

**HALDIA DOCK COMPLEX
KOLKATA PORT TRUST**



ENGINEERING DEPARTMENT INVITE E-TENDER

[Tender No. SDM(P&E)/T/08/2018-2019

&

E-TENDER No.: KoPT/Haldia Dock Complex/P&E Div/8/18-19/ET/146]

FOR

DESIGN, ENGINEERING, SUPPLY, CONSTRUCTION, ERECTION, TESTING AND COMMISSIONING INCLUDING 10 YEARS COMPREHENSIVE OPERATION & MAINTENANCE (O&M) CONTRACT OF 1 MW (AC) SOLAR PV POWER PLANT AT HALDIA DOCK COMPLEX, KOLKATA PORT TRUST.

JUNE - 2018

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[Tender No. : SDM(P&E)/T/08/2018-2019]

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KOLKATA PORT TRUST
HALDIA DOCK COMPLEX
SHORT E-TENDER NOTICE

E-Tender No.: KoPT/Haldia Dock Complex/P&E Div/8/18-19/ET/146 Dated: June 11, 2018

Online e-tenders are invited for the work of “Design, Engineering, Supply, Construction, Erection, Testing and Commissioning including 10 years Comprehensive Operation & Maintenance (O&M) Contract of 1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust”.

Date of Pre-Bid meeting : **25.06.2018**, 11:00 Hrs. onwards.

Closing date & time of online submission of e-tender: **12.07.2018**, up to 16:00 Hrs.

For details of tender and any corrigendum / addendum, please visit MSTC's e-portal <http://www.mstcecommerce.com/eprochome/kopt>.

General Manager (Engineering)
Haldia Dock Complex
Kolkata Port Trust

KOLKATA PORT TRUST
HALDIA DOCK COMPLEX
NOTICE INVITING E-TENDER
(Tender No. SDM(P&E)/T/08/2018-2019)

E-Tender No.: KoPT/Haldia Dock Complex/P&E Div/8/18-19/ET/146 Dated: June 11, 2018

E-Tenders, under **single stage two part system** [Part I: **Pre-qualification & Techno-commercial Bid** and Part II: **Price Bid**] are invited on behalf of Haldia Dock Complex (HDC), Kolkata Port Trust (KoPT), from the intending bidders, fulfilling the “**Minimum Eligibility Criteria (MEC)**” and complying with the “**Test of responsiveness**” for the work of “Design, Engineering, Supply, Construction, Erection, Testing and Commissioning including 10 years Comprehensive Operation & Maintenance (O&M) Contract of 1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust.”

2.1 MINIMUM ELIGIBILITY CRITERIA (MEC):

2.1.1 The average annual financial turnover of the bidder, during the last three (3) years, ending 31st March, 2018, must be at least Rs 1,77,96,231.00. Auditor’s Report of the bidding firm, certified by Chartered Accountant (CA), for the years 2015-16, 2016-17 and 2017-18, including relevant Audited Balance Sheets and Profit & Loss Accounts, should be made available.

Note: The bidder upload the scanned copies of Annual Financial Turnover Statement (certified by CA) for the years 2015-16, 2016-17 and 2017-18 along with Balance Sheets and Profit & Loss Accounts.

2.1.2 The bidder must have experience of having successfully completed “Similar Works” [defined below] during last seven (7) years, ending last day of month previous to the one in which tenders are invited, and the experience must be either of the following :-

a) Three similar completed works of contract value not less than Rs 2,37,28,308.00 each.

Or

b) Two similar completed works of contract value not less than Rs 2,96,60,385.00 each.

Or

c) One similar completed work of contract value not less than Rs 4,74,56,615.00.

The term “*similar works*” means -

“Successful execution of Design, Engineering, Supply, Construction, Erection, Testing, Commissioning including Operation & Maintenance (O&M) of 1 MW and/ or above capacity Solar PV Power Plant”.

Note: The bidder upload the scanned copies of work order(s) for similar works, successful completion certificates (with performance) from clients indicating the date of completion, value of work done, etc..

2.1.3 Valid Electrical Contractor’s License issued by competent authority of State / Central Govt. in line with The Indian Electricity Rules, 1956.

Note: The bidder upload scanned copy of valid Electrical Contractor’s License.

1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust.

