.			DS-2	3.00
			UDS-2	3.50-3.80
			DS-3	4.50
5.00m		9 13 18 (31)	SPT-2	5.00-5.45
			DS-4	6.00
Hard, reddish brown, clayey silt / silty clay.			*UDS-3	6.50-6.58
		8 14 23 (37)	SPT-3	7.00-7.45
			DS-5	7.80
8.00m		20 100 (>100) 5.0 cm Pentm.	SPT-4	8.00-8.20
			R1	CR=25% RQD=Nil
		NX rotary drilling from 8.00m to 15.00m		9.00
			R2	CR=25% RQD=Nil
Completely/highly weathered, yellowish grey to light grey, fine to medium grained, fractured rock.				10.00
			R3	CR=20% RQD=Nil
				11.00
			R4	CR=20% RQD=Nil
12.00m		20 27 38 (65)	SPT-5	12.00-12.45
Intermediate geometerial consists of completely weathered, reddish brown, fine to medium grained, decomposed rock.			R5	CR=Nil RQD=Nil
12.75m				12.00

BH-122/Sheet-1

Project : Geotechnical Investigation For Lara STPP, Stage II, Chhattisgarh.			CETEST
Job No : 4607	Created by : SKD	Created on : 10/11/2022	Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. DBH122 | Co-ordinates E=−670 N=−1714

Field Test	Nos	Samples	Nos
Penetrometer (SPT)	8	Undisturbed (UDS)	3
Cone (Pc)		Penetrometer (SPT)	8
Vane (V)		Disturbed (DS)	5
		Water Sample (WS)	0

Commencement Date : 27/10/2022
Completion Date : 28/10/2022
Bore Hole Diameter : 150mm / NX.
Level Of Ground : 205.070 M.
Water Struck At :
Standing Water Level : 8.30 m.

DESCRIPTION	SYMBOL	N−VALUE (EACH DIVN. = 15cm)	SAMPLES Ref. No	SAMPLES Depth (m)
12.75m. Intermediate geometerial consists of completely weathered, reddish brown, fine to medium grained, decomposed rock.		24 90 >100 (15.0 cm Pentn.)	SPT−6 R6	13.00−13.30 CR=Nil RQD=Nil
14.00m. Completely weathered, reddish brown, fractured rock.		100 >100 (10.0 cm Pentn.)	SPT−7 R7	14.00−14.10 CR=18% RQD=Nil
15.00m.		100 Refusal (4.0 cm Pentn.)	*SPT−8	15.00−15.04

13.00

14.00

15.00

N.B. − '*' means sample could not be recovered.

Project : Geotechnical Investigation for Lara STPP, Stage II, Chhattisgarh. CETEST

Job No : 4607 | Created by : Sumona | Created on : 23/11/2022 | Sheet No:

BORE LOG DATA SHEET | BORE HOLE NO.DBH134 | Co-ordinates E=−667 N=−1450

Field Test	Nos	Samples	Nos
Penetrometer (SPT)	8	Undisturbed (UDS)	2
Cone (Pc)		Penetrometer (SPT)	8
Vane (V)		Disturbed (DS)	3
		Water Sample (WS)	0

Commencement Date : 09/11/2022
Completion Date : 10/11/2022
Bore Hole Diameter : 150 mm.
Level Of Ground : 203.355 M
Water Struck At :
Standing Water Level : 7.20 m.

DESCRIPTION	SYMBOL	N−VALUE (EACH DIVN. = 15cm.)	SAMPLES Ref. No	SAMPLES Depth (m)
0.00m				
			*UDS−1	0.50−0.57
		7 10 12 (22)	SPT−1	1.00−1.45
Very stiff , reddish brown to yellowish brown, clayey silt / silty clay.			DS−1	2.00
			*UDS−2	2.50−2.58
		12 13 15 (28)	SPT−2	3.00−3.45
			DS−2	4.00
4.50m		15 20 29 (49)	SPT−3	4.50−4.95
			DS−3	5.50
Hard, reddish brown to yellowish brown, clayey silt / silty clay.		24 32 22 (54)	SPT−4	6.00−6.45
7.50m		100 4.0 cm Pentn. (refusal)	*SPT−5	7.50−7.54 7.50
			R1	CR=09% RQD=NIL
		100 8.0 cm Pentn. (>100)	SPT−6	8.50−8.58 8.50
			R2	CR=10% RQD=NIL
		100 6.0 cm Pentn. (refusal)	SPT−7	9.50−9.56 9.50
completely to highly weathered, fine to medium grained, reddish brown to yellowish brown, fractured rock.			R3	CR=10% RQD=NIL
		100 3.0 cm Pentn. (refusal)	*SPT−8	10.50−10.53 10.50
			R4	CR=22% RQD=NIL
				11.50
			R5	CR=21% RQD=NIL
				12.50
12.75m				

