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# VOLUME – IA

TECHNICAL CONDITIONS OF CONTRACT (TCC) FOR CONSTRUCTION OF BARBED WIRE FENCING WORKS WITH GATE, WATCH TOWERS AND OTHER ASSOCIATED CIVIL WORKS FOR 1X65MW PV SOLAR PROJECT AT NEYVELI, TAMILNADU.

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TCC No: HY/PE&SD/E&C-Sub Contract/ Solar/65MW/NLC/ Fencing -01 Rev. 00

**BHARAT HEAVY ELECTRICALS LIMITED**  
PROJECT ENGINEERING & SYSTEMS DIVISION



## TECHNICAL CONDITIONS OF CONTRACT (TCC) Contents

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**TECHNICAL CONDITIONS OF CONTRACT (TCC)**  
**Chapter-I Project Details**

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**1.0 Project Details**

NLC is setting up 2 blocks of Grid Interactive Solar PV Plant of each 65 MW on EPC basis at Neyveli in Tamilnadu. The Plant is divided into 2 blocks, each of 65 MW. BHEL has awarded 1 block of 65 MW.

1	Customer	:	Neyveli Lignite Corporation Ltd. (NLC)
2	Project Information	:	2x65 MW Solar PV Plant of NLC at Neyveli in Tamilnadu.
3	Location	:	Neyveli, Cuddalore District in Tamilnadu
4	Address Detail	:	Neyveli, Cuddalore District in Tamilnadu
5	Nearest Railway Station	:	Neyveli Railway Station
6	Site Details	:	The project site consists of 325 Acres i.e. 200 Acres in between NLC Block-2 to Block-7 and 125 Acres adjacent to Neyveli New Thermal Power Project.
7	Nearest Air Port	:	Tiruchirapalli
11	Ambient Air Temperature (Average)	:	a) Outdoor : 50 <sup>0</sup> C b) Indoor : 45 <sup>0</sup> C
12	Average Relative Humidity	:	100 % Maximum
13	Climatic Condition	:	Tropical Climate

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

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter-II Scope of Works

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### 2.0 SCOPE OF WORK

This section list major scope of work for construction of Barbed Wire Fencing with Gate, Watch Towers and associated civil works for 1 x 65 MW of Solar PV Plant of NLC at Neyveli, Tamilnadu to be carried out by contractor, but not limited to following for safe, speedy completion of this package.

- 2.1 The work to be performed under the scope of this tender mainly consists of but not limited to complete Civil, Structural and Architectural works as per schedule of items of the following Packages:
  - 2.1.1 Barbed Wire Fencing works with Gate and associated civil works
  - 2.1.2 Watch Towers and associated civil works.
  - 2.1.3 Any other foundation /Structure which may be introduced at later date.
- 2.2 The drawings enclosed with this tender are intended to give the tenderer a general idea of the type and extent of work involved. The drawings are as such only indicative and not to be considered as the exact construction drawings. Further this is to be noted that the drawings and the documents furnished along with this specification are the sole property of BHEL. It must not be used directly or indirectly in any way detrimental to the interest of the company.
- 2.3 The scope of work will also include such other related works although they may not be specifically mentioned in the above paragraph and all such incidental items not specified but reasonably imply and necessary for completion of the job as a whole all as desired and as directed by the engineer.
- 2.4 The detail scope of work covered above is not a comprehensive list of items of work involved. The detail scope of work may vary considerably depending on the actual construction requirements.
- 2.5 **ALSO INCLUDED IN THE SCOPE**

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

- 2.5.1 Furnishing all labour, materials, supervision, construction plans, equipment, supplies, transport, to and from the site, fuel, electricity, compressed air, water, transit and storage insurance and all other incidental items and temporary works not shown on specified but reasonably implied or necessary for the proper completion, maintenance and handling over the works, except in accordance with the stipulations laid down in the contract documents and additional stipulations as may be provided by the engineer during the course of works.
- 2.5.2 Furnishing samples of all materials required by the engineers for testing/inspection and approval for use in the works. The samples may be retained by the engineer for final incorporation in the works.
- 2.5.3 Furnishing test reports for the products used or intended to be used, if called for the specifications or if so desired by the engineer.