2.2 TEST OF RESPONSIVENESS:

The bidder should be considered responsive, only if scanned copy of the required document shall be uploaded along with bids;

- a) **Goods and Services Tax (GST)** Registration Certificate, issued by Government of India.
- b) Valid **Profession Tax Clearance Certificate (PTCC)** or Up-to-date **Profession Tax payment challan**, if applicable. If this is not applicable, the bidder must submit [upload] a declaration in this regard.
- c) Certificate for allotment of **Employees' Provident Fund (EPF) Code No.** [**Latest challan** is to be submitted (uploaded)], if applicable. If this is not applicable, the Bidder should submit [upload] a declaration (in the form of Affidavit), in this regard.
- d) Registration certificate of **Employees' State Insurance (ESI)** authority, if applicable.

If this is not applicable, necessary document(s) [to establish Non-applicability], along with **affidavit, affirmed before a first-class Judicial Magistrate** to that effect, are to be submitted [uploaded]. Moreover, such bidder(s) shall have to submit a declaration, confirming that they will obtain registration certificate of ESI authority, if required, and they will indemnify **Kolkata Port Trust** against all damages & accident occurring to their labourer (including that of sub-contractor's labourers), in connection with the instant contract, in case they become a Successful Bidder.

- e) PAN Card, issued by Income Tax Department, Government of India.
- f) **Certificate of MSME / Micro & Small Enterprises (MSEs) / DIC / SSI / National Small Industries Corporation (NSIC)** to get benefit in this regard.
- g) The bidder shall upload the scanned copy of **Power of Attorney**.

2.3 Criteria for association of firms, acting jointly and severally:

In case of **association**, in the form of a **Licensing Agreement** or a **Technical Collaboration Agreement** or a **Joint Venture Agreement** or a **Consortium** with other **manufacturer(s)**, the members of the association should nominate one of the members as "**Lead Partner**" for participating in the bid and for signing all the documents related therewith, up to signing of Contract Agreement and execution thereafter (in case of award of contract). All the members of the association must also be jointly and severally responsible for satisfactory performance of the contract (in case of award of contract). Scanned copies of **Agreements** amongst the "Lead Partner" and other members of the association are to be uploaded by the bidder in the "Pre-qualification & Techno-commercial Bid".

The experience of each member of Licensing Agreement or Technical Collaboration Agreement or Joint Venture Agreement or Consortium would be considered at par with other firms, subject to the condition that the collective experience of the members, comprising the Licensing Agreement or Technical Collaboration Agreement or Joint Venture Agreement or Consortium, must meet the criteria established in the MEC.

2.4 The bidders are required to submit bid as per the instructions of the instant bidding documents (including Notice Inviting e-Tender). Bid will be considered rejected if any of the essential

documents is not submitted by the bidder. Essential documents means papers related to “Minimum Eligibility Criteria (MEC)”, “Test of responsiveness”, including Bid Document fee, Earnest Money Deposit and Power of Attorney.

2.5 AVAILABILITY OF THE BIDDING DOCUMENTS:

The bidding documents (in full) would be available in the following websites:-

- <http://www.mstcecommerce.com/eprochome/kopt> of MSTC Ltd.
- <http://eprocure.gov.in/epublish/app> of Central Public Procurement Portal.
- <http://www.kolkataporttrust.gov.in> of Kolkata Port Trust.

Corrigenda, Addenda, Queries & Clarifications, if any, would also be available in the aforesaid websites.

2.6 PARTICIPATING IN THE BIDDING PROCESS:

The bidders will have to participate in the *electronic bidding process through the website of MSTC Ltd. (<http://www.mstcecommerce.com/>) only.*

General Manager (Engineering)
Haldia Dock Complex
Kolkata Port Trust

SCHEDULE OF TENDER (SOT)

(Tender No. SDM(P&E)/T/08/2018-2019)

E-Tender No.: KoPT/Haldia Dock Complex/P&E Div/8/18-19/ET/146 Dated: June 11, 2018