BH−134/Sheet−1

Project : Geotechnical Investigation for Lara STPP, Stage II, Chhattisgarh. CETEST

Job No : 4607 | Created by : Sumona | Created on : 23/11/2022 | Sheet No:

BORE LOG DATA SHEET | BORE HOLE NO.DBH134 | Co-ordinates E=−667 N=−1450

Field Test	Nos	Samples	Nos
Penetrometer (SPT)	8	Undisturbed (UDS)	2
Cone (Pc)		Penetrometer (SPT)	8
Vane (V)		Disturbed (DS)	3
		Water Sample (WS)	0

Commencement Date : 09/11/2022
Completion Date : 10/11/2022
Bore Hole Diameter : 150 mm.
Level Of Ground : 203.355 M.
Water Struck At :
Standing Water Level : 7.20 m.

DESCRIPTION	SYMBOL	N−VALUE EACH DIVN. = 15cm.	SAMPLES Ref. No	SAMPLES Depth (m)
12.75m				
completely to highly weathered, fine to medium grained, reddish brown to yellowish brown, fractured rock.			R6	CR=20% RQD=NIL 13.50
			R7	CR=21% RQD=NIL 14.50
15.00m			R8	CR=32% RQD=NIL 15.00

N.B. − '*' means sample could not be recovered.

BH−134/Sheet−2

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METRES.
2. ±0.00 OF MAIN PLANT AREA CORRESPONDS TO RL(+)209.50M.
3. THIS DRAWING IS FOR TOPOGRAPHICAL SURVEY FOR NGL PURPOSE.

LEGEND:

1. ROADS (DOUBLE LINE)
   ROADS (SINGLE LINE)
2. BOUNDARY WALL
3. FENCING
4. RAILWAY LINE
5. FACILITIES/ BUILDINGS OF STAGE-I
6. FORMATION LEVEL — RL(+)202.0/203.0/205.0M
7. LAND ACQUISITION LINE
8. FACILITIES/ BUILDINGS OF STAGE-II
9. FENCING FOR STAGE-II
10. SPOT LEVEL — RL(+) 207.527M/208.905M/209.392M/210.112M
11. CONTOUR LEVEL

FOR TENDER PURPOSE ONLY

REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	C&I	ES	APPD	DATE
B	FOR TENDER PURPOSE ONLY	TSY	KK								02.01.23
A	FOR TENDER PURPOSE ONLY	TSY	KK								30.12.22
0	FOR TENDER PURPOSE ONLY	MANOJ	KK								19.12.22

CLEARED BY

NTPC Limited

(A GOVERNMENT OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT: LARA SUPER THERMAL POWER PROJECT (STAGE-II 2X800MW)

TITLE: TOPOGRAPHICAL SURVEY

OLD SURVEY DATA FOR NGL PURPOSE

SIZE	SCALE	DRG. NO.	REV. NO.
A0	1:4000	9587-999-POC-F-002	B

SHEET 1

FOR TENDER PURPOSE ONLY

REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	C&I	ES	APPD	DATE
B	FOR TENDER PURPOSE ONLY		KK	VK						SK	02.01.23
A	FOR TENDER PURPOSE ONLY		KK	VK						SK	28.12.22
0	FOR TENDER PURPOSE ONLY		KK	VK						SK	19.12.22

CLEARED BY

NTPC Limited
(A GOVERNMENT OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT: LARA SUPER THERMAL POWER PROJECT
(STAGE-II 2X800MW)

TITLE: TOPOGRAPHICAL SURVEY
(EXISTING GROUND LEVEL)