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter-II Scope of Works

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- 2.5.4 Giving all notices, paying all fees, taxes etc., in accordance with the general conditions of contract, that are required for all works including temporary works.
  - 2.5.5 Arranging manufacturer's supervision for items of work done as per manufacturer's specifications when so specified.
  - 2.5.6 Providing all incidental items not shown or specified but reasonably implied or necessary for the successful completion of the work in accordance with contract.
- 2.6 **WORK BY OTHERS**

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

**FOR FURTHER DETAILED SCOPE OF WORKS REFER RELEVANT TECHNICAL SPECIFICATIONS PROVIDED IN THE SUBSEQUENT CHAPTERS IN THE TCC**

**TECHNICAL CONDITIONS OF CONTRACT (TCC)**  
**Chapter – III: Facilities in the scope of Contractor/BHEL**

S. No.	Description <b>PART I</b>	Scope / to be taken care by		Remarks
		BHEL	Bidder	
<b>3.1</b>	<b>ESTABLISHMENT</b>			
<b>3.1.1</b>	<b>FOR CONSTRUCTION PURPOSE:</b>			
a	Open space for office (as per availability)	Yes		Location will be finalized after joint survey with customer (NLC)
b	Open space for storage (as per availability)	Yes		Location will be finalized after joint survey with customer (NLC)
c	Construction of bidder's office, canteen and storage building including supply of materials and other services		Yes	
d	Bidder's all office equipments, office / store / canteen consumables		Yes	
e	Canteen facilities for the bidder's staff, supervisors and engineers etc		Yes	
f	Firefighting equipments like buckets, extinguishers etc		Yes	
g	Fencing of storage area, office, canteen etc of the bidder		Yes	
<b>3.1.2</b>	<b>FOR LIVING PURPOSES OF THE BIDDER</b>			
a	Open space for labour colony (as per availability)	Yes		Can be provided as per availability
b	Labour Colony with internal roads, sanitation, complying with statutory requirements		Yes	
<b>3.2.0</b>	<b>ELECTRICITY</b>			
<b>3.2.1</b>	<b>Electricity For construction purposes</b>	Yes		Refer below note Point 1
<b>3.2.2</b>	<b>Electricity for the office, stores, canteen etc. of the bidder</b>			Not applicable
<b>3.2.3</b>	<b>Electricity for living accommodation of the bidder's staff, engineers, supervisors etc</b>			Not applicable
<b>3.3.0</b>	<b>WATER SUPPLY</b>			
<b>3.3.1</b>	<b>For construction purposes</b>	Yes		Refer below note Point 2
<b>3.3.2</b>	<b><u>Water supply for bidder's office, stores, canteen etc</u></b>			Not applicable

**TECHNICAL CONDITIONS OF CONTRACT (TCC)**  
**Chapter – III: Facilities in the scope of Contractor/BHEL**

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

**TECHNICAL CONDITIONS OF CONTRACT (TCC)**  
**Chapter – III: Facilities in the scope of Contractor/BHEL**

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Sl. No	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
	<b>PART II</b> <b>3.9.0 CONSTRUCTION FACILITIES</b>			
<b>3.9.1</b>	<b>Engineering works for construction:</b>			
a	Providing the construction drawings for all the works covered under this scope	Yes		
b	Drawings for construction methods	Yes		
c	As-built drawings – where ever deviations observed and executed and also based on the decisions taken at site- example – routing of small bore pipes		<b>YES</b>	In consultation with BHEL
d	Shipping lists etc for reference and planning the activities		Yes	In consultation with BHEL
e	Preparation of construction (Concreting B/W, etc.) schedules and other input requirements		Yes	In consultation with BHEL
f	Review of performance and revision of site construction schedules in order to achieve the end dates and other commitments	Yes	Yes	In consultation with BHEL
g	Weekly construction schedules based on S. No. e. hard copy to Construction manager, by email to HO.		Yes	In consultation with BHEL
h	Daily construction / work plan based on S. No. g. hard copy to Construction manager, by email to HO.		Yes	In consultation with BHEL
i	Periodic visit of senior official of the bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two Weeks.		Yes	