3.1.	Name of work	::	Design, Engineering, Supply, Construction, Erection, Testing and Commissioning including 10 years Comprehensive Operation & Maintenance (O&M) Contract of 1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust.
3.2.	Tender Inviting Authority	::	General Manager (Engg.) Haldia Dock Complex ; Kolkata Port Trust.
3.3.	Mode of Tender	::	e-Procurement System Online (Part I: Pre-qualification & Techno-commercial Bid and Part II: Price Bid) through http://www.mstcecommerce.com/eprochome/kopt . of MSTC Ltd. <i>No physical tender is acceptable by Haldia Dock Complex, Kolkata Port Trust.</i>
3.4.	Estimated Cost	::	Rs 5,93,20,769.00 (excluding GST).
3.5.	i) Transaction Fee	::	The intending bidders must deposit Rs 17,700.00 (Indian Rupees Seventeen thousand Seven hundred) only [Including GST @18%] as “ Transaction Fee ” (non-refundable), in favour of MSTC LIMITED by NEFT or Online Payment . The intending bidders will be activated for bid submission only after receipt of aforesaid “ Transaction Fee ” by MSTC LIMITED . The intending bidders are advised to remit the “ Transaction Fee ” well in advance before the closing time of the event, so as to give themselves sufficient time to submit the bid.
	ii) Bid Document Fee (Cost of bidding documents)	::	The intending bidders must deposit Rs 2,950.00 (Indian Rupees: Two thousand nine hundred and fifty) only [including GST @ 18%], as Bid Document Fee (non-refundable) , to Haldia Dock Complex, along with their offer. In case the said Bid Document Fee is not deposited by the bidder, the respective bid will be summarily rejected, treating the same as non-responsive.
	iii) Earnest Money Deposit (EMD)	::	The intending bidders must deposit Rs. 11,86,415.00 (Indian Rupees: Eleven lakh Eighty Six thousand Four Hundred Fifteen) only , as Earnest Money , to Haldia Dock Complex, along with their offer. In case the said Earnest Money is not deposited by the bidder, the respective bid will be summarily rejected, treating the

1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust.

			same as non-responsive.
			NOTE :: (i) For exemption of Bid Document Fee and EMD to upload the scanned copy of the certificate from MSME / Micro & Small Enterprises (MSEs) / DIC / SSI / National Small Industries Corporation (NSIC) or any empowered Central / State Govt. authority is required in electronic format. (ii) The bidders, who are not registered with MSTC, are advised to get themselves registered with MSTC, at least 72 (seventy-two) hours prior to making payment of Bid Document Fee and Earnest Money. (iii) The bidders are advised to deposit Bid Document Fee and EMD using the Axis Bank Payment Gateway only. No other method of payment of Bid Document Fee shall be accepted.
3.6.	Completion Period	::	08 months (for EPC work).
3.7.	Bid Validity	::	120 days.
3.8.	Security Deposit	::	10 % of the Contract Value (excluding GST) for completion period in the form of Bank Guarantee.
3.9.	Comprehensive Operation & Maintenance (O&M) Period	::	10 Years, after successful completion of EPC work.
3.10.	Performance Bank Guarantee	::	10% of the Contract Value (excluding GST) during 10 years comprehensive operation & maintenance work.
3.11.	Date, time and venue of Pre-Bid Meeting (off-line).	::	25.06.2018 at 11:00 Hrs (IST). Office of Sr. Dy. Manager (P&E); Chiranjibpur; P.O: Haldia; Dist.: Purba Medinipur; PIN: 721 604; West Bengal; India.
3.12.	i) Starting date & time of submission of e-Tender at http://www.mstcecommerce.com/eprochome/kopt	::	04.07.2018 from 11:00 Hrs. (IST).
	ii) Closing date & time of submission of e-Tender at http://www.mstcecommerce.com/eprochome/kopt	::	12.07.2018 up to 16:00 Hrs. (IST).
	iii) Date & time of opening of Part-I (Techno-commercial Bid)	::	12.07.2018, 16:30 Hrs. (IST) onwards.

	iv) Date & time of opening of Part-II (Price Bid)	::	Shall be informed separately.
3.13.	Address of the Employer	::	Kolkata Port Trust (KoPT). 15 Strand Road, Kolkata – 700 001, West Bengal, India.
3.14.	Address of Engineer	::	General Manager (Engineering) Haldia Dock Complex ; Kolkata Port Trust. <u>Address:</u> Engineering Department Jawahar Tower Complex ; P.O.: Haldia Township; Dist.: Purba Medinipur ; PIN: –721607 West Bengal, India. Telephone no. : + 91-3224-263255 E. mail : aganesan.hdc@nic.in
3.15.	Address of the Engineer's representative	::	Shri K. Mukhopadhyay, Sr. Dy. Manager (P&E), Haldia Dock Complex, Operational Administrative Building (1 st floor), Chiranjibpur; P.O: Haldia; Dist.: Purba Medinipur; PIN: 721 604; West Bengal; India. Telephone no. : + 91-3224-252713 Mobile no. : + 91 94340 62312 E. mail : koushikm.hdc@nic.in