SIZE	SCALE	DRG. NO.	REV. NO.
A0	1:4000	9587-999-POC-F-002	B SHEET 2

DRG. NO. 9587-999-POC-F-002 REV. NO. B

CLAUSE NO.	TECHNICAL REQUIREMENTS

7.00.00 **FOUNDATION SYSTEM AND GEOTECHNICAL DATA**

7.01.00 **Soil Data**

Owner has carried out detailed geotechnical investigation at the project site. Bore logs data and Bearing capacity for design of foundations are given at Annexure - C of this specification. The detailed geotechnical investigation report comprising of Boreholes, Laboratory tests, Chemical analysis, etc for the sub-strata prevailing at site would be made available for the Bidder's study at the Owner's office, if required. The onus of correct assessment / interpretation and understanding of the existing subsoil condition / data lies with the Bidder. **In case, bidder feels that the available data is inadequate, he may carry out his own geotechnical investigation. Further, if any change in layout or for any area not covered in the provided geotechnical data, the bidder has to carry out geotechnical investigation in the area at no cost to Owner.** Geotechnical investigation work shall got executed by the Contractor through the agencies as mentioned in Clause No. 7.07.01. However, no time extension shall be given on account of soil investigation carried out by the Bidder. The geotechnical investigation report shall be prepared with detailed recommendations regarding type of foundation and allowable bearing pressure for various structures/ facilities and other soil parameters. Net allowable bearing pressure shall be limited to Table-1 and Table-1a of Annexure-C. The report shall be submitted for Owner's approval prior to commencement of design of foundation.

Bidder may refer enclosed topographical survey drawing and general layout plan along with borelogs for variation in existing/ natural ground level (NGL) and finished ground level (FGL). Wherever ash/coal deposit/brick-bats etc. is found the same shall be treated as filled up soil.

7.01.01 **The furnished borelog details are specific to the co-ordinates where the boreholes have been carried out and are provided for bidder's information only. Soil profile in the proposed area may vary with respect to the borelogs enclosed for bidder's information. Bidder has to consider all such variations in his estimation, over the extent of the work to be carried out. The Bidder should note that nothing extra whatsoever on account of variation between soil data collected by Owner and that found by the Bidder during geotechnical investigation by him or during execution of works, shall be Payable.**

7.01.02 Tank Foundations

a) The tanks shall rest on flexible tank pad foundation, resting on sand with concrete ring wall to retain sand. Base of the concrete ring wall shall not rest on the expansive soil, if any.

b) Entire loose/ soft soil inside the concrete ring wall shall be removed and shall be filled with sand. Sand for filling shall be clean and well graded conforming to IS 383 with grading Zone I to III.

c) Sand shall be spread in layers not exceeding 30cm compacted thickness over the area. Each layer shall be uniformly compacted by mechanical means like plate vibrators, small vibratory rollers, etc to achieve a relative density of not less than 80%.

d) Other requirements of tank foundations shall be as per IS 803 and as specified elsewhere in the specifications.

7.02.00 **Foundation System**

The requirements for the foundation system to be adopted are as given in subsequent clauses. Depending upon the depth of competent strata/stratum, type of structures, functional

requirement of facility, extent of cutting / filling, suitable open or pile foundation shall be adopted with approval of owner.

7.02.01 General Requirements

a) All structures/equipment shall be supported on suitable open foundations (isolated, combined, raft) or pile foundation depending on type of structures/facilities, sub-strata, topography etc.

b) The roads, ground floor slabs, trenches, pipe pedestals (except thrust blocks), channels/drains and staircase foundation with foundation loading intensity less than 4 T / M2 may be supported on open / shallow foundations resting on virgin / controlled compacted filled up soil.

c) No other foundation (other than as mentioned in (b) above and (g) below) shall rest on the filled up ground / soil.

d) All foundations shall be designed in accordance with relevant parts of the latest revisions of Indian Standards.

e) The water table for design purpose shall be considered at Finished Ground Level.

f) A combination of open and pile foundations shall not be permitted under the same equipment / structure / building.

g) Foundation for equipments on ground floor

For equipments of static weight upto 1.5 T, the equipment may be supported on the ground floor slab by locally thickening the slab. Thickening of the ground floor slab shall be done upto an extent of about 0.6 m beyond the plan area of the equipment on all the sides. Further, the load intensity below the equipment shall be limited to 4T/m2. Other requirements of floor slab and compaction below the floor slab shall be adhered, as specified elsewhere in the specifications.