**TECHNICAL CONDITIONS OF CONTRACT (TCC)**  
**Chapter – III: Facilities in the scope of Contractor/BHEL**

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Sl. No	Description  <b>PART II</b>  <b>3.9.0 CONSTRUCTION FACILITIES</b>	Scope / to be taken care by		Remarks
		BHEL	Bidder	
j	Arranging the materials required for Work		Yes	
k	Coordination for inspection & checking and getting clearance from customer		Yes	
l	Preparation of formats for completion of activities		Yes	

Note:

1. 3-Phase power supply will be made available by customer free of charge at one point near the plant are of each site. Contractor has to make required lines, power conversion, control and distribution network for meeting construction loads.
2. Water required for the construction purposes will be made available by customer free of charge at one point near the plant are of each site. Contractor has to make required arrangements to meet their requirement.

**TECHNICAL CONDITIONS OF CONTRACT (TCC)**  
**Chapter – IV: T&Ps to be deployed by Contractor**

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**4. LIST OF TOOLS AND PLANT:**

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

S.No.	Description	Minimum Quantity	Remarks
1.	Concrete Mixer 0.25 to 0.40 cum with hopper/Self-loading mobile concrete mixer	2 nos.	
2.	Needle Vibrator ( Needle type 40mm )	4 nos.	
3.	Needle Vibrator ( Needle type 25mm )	2 nos.	
3.	Surface Vibrator	1 no.	Need based
4.	Concrete Pump		Need based
5.	Dewatering Pump	2 nos.	Need based
6.	Earth Compactor	2 nos.	Need based
7.	Reinforcement steel cutting & Bending machine	2 nos.	Need based
8.	Welding Machine	2 nos.	Need based
9.	Grinding Machine	4 nos.	Need based
10.	Excavator	1 no.	Need based
11.	Theodolite with staff	1 no.	Need based
12.	Dumpy level with staff	1 no.	
13.	Compression testing machine ( for concrete cubes )	1no	Need based
14.	Cube mould ( 15cm.x15cm.x15cm.)	6 nos.	
15.	Sieve analysis sieve sets for coarse & fine aggregates	1 set	Need based
14.	Jar/Breaker for Bulk density test of sand	1 no.	Need based

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

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter-V: Time Schedule

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### 5.1 TIME SCHEDULE

#### 5.1.1

The entire work of construction of Fencing with Gate, Watch Towers and associated civil works as detailed elsewhere in the Tender Specification shall be completed within 2 (Two) months from the date of commencement of work at site.

#### 5.1.2

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

#### 5.1.3

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

### 5.2 COMMENCEMENT OF CONTRACT PERIOD

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

### 5.3 MOBILISATION

#### 5.3.1

The activities for Excavation, Concreting, Architectural, structural & other civil construction works, etc. shall be started as per directions of Construction manager of BHEL.

#### 5.3.2

The contractor should mobilize minimum 4 parallel gangs in order to complete the work in 2 months for fencing with gate and watch towers with all associated civil works.

#### 5.3.3

Requisite Material, men and machinery should be arranged in order to complete the project within stipulated time period.

#### 5.3.4

The contractor has to augment his resources in such a manner that following major milestones of the project are achieved on specified schedules:

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter-V: Time Schedule

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### TENTATIVE SCHEDULE

S.No.	Activity/Mile stone	Duration in months	
		Start	Finish
1	Site Mobilization and Preparatory Works	Sep'16	Sep'16
2	Barbed Wire Fencing works with Gate, Watch Towers and associated civil works	Sep'16	Oct'16
3	Completion of facilities		Oct'16

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

#### 5.4 CONTRACT PERIOD

For the purpose of contract, the period shall be taken as 2 (Two) months. Completion of the work shall be as per BHEL Bar Charts revised from time to time. In order to expedite the work, the contractor has to deploy manpower on two-shift basis during erection and during pre-commissioning and commissioning period manpower should be provided round the clock basis as per site requirement without any extra cost to BHEL.