General Manager (Engineering)
Haldia Dock Complex
Kolkata Port Trust

SECTION - IV

INSTRUCTIONS FOR ONLINE BID SUBMISSION

4.1 Introduction:

- 4.1.1** This is an e-procurement event of **HALDIA DOCK COMPLEX**. The e-procurement service provider is **MSTC Ltd.**, 225C, A.J.C. Bose Road, Kolkata-700 020.
- 4.1.2** The intending bidders are requested to go through the “**Instructions To Bidders (ITB)**” and contents of this bidding document, including all terms & conditions and Technical Specifications before submitting online tender. Bidders who do not comply with the requirements / conditions, with documentary proof (wherever required), will not qualify in the tender, for opening of Price Bid.
- 4.1.3** **SPECIAL NOTE:**
THE PRE-QUALIFICATION & TECHNO-COMMERCIAL BID AND PRICE BID SHALL HAVE TO BE SUBMITTED ON-LINE AT www.mstcecommerce.com/eprochome/kopt only.
- 4.1.4** Possession of valid Digital Signature Certificate (DSC) [Class III Signing Type] and Registration of the intending bidder with **MSTC Limited** on the e-Procurement / e-Tender Portal of MSTC are pre-requisites for the instant e-Tendering.
- 4.1.5** The Digital Signature Certificate (DSC) [Class III Signing Type], issued by nCode/eMudra or any Certifying Authority (CA) recognized by Controller of Certifying Authorities (CCA), India, should be registered. Only the DSC that is registered should be used by the bidder and the bidder should ensure safety of the same.
- 4.1.6** The intending bidders are requested to read the vendor guide and see the video in the webpage www.mstcecommerce.com/eprochome to familiarize themselves with the system before bidding.
- 4.1.7** The online tender should be submitted strictly as per the terms and conditions and procedures laid down in the website www.mstcecommerce.com/eprochome/ of **MSTC Limited**.
- 4.1.8** All entries in the tender should be entered in online Technical & Commercial formats, without any ambiguity.
- 4.1.9** The e-Tender platform shall remain open from the pre-announced date & time and for as much duration as mentioned in the Schedule of Tender (SOT).
- 4.1.10** E-tender cannot be accessed after the closing date and time of e-Tender, mentioned in the Schedule of Tender (SoT) of the instant bidding documents.

4.2 Process of e-tender :

4.2.1 Registration:

The process involves **vendor’s registration with MSTC e-procurement portal** which is **free of cost**. Only after registration, the vendor(s) can submit his / their bids electronically. Electronic bidding for submission of Techno-Commercial Bid as well as

Price Bid will be done over the internet. The **Vendor should possess Class III Signing type Digital Certificate**. Vendors are to make their own arrangement for bidding from a Personal Computer / Laptop, connected with Internet. **MSTC** is not responsible for making such arrangement. (*Bids will not be recorded without Digital Signature*).

4.2.2 Steps for Registration:

- i) Vendors are required to register themselves online with www.mstcecommerce.com → e-Procurement → PSUs / Govt. Departments → Kolkata Port Trust → Register as Vendor → (Filling up required details and creating own user id & password) → Submit.
- ii) Vendors will receive system generated mail(s), confirming their registration, in their e-mail ID(s), which has been provided during filling up the registration form.

4.2.3 The intending bidders are requested to submit their bids, keeping sufficient time in hand.

4.2.4 In case of any clarification regarding online submission of bids, the intending bidders are requested to contact HDC/MSTC, well in advance, keeping sufficient time in hand.

Contact person (Haldia Dock Complex):

- (i) Shri K. Mukhopadhyay
Designation: Sr. Deputy Manager (P&E)
Mobile No.: + 91 94340 62312
Landline: + 91-3224-252713
E-mail : koushikm.hdc@nic.in
- (ii) Shri B. Goswami
Designation: Deputy Manager (P&E)
Mobile No.: + 91 94340 31315
Landline: + 91-3224-252573
E-mail : bgoswami.hdc@nic.in

Contact persons (MSTC Ltd.):

- (i) Shri S. Mukherjee
Deputy Manager (e-Commerce)
Mobile : +91 – 72780 30407
Landline: +91 – 33 – 2290 1004
E-mail : smukherjee@mstcindia.co.in
- (ii) Mrs. S. Maity
Assistant Manager (e-Commerce)
Mobile : +91 – 98311 55225
Landline: +91 – 33 – 2290 1004
E-mail : smaity@mstcindia.co.in

4.2.5 System requirements and other requirements:

- i) Operating System: Windows 7 or above.
- ii) Internet Browser: IE-7 or above.
- iii) Class-III Signing Type Digital Certificate.