For equipment's of static weight between 1.5 T and 20 T, the equipment may be supported on compacted sand filling from Natural Ground Level (NGL) or excavation level of nearby footing whichever is deeper with the load intensity below the equipment limited to 4T/m2. The minimum depth of foundation is 1.0m below FFL. Other requirements of sand compaction below the foundation shall be adhered, as specified elsewhere in the specifications.

For equipment of static weight more than 20 T, the equipment foundation shall be taken to the founding level or shall be built up with PCC from the level as mentioned in the Table 1 and Table 1a. The pedestal of equipment foundation or the foundation Block shall be isolated from the adjoining floor slab by providing bitumen impregnated fiber board of minimum 50 mm thick, conforming to IS: 1838 all around the equipment pedestal for the full depth of the floor slab.

7.02.02 Open Foundations

In case open foundations are adopted, following shall be adhered to.

a) The minimum width of foundation shall be 1.0 m.

b) In case of soil, minimum founding level shall be 1.0m below Finished ground level (FGL) or, 1.0m below Natural ground level (NGL) whichever is lower.

In case of rock, minimum founding level shall be 0.6m below Finished ground level (FGL) or, 0.6m below Natural ground level (NGL) whichever is lower.

For meeting the bearing capacity and /or functional requirement lower depth to be adopted based on requirement.

c) It shall be ensured that all foundations of a particular structure/ buildings/ facility shall rest on one bearing stratum.

d) Wherever the intended bearing sub-strata is virgin soil stratum but the actual stratum encountered during foundation excavation consists of filled up soil at founding level,

under such cases either the foundation shall be lowered completely into the virgin stratum or the filled up soil upto the virgin layers shall be removed and built up through PCC (1:4:8) up to designed foundation level.

e) Wherever the intended bearing stratum is weathered rock, but the actual strata encountered during excavation consists of both overburden soil and weathered rock at founding level, under such cases, the overburden upto the weathered rock level including 0.5 m into the weathered rock shall be removed and built up through PCC (1:3:6) upto the designed founding level. Thus, maintaining the same founding level for all the footings of a structure.

f) The last layer of about 300 mm before reaching the founding level shall be excavated carefully by such equipment so that soil / rock at the required level will be left in its natural condition.

7.03.00 Special Requirements

7.03.01 Details of treatment for foundations / underground structures required to counteract soil / water chemical environment, cement type, grade of concrete, type of reinforcement, cover to reinforcement and protective coating to foundations, etc. shall be as mentioned in Annexure-C of this specification

7.04.00 Excavation, Filling and Dewatering

7.04.01 For excavation works, comprehensive dewatering with well point or deep wells arrangement, if required, shall be adopted. Scheme for dewatering and design with all computations and back up data for dewatering shall be submitted for the owner's information. The water table shall be maintained at 0.5m below the founding depth.

7.04.02 Excavation for shallow foundations shall be covered with PCC immediately after reaching the founding level. In case of any local loosening of soil or any loose pockets are encountered at founding level during excavation the same shall be removed and compensated by PCC M7.5. The final layer of about 300 mm thickness above the founding level shall be excavated by suitable means, so as to avoid disturbance to founding stratum.

7.04.03 **Backfilling in Power House & Boiler Area**

Backfilling around foundations, trenches, sumps, pits, plinths, etc. shall be carried out with sand in layers not exceeding 300 mm compacted thickness and each layer shall be compacted to minimum 80% of relative density.

Backfilling in other area

Backfilling around foundations, pipes, trenches, sumps, pits, plinths, etc. shall be carried out with approved material in layers not exceeding 300 mm compacted thickness (higher thickness of layers upto 500mm with heavy mechanical compacting equipment) and each layer shall be compacted to 90% of standard proctor density for cohesive soils and to 80% of relative density for non cohesive soils.

Rock pieces having size less than 150 mm and interstices filled with soil may be used for backfilling around foundation, plinths etc. and shall be compacted to minimum of 85% of original stack of material after filling the interstices.