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter-VI: Payment Terms

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### 6.1

The progressive payment for the work on accepted price of contract value will be released on the basis of running account bills & other bills as per the provisions of relevant clauses of GCC and SCC.

### 6.2

The following documents are to be submitted along with the Running Account Bills for process of payment

6.2.1 Tax Invoice with details of TIN number of BHEL and contractor.

6.2.2 Measurement books duly filled and signed officials of BHEL and contractor

6.2.3 Provident Fund Remittance challan of previous month.

6.2.4 ESI Remittance challan of previous month.

6.2.5 Invoice submitted along with running bills to indicate the service tax amount charged and bear the Service tax Number.

6.2.6 Bill submitted subsequently to be accompanied with a declaration that service tax liability on the earlier bill has been discharged.

6.2.6.1 By paying money to the Government (along with Tax paid Challan Copy)

6.2.6.2 By utilization of Input Service tax Credit

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter-VII: Taxes, Duties & Levies

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### 7.0 TAXES, DUTIES, LEVIES

#### 7.1. For All types of works

##### 7.1.1

The contractor shall pay all (save the specific exclusions as enumerated in this contract) taxes, fees, license charges, deposits, duties, tools, royalty, commissions or other charges which may be levied on the input goods & services consumed and output goods & services delivered in course of the Contractor's operations in executing the contract. In case BHEL is forced to pay any of such taxes, BHEL shall have the right to recover the same from contractor's bills or otherwise as deemed fit.

**However, provisions regarding Service Tax, Swachh Bharat Cess, Krishi Kalyan Cess and Value Added Tax (VAT) on output services and goods shall be as per following clauses.**

#### 7.1.2 Service Tax, Swachh Bharat Cess & Krishi Kalyan Cess on Output Services:

Contractor's price/rates shall be **exclusive** of Service Tax and Swachh Bharat Cess on Services. In case, it becomes mandatory for the contractor under provisions of relevant act/law to collect the Service Tax, Swachh Bharat Cess & Krishi Kalyan Cess from BHEL and pay the same to the concerned tax authorities, such applicable amount will be paid by BHEL at the prevailing Service Tax Rate, presently Service Tax 14%, Swachh Bharat Cess 0.5% and Krishi Kalyan Cess 0.5% on the admitted Service value against submission of documentary evidence of their remittance.

**Contractor shall submit to BHEL documentary evidence of Service Tax registration certificate specifying name of services covered under this contract. Contractor shall submit serially numbered Service Tax and Cess Invoice, signed by the Contractor or a person authorized by the Contractor in respect of taxable service provided, and shall contain the following, namely,**

- 1.The name, address and the registration number of the contractor,**
- 2.The name and address of the party receiving taxable service,**
- 3.Description and value of taxable service provided and,**
- 4.The Service tax, Swachh Bharat Cess & Krishi Kalyan Cess payable thereon.**

**All the above four conditions shall be fulfilled in the invoice before release of service tax, Swachh Bharat Cess and Krishi Kalyan Cess payment.**

**Wherever, more than one route/option are available for discharge of Service Tax, Swachh Bharat Cess & Krishi Kalyan Cess, liability under a particular service, (e.g. "works contract Service"), contractor shall obtain prior written consent from BHEL before billing the amount towards Service Tax and Cess**

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter-VII: Taxes, Duties & Levies

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### 7.1.3 VAT (Sales Tax /WCT)

As regards Value Added Tax (VAT)/CST on transfer of property in goods involved in Works Contract (previously known as Works Contract Tax) if applicable as per local laws, the price quoted by the contractor shall be **inclusive** of the same and in no case input or output VAT/CST will be reimbursed extra by BHEL.

In any case the Contractor shall register himself with the respective Sales Tax authorities of the State (where the project is located) and submit proof of such registration to BHEL along with the first RA bill. The contractor shall issue the tax Invoices to BHEL as per the Tax laws of respective State and also issue to BHEL the prescribed forms/undertakings/certificate/any other documents prescribed under the respective State VAT laws for enabling BHEL to avail input credit for the output VAT paid by the Contractor or for claiming set-off/deduction for the value of work executed by the Contractor, wherever applicable.