- iv) Latest update JRE 8 (x86 Offline) Software to be downloaded and installed in the system.
- v) To disable “Protected Mode” for DSC (Digital Signature Certificate) to appear in the signer box, the following setting may be applied:
Tools => Internet Options => Security => Disable Protected Mode (if enabled), i.e., remove the tick from the tick box mentioning “Enable Protected Mode”.
- vi) Other settings:
Tools => Internet Options => General => Click on Settings under “Browsing History/Delete Browsing History” => Temporary Internet Files => Activate “Every time I visit the webpage”.
- vii) To enable ALL Active X controls and disable ‘use pop up blocker’ under Tools → Internet Options → Custom Level (Please run IE settings from the webpage www.mstcecommerce.com once).

4.2.6 **Bidding in e-tender:**

- i) The intending bidders need to submit necessary Transaction Fee, to become eligible to bid online in the e-Tender. Transaction Fee is non-refundable.
Bid Document Fee is non-refundable. Earnest Money Deposit will be refunded to the unsuccessful bidders, without any interest, within 2 (two) months from the date of opening of Price Bids or on finalization/ acceptance of tender, whichever is earlier. Earnest Money Deposit of the successful bidder will be refunded, without any interest, after submission of Security Deposit by them.
- ii) The bidders must upload all the documents required as per the instant bidding documents (including Notice Inviting e-Tender). Any other document uploaded, which is not required as per the instant bidding documents (including Notice Inviting e-Tender), shall not be considered.
- iii) **Certificate of MSME / Micro & Small Enterprises (MSEs) / DIC / SSI / National Small Industries Corporation (NSIC)** shall have to be submitted (uploaded) to get benefit.
- iv) Unit of Measure (UOM) is indicated in the e-Tender platform. Rate to be quoted should be in Indian Rupees, as per UOM indicated in the e-Tender platform or in the bidding documents.
- v) **Steps for submitting Pre-Qualification & Techno-Commercial Bid and Price Bid :**
The intending bidder(s), who have submitted the required Transaction Fee, can only submit their Pre-qualification & Techno-commercial Bid and Price Bid, through Internet, in MSTC website. The steps are given hereunder:
 - a) www.mstcecommerce.com → e-Procurement → PSUs/Govt. Departments → Kolkata Port Trust → Login → My Menu → Auction Floor Manager → Live Event → Selection of the Live Event → Techno-commercial Bid

- b) The bidder should allow running JAVA application. This exercise has to be done immediately after opening of Bid Floor. Then the necessary steps, as would appear, would have to be followed. If this application is not run, then the bidder will not be able to save/submit their bid.
- c) After filling the Techno-commercial Bid, the bidder should click on “Save” for recording their Techno-commercial Bid. Once the same is done, the Price Bid link becomes active and the same has to be filled up and then the bidder should click on “Save” to record their Price Bid. Then once both the Techno-commercial Bid and Price Bid have been saved, the bidder can click on the “Final submission” button to register their bid.
- vi) The bidders should quote their offered prices appropriately, only in the aforesaid Price Bid link. Price indicated anywhere else, in any other form or manner, will not be considered for evaluation of Price Bid.
- vii) The Techno-commercial Bid and Price Bid cannot be modified/revised, once the “Final submission” button has been clicked by the bidder.
- viii) After submitting online bid, the bidder cannot access the bid submitted by him/them, once the “Final submission” button has been clicked by the bidder.

4.2.7 Special Note towards Transaction Fee:

The intending bidder shall pay the Transaction Fee using “Transaction Fee Payment” link under “My Menu” in the vendor login. The intending bidder has to select the particular tender from the event dropdown box. The intending bidder shall have the facility of making the payment either through NEFT or Online Payment. On selecting NEFT, the intending bidder shall generate a challan by filling up a form. The intending bidder shall remit the Transaction Fee amount as per the details printed on the challan, without making change in the same. On selecting Online Payment, the intending bidder shall have the provision of making payment using its Credit Card/Debit Card/Net Banking. Once the payment gets credited to MSTC’s designated Bank account, the Transaction Fee shall be auto authorized and the intending bidder shall be receiving a system generated mail.

Transaction Fee is non-refundable.

An intending bidder will not have access to online e-Tender without making payment towards Transaction Fee. In other words, an intending bidder will be activated for bid submission, only after receipt of the Transaction Fee by MSTC Limited.

NOTE: The intending bidders are advised to remit the “Transaction Fee” well in advance before the closing time of the event, so as to give themselves sufficient time to submit the bid.