7.04.04 Founding level for trenches/channels shall be decided as per functional requirement. The bottom of excavation shall be properly compacted prior to casting of bottom slab of trenches / channels.

7.04.05 CBR tests for pavement/road design shall be carried out by the Contractor after earth filling (if applicable) has been completed upto the formation level.

7.04.06 The contractor shall take all necessary measures during excavation to prevent the hazards of falling or sliding of material or article from any bank or side of such excavation which is more

than one and a half meter above the footing by providing adequate piling, shoring, bracing etc. against such bank or sides.

Adequate and suitable warning signs shall be put up at conspicuous places at the excavation work to prevent any persons or vehicles falling into the excavation trench. No worker should be allowed to work where he may be stuck or endangered by excavation machinery or collapse of excavations or trenches.

7.05.00 **EXCAVATION IN ROCK**

Excavation in rock shall be carried out by mechanical means and if blasting is required for founding of some of the structures under this package, control blasting only shall be carried out.

7.05.01 Controlled blasting shall be done by a specialised agency duly approved by Engineer. All controlled blasting shall be done by using time delay detonators (i.e. excel type).

7.05.02
a) Contractor shall engage an agency expert in blasting such as, NIRM (National Institute of Rock Mechanics), CMPDIL, Central Institute of Mining and Fuel Research Dhanbad, Dept. of Mining of Govt. Institutions etc. to design detailed blasting scheme and get the same approved from Engineer before carrying out the blasting operation. All blasting shall be done as per the approved blasting scheme & initial blasting operations shall be done under the supervision & guidance of the representative of the blasting expert.

b) All the statutory laws, (Explosives Act etc.) rules, regulations, Indian Standards, etc. pertaining to the acquisition, transport, storage, handling and use of explosives, etc. shall be strictly followed.

c) The Contractor shall obtain Licenses from Competent Authorities for undertaking blasting work as well as for procuring, transporting to site and storing the explosives as per explosives act. The Contractor shall be responsible for the safe transport, use, custody and proper accounting of the explosive Materials.

d) The Contractor shall be responsible and liable for any accident and injury / damage which may occur to any person or property of the project or public on account of any operations connected with the storage, transportation, handling or use of explosive and blasting operations.

7.06.00 **Sheeting & Shoring**

The contractor shall ascertain for himself the nature of materials to be excavated and difficulties, if any, likely to be encountered in excavation while executing the work. Sheet piling, sheeting and shoring, bracing and maintaining suitable slopes, drainage, etc. shall be provided and installed by the Contractor, to the satisfaction of the Engineer.

7.07.01 **Geotechnical investigation work may be got executed by the Contractor through the following suggested agencies**

1. C.E.TESTING COMPANY Pvt. Ltd, Kolkata

2. Cengrs Geotechnica Pvt. Ltd, New Delhi

3. KCT Consultancy Services, Ahemdabad

4. M.K. Soil Testing Laboratory, Ahemdabad

5. Secon Private Limited, Banglore

6. Soil Engineering Consultants, New Delhi

7. CEG Test House and Research Centre Private Limited, Jaipur

8. Geomarine Consultants Pvt Ltd., Chennai

9. Soiltech India Private Limited, Pune

Annexure-C

SOIL DATA AND FOUNDATION SYSTEM

Employer has carried out geotechnical investigation in the proposed area. Logs of boreholes of proposed area are enclosed with this Annexure.

a) The minimum founding level and the corresponding net allowable bearing pressure shall be as given in Table – 1 below (**except CWPH, FOPH, Swichyard, crusher house and stacker reclaimer area)**.