Deduction of tax at source (if applicable) shall be made as per the provisions of law and is to be construed as an advance tax paid by BHEL on behalf of the contractor and no reimbursement thereof will be made by BHEL.

Further, if BHEL, at the instance of customer or otherwise adopts the specific route for discharging output VAT liability itself, benefit of the reduction in liability of the contractor has to be passed on to BHEL.

In case, BHEL is forced to pay any VAT liability on behalf of the contractor, the same will be recovered from contractor's bill or otherwise as deemed fit.

### 7.2 New Taxes/Levies - For All types of works

In case the Government imposes any new levy/tax on the output service/ goods/work after award of the contract but before the scheduled completion date as per contract, the same shall be reimbursed by BHEL at actual against documentary evidence/proof.

In case any new tax/levy/duty etc. becomes applicable after the date of Bidder's offer, the Bidder/Contractor must convey its impact on the bidder's price duly substantiated by documentary evidence in support of the same **before opening of Price Bid**. Claim for any such impact after opening the Price Bid will not be considered by BHEL for reimbursement of tax or reassessment of offer.

## TECHNICAL CONDITIONS OF CONTRACT (TCC)

### Chapter-VII: Taxes, Duties & Levies

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No reimbursement/recovery on account of increase/reduction in the rate of taxes, levies, duties etc. on **input** goods/services/work of the Contractor shall be made by BHEL. Such impact shall be taken care of by the Price Variation/Adjustment Clause (PVC) if any. In case PVC is not applicable for the contract, Bidder has to make own assessment of the impact of future variation if any, in rates of taxes/duties/ levies etc. in the price bid.

#### **7.3 GST: For All types of works excepting works covered under sl no 7.2**

As and when GST becomes applicable to this contract, the net differential (negative or positive) financial liability of the Contractor to the Authorities (as compared to such liability prior to applicability of GST), if any, shall be to the account of BHEL. For this purpose, all available options under the GST shall be explored, and the decision of BHEL in this regard shall be final and binding on the Contractor.

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter-I: General

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### 8.1

The work covered under this specification is of highly sophisticated nature, requiring the best quality of workmanship for construction, engineering and construction management. The Bidder should ensure timely completion of work. The Bidder must have adequate quantity of tools, construction aids, equipment's etc., in his possession. He must also have on his rolls adequate, trained, qualified and experienced supervisory staff and skilled personnel.

### 8.2

The work shall be executed under the usual conditions affecting industrial construction and in conjunction with numerous other operations at site. The Bidder and his personnel shall cooperate with the personnel of other agencies, co-ordinate his work with others and proceed in a manner that shall not delay or hinder the progress of work as a whole.

### 8.3

All the work shall be carried out as per the instructions of BHEL engineer. BHEL engineer's decision regarding the correctness of the work and method of working shall be final and binding on the Bidder.

### 8.4

The Bidder shall at his cost perform any services, tests etc, although not specified but nevertheless required for the completion of work.

### 8.5

Contractor shall execute the work as per sequence prescribed by BHEL at site. The sequence of activities, methodology will be decided by the BHEL engineers depending upon the availability of material, drawings, work fronts etc. No claims for extra payment from the Contractor will be entertained on the grounds of deviation from the methods and sequence of construction advised and agreed by BHEL engineer or for any reasons whatsoever.

### 8.6

All the necessary certificates and licenses required to carry out this work are to be arranged by the Contractor expeditiously at his cost.

### 8.7

The work to be carried out under the scope of these specifications covers ,temporary storing of contractor's own construction material, using the same in the work, carrying out all other activities, viz. survey, excavation, concreting, backfilling, and all the other activities as defined in the scope of work enumerated in chapter-2, Part-I of TCC document, Bill of Quantities and elsewhere till handing over of the entire work. The work shall conform to dimensions and tolerances specified in the various drawings, documents etc. That will be provided during the course of construction. If any portion of the work is found to be defective in workmanship or not conforming to drawings or other specifications, the Contractor shall dismantle and re-do the work duly replacing the defective materials at his cost failing which the work will be got done by BHEL at the cost and risk of the contractor.