4.2.8 Procedure of payment of Earnest Money and Bid Document Fee through Axis Bank Gateway :

- i) The bidder would be able to access the payment gateway from the Vendor login page of the MSTC ecommerce site (www.mstcecommerce.com → e-Procurement → PSU/Govt. depts. → Kolkata Port Trust) under the icon “HDC EMD/Tender

Fee Payment”. Clicking this icon will take the bidders to the Axis Bank Gateway.

Alternatively, the bidder can also access the gateway by from Axis Bank Easy Pay website (<https://easypay.axisbank.co.in> → Others → Haldia Dock Complex).

- ii) The bidder will be required to mention the bidder’s ID (the ID used by the bidder for logging in the MSTC website) and Bid ID (E-Tender No. of the tender against which the bidder intends to submit bid) and then click ‘VALIDATE’.
- iii) A webpage will populate, where the bidder will be required to select “Earnest Money” OR “Bid Document Fee”, then indicate his Mobile Number and the CAPTCHA displayed in the webpage.
- iv) Depending on the selection, another webpage will come up.
- v) In case of selection of Earnest Money (EM), the bidder will be required to select the option of With or Without Bank Guarantee. In case of the instant tender, where there is no option to pay the EM through Bank Guarantee (BG), the bidders should select the option ‘Without’.
- vi) The bidder will be required to mention their Bank Account Number, IFSC of their Bank and the name of the account, insert the CAPTCHA mentioned in the webpage and then ‘SUBMIT’. In case of Bid Document Fee payment, Bank Account Number would not be required.
An URN Number will be generated. Bidders should keep note of this URN Number for all future reference.
- vii) Another webpage will come up and the bidder will have the option to select payment methods from – (i) Internet Banking and (ii) NEFT/RTGS, after agreeing with the terms and conditions, by clicking the dialogue box appearing in the webpage.
- viii) In case of selection of Internet Banking, the bidder will be required to select any Bank of their choice and depending on the selection, the bidder will then be guided to the webpage of the respective Bank.
After validating the payment in the respective Bank, the system will return to the Axis Bank Payment Gateway.
- ix) In case of selection of RTGS/NEFT, the webpage will generate a payment advice. The Bank Account Number, IFSC of the Bank, name of the payee, i.e., Haldia Dock Complex, and the amount to be paid will be indicated in the said payment advice. The bidder will also get an SMS and e-mail detailing the same.
The bidder will be required to mention the same correctly in the Bank Challan, which is required to be filled up for payment by RTGS/NEFT in the Bank from where they intend to make the payment.
The bidders should note that Bank a/c number of HDC, mentioned in the Payment Advice, will change for each and every transaction and hence, for each and every payment, the entire process from the beginning will have to be followed for generation of a URN Number.
- x) For payment of Bid Document Fee, identical process is to be followed.
- xi) The bidders will be able to know the status of their payment, by using the ‘Enquire URN’ facility, by mentioning the URN Number in the Axis Bank login

page. Until such time the payment is credited to HDC's a/c, the system will show the status as 'Pending'.

- xii) The bidders should note that until such time the status remains 'Pending', the payment is not made to HDC and mere generation of URN Number will not signify payment of EM or Bid Document Fee. Hence, if the status remains 'Pending' after some time of submitting the RTGS/NEFT payment request at their Bank, then the bidders should contact their Bank to enquire about the status of RTGS/NEFT request.
- xiii) In case of any problem relating to use of the payment gateway, the bidders should contact the tender inviting authority, whose phone number and e-mail address are mentioned in the e-Tender.

4.2.9 Special Note towards uploading required documents:

The intending bidders are instructed to use "**Attach Doc**" button to upload documents in document library. Multiple documents can be uploaded.

4.3 Instructions related to Micro & Small Enterprises (MSEs):

- 4.3.1 **Micro & Small Enterprises (MSEs)** registered with **National Small Industries Corporation (NSIC)** [under Single Point Registration Scheme (SPRS)] , having valid **NSIC Certificate for MSEs** along with DIC (District Industries Centre) Certificate, are exempted from depositing **Bid Document Fee** and **Earnest Money**, with respect to items for which the firm got them registered.
- 4.3.2 **Micro & Small Enterprises (MSEs)** registered with **NSIC under Single Point Registration Scheme (SPRS)** are eligible to get the benefits under new **Public Procurement policies** for MSEs as notified by the **Government of India, Ministry of Micro, Small & Medium Enterprises (MSME)** in **The Gazette of India** vide No. 503, dated 26.03.2012.
- 4.3.3 When splitting of tender quantity is not possible purely on technical ground, Trustees reserve the right not to negotiate price with MSE if their price is within the band of L1+15% in comparison with L1 price of non-MSE for consideration of award of order for 20% of tender quantity against any item as per new public procurement policy.
- 4.3.4 If **Micro & Small Enterprises (MSEs)**, registered with NSIC [under single point registration scheme] intend to participate with respect to items for which they are not registered with NSIC, then they will have to deposit full amount of **Bid Document Fee** and **Earnest Money**, in accordance with the **Schedule of Tender (SoT)**. Otherwise, their offer with respect to such items (for which they are not registered with NSIC) will not be considered.