Table-1

Founding Depth/ Stratum	Net Allowable Bearing Pressure T/m2		
	Isolated and combined footings including raft for 25mm permissible settlement in case of soil and 12mm in case of rocky strata	Isolated and combined footings for 40mm permissible settlement in case of soil and 12mm in case of rocky strata	Rafts (width > 6m) for 75mm permissible settlement in case of soil and 12mm in case of rocky strata
	Width upto 6.0m		
In case of foundation stratum is soil			
1.0m below NGL	8	10	12
2.0m below NGL	12	18	22
3.0m below NGL	15	22	25
4.0m below NGL	20	25	28
5.0m below NGL	25	28	30
6.0m below NGL	30	35	35
7.0m below NGL	35	40	40
8.0m or more than 8.0m below NGL	45	45	45
In case of founding stratum is rock			
0.6m embedment into weathered rock	35	35	35
1.0m embedment into weathered rock	40	40	40
2.0m embedment into weathered rock	50	50	50
3.0m embedment into weathered rock	52	52	52
3.5m or more than 3.5m embedment into weathered rock	55	55	55

The minimum founding level and the corresponding net allowable bearing pressure for **CWPH, FOPH, crusher house, Switchyard and stacker reclaimer area** shall be as given in Table – 1a below.

Table-1a

Founding Depth/ Stratum	Net Allowable Bearing Pressure T/m2		
	Isolated and combined footings including raft for 25mm permissible settlement in case of soil and 12mm in case of rocky strata	Isolated and combined footings for 40mm permissible settlement in case of soil and 12mm in case of rocky strata	Rafts (width > 6m) for 75mm permissible settlement in case of soil and 12mm in case of rocky strata
	Width upto 6.0m		
In case of foundation stratum is soil			
1.0m below NGL	8	10	12
2.0m below NGL	10	12	22
3.0m below NGL	14	15	24
4.0m below NGL	14	16	28
5.0m below NGL	15	18	30
6.0m below NGL	16	19	31
7.0m below NGL	17	21	33
8.0m or more than 8.0m below NGL	19	23	35
In case of founding stratum is rock			
0.6m embedment into weathered rock	35	35	35
1.0m embedment into weathered rock	40	40	40
2.0m embedment into weathered rock	50	50	50

For Finished ground level (FGL) refer General layout plan (GLP)

To determine the Natural Ground Level (NGL) the following two tender drawings titled "TOPGRAPHICAL SURVEY OLD SURVEY DATA FOR NGL PURPOSE" and "TOPGRAPHICAL SURVEY (EXISTING GROUND LEVEL)" shall be referred. Further the above two tender drawings shall also be referred in conjunction with borelog data attached at Annexure to this chapter.
The NGL for any particular structure/facility shall be the lowest of all the NGLs mentioned in the extent of the building/facility.
The NGL of any point shall be the lowest of the levels at (a) TOPGRAPHICAL SURVEY OLD SURVEY DATA FOR NGL PURPOSE (b) TOPGRAPHICAL SURVEY (EXISTING GROUND LEVEL) and (c) Borelog data attached at Annexure to this chapter.
In case any loose/soft pockets is encountered at founding level, the same shall be removed completely upto the hard strata and filled up with PCC (1:4:8).

The net allowable bearing pressure higher than above mentioned values shall not be permitted. At intermediate levels the bearing capacity shall be same as the net allowable bearing pressure corresponding to the immediate shallower level mentioned above.

For open foundations, the total permissible settlement shall be governed by IS: 1904 / IS: 13063 and from functional requirements whichever is more stringent. However, total settlement shall be restricted to the following:

Isolated & Raft (Main power house, TG Area Footings, Boiler, Mill, Bunker Footings & Fans) resting on soil	25 mm
Isolated & Strip (other than Main power house, TG Area Footings, Boiler, Mill, Bunker Footings & Fans) resting on soil	40 mm
Raft (other than Main power house, TG Area Footings, Boiler, Mill, Bunker Footings & Fans) resting on soil	75 mm
Foundations in Weathered rock / rock	12 mm

In case the total permissible settlement is to be restricted to less than as above specified from functional requirements, then the net allowable bearing pressure shall be reduced after review in consultation with Engineer.

c) Special Requirements:

i) Chemicals in ground water and subsoil, as observed during investigation are:

Chemical	Sulphates	Chlorides	pH
Ground Water	60-120 mg/L	57-88 mg/L	7.64-7.95
Sub-soil	<0.05%	0.007-.010	5.04-8.32

ii) In view of the above, the following shall be adopted.

Cement Type	As specified elsewhere in the specifications
Concrete Grade	As specified elsewhere in the specifications
Type of Reinforcement	As specified elsewhere in the specifications
Cover to Reinforcement	As specified elsewhere in the specifications