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter-I: General

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8.8

The terminal points as decided by BHEL shall be final and binding on the Contractor.

8.9

During the course of execution of this work, certain rework/ modification/ rectification/ repairs/ fabrication/dismantling/reconcreting etc. will be necessary on account of feedback from customer/BHEL on account of design discrepancies and manufacturing defects and site operation/maintenance requirements. Contractor shall carryout such rework/ modification/rectification/fabrication/repairs etc., promptly and expeditiously. Claims of contractor, if any, for such works will be dealt as per relevant clauses of General Conditions of Contract.

8.10

Daily log sheets indicating the details of work carried out, man-hours, consumables used etc, shall be maintained by the Contractor and got signed by BHEL engineer every day.

8.11

All tools and tackles, fixtures, equipment, materials, manpower, supervisors/ engineers, consumables etc. required for this scope of work shall be provided by the Contractor. All expenditure including taxes and incidentals in this connection will have to be borne by him unless otherwise specified in the relevant clause.

8.12

The contractor shall make adequate security arrangements including employment of security personnel and ensure protection from theft, fire, pilferage, damage and loss of materials/equipments issued to him for the work. Special care will have to be taken to guard against pilferage / theft of cement, steel and/or other materials.

8.13

Contractor shall ensure proper housekeeping and remove all scrap materials periodically from various work area covered in the scope and deposit the same at the place earmarked for this purpose. In case of contractor's failure to do the same, BHEL reserves the right to remove scrap at contractor's cost and risk.

8.14

Access to site for inspection by BHEL and customer engineers shall be made available by the contractor at all times.

8.15

As Built Drawings : Contractor shall be supplied with two extra copies of the layout & detailed drawings. Contractor to incorporate in one of the copy with Red ink all the changes / deviations / alterations etc carried out at site due to various reasons, with site engineer's endorsement. Marked up drawings shall be submitted to BHEL for approval.

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter-I: General

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8.16

Site Inspection : The owner / employer or his authorized agents may inspect various stages of work during the currency of the contract awarded to him. The contractor shall make necessary arrangements for such inspection and carry out the rectification pointed out by the owner / employer without any extra cost to the owner / employer. No cost whatsoever such duplication of inspection of work be entertained.

8.17

BHEL will not supply any materials unless otherwise specified.

8.18

Makes of supply of cement, steel and painting materials shall be as per approved material list by NLC/BHEL.

8.19

The Contractor shall carry the work as per the Field Quality Plan issued by BHEL/NLC.

8.20

Lab has to be established at site for carrying out testing as per Field Quality Plan, like Cube testing machine, cube mounds etc.

8.21

Weigh batcher with printing facility should be available as per the deployment of parallel gangs.

8.22

Calibration of equipment's should be done by NABL/NPL accredited laboratories.

8.23

Welding procedure to be followed as per Field Quality plan. (Welding procedure and prequalification of welder required to be produced)(If required).

8.24

Indicative Field Quality Plan attached with the NIT.

8.25

Contractor should submit the royalty certificates for quantity of Coarse and fine aggregates used at site.

8.26

Field Quality Assurance Formats: It is the responsibility of the contractor to collect and fill up the relevant concrete pour card/FQA Log sheets and present the same to BHEL after carrying out the necessary checks as per the log sheets and obtaining the signature of BHEL / Customer in token of their acceptance. Monthly Running Bill Payment to the contractor will be linked with the submission of these Log sheets.

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter-II: Fencing with Gate and Watch Tower Works

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### 9.0 SCOPE

The works involve:

- 1) Fencing with Gate
- 2) Watch Towers
- 3) Any other foundation /Structure which may be introduced a later date.

The work will involve all civil, structural and architectural works connected such as jungle clearance, earth work, concrete work, steel work, embedment, plastering, painting and Gate etc.