4.4 Other Instructions related to e-Procurement:

- 4.4.1 All notices and correspondence with the bidder(s) shall be sent by e-mail only during the process till finalization of tender by HDC, KoPT. Hence, the intending bidders are required to ensure that their e-mail IDs provided are valid and updated at the stage of registration of bidders with MSTC (i.e., Service Provider). The intending bidders are also requested to ensure validity of their DSC (Digital Signature Certificate).

- 4.4.2** In all cases, an intending bidder should use their own ID and Password, along with Digital Signature, at the time of submission of their bid. It is mandatory that all bids are submitted with Digital Signature Certificate (DSC), otherwise the same will not be accepted by the system.
- 4.4.3** Addenda, Corrigenda and Queries & Clarifications (with respect to the instant e-Tender), if any, would be hosted in the e-Procurement portal of MSTC.
- Since there is no provision to take out the list of intending bidders downloading the bidding documents from the websites mentioned in the Tender Notice, the intending bidders are requested to check the website of MSTC to ensure that they have not missed any Addenda, Corrigenda and Queries & Clarifications, uploaded against the instant e-Tender, after downloading the bidding documents. The responsibility of downloading such Addenda, Corrigenda and Queries & Clarifications, if any, will be that of the intending bidders.
- 4.4.4** No deviation/variation of the techno-commercial terms and conditions of the bidding documents will be considered by HDC, KoPT. Submission of bid in the e-Tender platform by any bidder confirms their acceptance of the techno-commercial terms and conditions of the bidding documents.
- 4.4.5** HDC, KoPT reserves the right to accept or reject any bid (in full or part) and to annul the bidding process and to reject all bids, at any time prior to contract award, without assigning any reason thereof and without thereby incurring any liability to the bidders.
- 4.4.6** Any order resulting from this open e-Tender shall be governed by the terms and conditions mentioned therein.
- 4.4.7** All electronic bids submitted during the e-Tender process shall be legally binding on the bidders. Any bid will be considered as the valid bid offered by that bidder and acceptance of the same by HDC, KoPT will form a binding contract, between HDC, KoPT and the bidder, for execution of the work. Such successful bidder shall be called hereafter the 'CONTRACTOR'.
- 4.4.8** The bids will be evaluated based on the filled-in Technical & Commercial formats and the requisite documents submitted (uploaded) by the bidders.
- 4.4.9** The documents uploaded by bidder(s) will be scrutinized. During scrutiny, in case any of the information furnished by the bidder is found to be false, Earnest Money Deposit of such defaulting bidder(s) will be forfeited. Punitive action, including suspension and banning of business, can also be taken against such defaulting bidder(s).
- 4.4.10** HDC, KoPT, at its discretion, may extend the closing date & time of e-Tender, prior to the closing date & time of e-Tender mentioned in the Schedule of Tender (SoT). However, the closing date & time of e-Tender will not be extended, under any situation, after the due date is over.
- 4.5 Opening of Part-I (i.e. Pre-qualification & Techno-commercial Bid) and Part-II (i.e. Price Bid) :**
- 4.5.1 Part I** (Pre-qualification & Techno-commercial Bid) will be opened electronically on specified date and time, as given in the Schedule of Tender (SoT). Bidder(s) can witness electronic opening of bid(s).
- 4.5.2 Part II** (Price Bid) will be opened electronically of only those bidder(s), who qualify(ies) in the "Pre-qualification & Techno-commercial Bid" [Part I]. Such bidder(s) will be intimated date of opening of Part II (Price Bid), through e-mail, to valid e-mail ID(s) confirmed by them.

SECTION - V

INSTRUCTIONS TO BIDDERS (ITB)

A. GENERAL

5.1 Definition and interpretations :

- (a) the term “in writing” means communicated in written form (i.e. by mail, e-mail, fax, telex, etc.) and delivered against receipt;
- (b) except where the context requires otherwise, words indicating the singular also include the plural and words indicating the plural also include the singular;
- (c) “day” means calendar day; and
- (d) “procurement” means the entire work requirements, as specified in **Section VI Technical Specification**.