### 9.1 DETAILED SPECIFICATION

#### 9.1.1 Fencing with Gate:

The entire solar PV power plant array yard shall be provided with 2.40 M high Barbed Wire fencing with RC posts at 3.00 M spacing with strut posts at every 5.00 M spacing and at corners. The top 0.50 M of fencing shall act as anti-climbing device for safety. GI Barbed wire shall be of reputed make and shall be got approved before use on works. Main Gate of size 6.00 x 2.40 M and wicket gate of size 1.20 x 2.00 M (both using MS structurals) shall be provided at the main entrance for personnel and vehicle entry/exit.

The outdoor transformer yard shall also be provided with fencing, gate, aggregate filling, cable tranches, earth pits etc., as per standards.

#### 9.1.2 Watch Towers:

**Eight** (8) Nos of Watch towers (using MS structurals) shall be provided around the periphery of Solar PV Power Plant site. Watch tower shall be of height 3.50M up to the bottom of the cabin of size 2.00 x 2.00 x 2.00 M. The cabin floor shall be a platform of size 3.20 x 3.20 M, RCC cast in situ and the roof shall cover the entire platform area. Cabin roof and sides shall be provided with pre painted insulated sandwiched galvalume sheets. The cabin shall be provided with a steel door of size 0.80 x 1.80M on one side and glazed sliding windows of size 1.20 x 1.20 M on all other 3 sides. Minimum 800 mm wide steel staircase with MS handrails on both sides as per requirement shall be provided. Hand rail and toe guards shall be provided for platform around cabin. These watch towers shall be designed and constructed considering the safety and security requirements of the Solar PV Power Plant. Entire structure of the watch tower shall be provided with proper surface treatment and painting system to withstand the harsh environment.

**All kind of Construction work shall follow the appropriate IS standards.**

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter-III: General Civil Works

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### 10.0 General Civil works

#### a) RCC WORK:

All RCC works shall be of nominal mix of M25 grade as per IS 456-2000 and the materials used viz. Cement reinforcement, steel etc. shall be as per relevant IS standards. In addition IS: 2502 Code of Practice for Bending and Fixing of Bars for concrete Reinforcement must be complied. Reinforcement shall be high strength TMT Fe 415 or Fe 500 conforming to IS: 1786 -1985.

#### b) Masonry work:

All masonry works shall be using at least Chamber burnt bricks of approved quality as per IS 2212 and IS: 3495. The cement mortar for brick masonry shall be in the ratio 1 cement: 5 sand. Bricks required for masonry work shall be thoroughly soaked in clean water tank for approximately two hours. Brick shall be laid in English bond style. Green masonry work shall be protected from rain. Masonry work shall be kept moist on all the faces for a period of seven days.

#### c) Plastering:

All external surfaces shall have 18 mm cement plaster in two coats, under layer 12 mm thick cement plaster 1:4 and finished with a top layer 6 mm thick cement plaster 1:5 (DSR 13.19) with water proofing compound. White cement primer shall be used as per manufacturer's recommendation. At least one coat of plaster shall be applied to interior walls by hand or mechanically, to a total thickness of 12 mm using 1: 4, 1 cement and 4 sand. Plastering shall comply to IS: 1542, IS: 1661, IS: 1630. Acrylic emulsion paint - two coats on smooth surface applied with 2 mm thick Plaster of Paris putty for control room. Plaster of Paris (Gypsum Anhydrous) conforming to IS: 2547 shall be used for plaster of Paris punning.

#### d) Paintings of Walls & Ceilings:

The paint shall be anti-fungal quality of reputed brand suitable for masonry surfaces for medium rainfall zone. All painting on masonry or concrete surface shall preferably be applied by roller. If applied by brush then same shall be finished off with roller. For painting on concrete, masonry and plastered surface IS: 2395 shall be followed. All paints shall be of approved make including chemical resistant paint. Minimum 2 finishing coats of paint shall be applied over a coat of primer. For painting on steel work and ferrous metals, BS: 5493 and IS: 1477 shall be followed. The type of surface preparation, thickness and type of primer, intermediate and finishing paint shall be according to the painting system adopted. The emulsion paint for both internal and external surfaces shall be as per IS: 5411 and shall be of approved brand and manufacturer. Ceiling of all rooms except Battery room shall be provided with distemper. The ceiling of Battery room (if provided) shall be painted with epoxy based paint system.

#### e) Plinth Protection:

Plinth protection to a minimum width of 1.50m shall be provided around the substation building with well graded 20 mm BG metal and PCC 1:2:4 & smoothly finished on top surface.

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter-IV: General Technical Specifications

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### **11.0 PREAMBLE TO THE SCHEDULE OF QTS. (SOQ) PROVIDED IN PRICE BID SPECIFICATION**

- 11.1 Details of the items in this Schedule shall be read in conjunction with the corresponding NLC specifications, drawings and other documents and shall have precedence over any contrary statement mentioned anywhere in this document.
- 11.2 The work shall be carried out as per construction drawings, specifications, the description of the items in this schedule and/or Engineer's instructions., Drawings enclosed with these documents are only indicative giving some idea of the type of work involved. The layout, sizes and details of the building, structures and foundations shown in tender drawings may vary at a large extent during actual construction. Final drawings will be issued progressively during the execution of the work.
- 11.3 Items of work provided in this schedule but not covered in the specifications shall be executed strictly as per instructions of the Engineer.
- 11.4 Unless specifically mentioned otherwise in the contract, the bidder shall quote his rates for the finished items and shall provide for the complete cost towards fuel, tools, tackle, equipment, constructional plant , temporary works, labour, materials, levies , taxes , transport, layout, repairs, rectification, maintenance till handing over, supervision, shops, establishments, services , temporary roads, revenue expenses, contingencies, overheads, profits and all incidental items not specifically mentioned but reasonably implied and necessary to complete the works according to the contract.
- 11.5 The rate quoted shall be inclusive of cleaning the site of any vegetation's, dressing and leveling etc., required for commencement of site activities. No separate payment will be made towards the same.
- 11.6 Rates shall be quoted both in figures and in words in clear legible writing. No over writing is allowed. All scoring and cancellation should be counter signed by the bidder. In case of illegibility, the interpretation of the engineer shall be final. All entries shall be in English language.
- 11.7 Payments will be made on the actual quantity of work executed against each SOQ item.
- 11.8 Engineers decision shall be final and binding on the contractors regarding clarification of items in this schedule with respect to the other section of the contract.
- 11.9 In case of any discrepancy between item description, relevant drawing and/or specification clarification shall be sought at tender stage itself. Otherwise it shall be assumed that the bidder has quoted for the more stringent requirement.

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

## Chapter-IV: General Technical Specifications

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### 11.10 HIERARCHY:

In case of any conflict/deviations amongst various documents, the order of precedence shall be as follows

- Statutory Regulations
- NLC's specification
- Items in Schedule of quantities
- IS/BS standards.
- CPWD's technical specification.
- BHEL's specification (with prior approval of Engineer-in-charge).

**NOTE: The above technical specification is not exhaustive. In case for any item of work, technical specification is not available, such items of works will be carried out in conformance to technical specification of CPWD/manufacturer's recommendations/best engineering practice. In case of any dispute between two specifications or non-availability of specifications, customer's specification will prevail. Decision on applicability of any particular specifications will rest with BHEL engineer and his decision in the matter will be final & binding on the contractor. Contractor has to make himself well conversant with the Customer specification.**

**TECHNICAL CONDITIONS OF CONTRACT (TCC)**  
**Chapter-V LIST OF DRAWINGS**

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**12.0 LIST OF DRAWINGS (Annexure-II)**

<b>S.NO.</b>	<b>TITLE</b>	<b>DRAWING No.</b>	<b>REV.NO.</b>	
01	Detail of Fencing	PY-DS-1-M088-1260-02	01	
02	Typical Layout for 40MW	GEO/BHEL/NLC-01	00	
03	Typical Layout for 25MW	NA		

Note: All the above tabulated documents are for tender purpose only.