5.2 Fraud and corruption

5.2.1 It is the policy of **Kolkata Port Trust (KoPT)** to require that bidders, Contractors, Sub-contractors, and Consultants, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, **KoPT** :

- (a) defines, for the purposes of this provision, the terms set forth below as follows:
 - (i) “**corrupt practice**” means the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence the action of a public official in the procurement process or in contract execution;
 - (ii) “**fraudulent practice**” means a misrepresentation or omission of facts, in order to influence a public procurement process or the execution of a contract;
 - (iii) “**collusive practice**” means a scheme or arrangement between two or more bidders, designed to establish Bid Prices at artificial , non competitive levels;
 - and
 - (iv) “**coercive practice**” means harming, or threatening to harm, directly or indirectly, persons or their property to influence their participation in procurement process or affect the execution of a contract;
- (b) will reject a proposal for award, if it determines that the bidder, recommended for award, has, directly or through an agent, engaged in

corrupt, fraudulent, collusive, or coercive practices in competing for the contract in question;

- (c) Will terminate contract, if it determines at any time that representatives of KoPT engaged in corrupt, fraudulent, collusive, or coercive practices during the procurement or the execution of that contract ;
- (d) will sanction a firm or individual, including declaring them ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that they have, directly or through an agent, engaged in corrupt, fraudulent, collusive, or coercive practices in competing for, or in executing, a contract;

and

- (e) will have the right to require that a provision be included in Bidding Documents and in contracts, requiring bidders, contractors , subcontractors, and consultants to permit KoPT to inspect their accounts and records and other documents relating to the bid submission and contract performance.

5.2.2 Furthermore, bidders shall be aware of the provision stated in GCC.

5.3 Eligible bidders

5.3.1 A Bidder, and all parties constituting the Bidder, **should have the nationality of any country**. A Bidder shall be deemed to have nationality of a country if the Bidder is a citizen or is constituted, incorporated, or registered and operates in conformity with the provisions of the laws of the country. This criterion shall also apply to the determination of the nationality of proposed subcontractors or contractors for any part of the contract, including related services

5.3.2 A Bidder shall not have a conflict of interest. Any Bidder found to have a conflict of interest shall be disqualified. A Bidder may be considered to have a conflict of interest for the purpose of this bidding process, if the Bidder and one or more parties :

- (a) Submit more than one bid in this bidding process.

Or

- (b) are or have been associated in the past , with a firm or any of its affiliates which have been engaged by **KoPT** to provide consulting services for the preparation of the design, specifications, and other documents to be used for the procurement of the goods to be purchased under the instant Bidding Documents.

5.3.3 Participating by a Bidder in more than one bid shall result in the disqualification of all bids, in which such Bidder is involved.

5.3.4 A Bidder that is under a declaration of ineligibility by **KoPT**, in accordance with **ITB Clause No.5.2**, at the date of contract award shall be disqualified.

- 5.3.5 The same firm may be allowed to bid in both capacities (individually and also as Joint Venture), provided that the proposed Joint Venture is a Registered Company under Company Law, having a separate Legal entity.
- 5.3.6 If any bidder has a **Licensing Agreement** or a **Technical Collaboration Agreement** or a **Joint Venture Agreement** or a **Consortium** with other **manufacturer(s)**, then the bidder should comply with the following:
- 5.3.6.1 A copy of **Licensing Agreement/ Technical Collaboration Agreement/ Joint Venture Agreement** is to be uploaded along with the “Pre-qualification & Techno-commercial Bid”, duly attested by the bidder. Such Agreements should be in the nature of legally acceptable Agreements.
- 5.3.6.2 The bidder should submit an additional Supplementary Agreement, duly signed by all the Partners of the **Licensing Agreement/Technical Collaboration Agreement/Joint Venture Agreement**, on a Non-judicial Stamp Paper of worth not less than Rs. 50.00, duly notarised, covering the following points:
- 5.3.6.2.1 The **Licensing Agreement/ Technical Collaboration Agreement/Joint Venture Agreement**, irrevocable in nature, is valid for at least a continuous period of 10 (ten) years from the date of commissioning of the plant.
- 5.3.6.2.2 One of the partners shall be nominated as the “Lead Partner”.
- 5.3.6.2.3 The Lead Partner shall be authorised to incur liabilities and receive instructions for & on behalf of any & all the partners. The entire execution of the contract, including payment, shall be carried out exclusively through the Lead Partner.
- During the entire period of the contract, the Lead Partner cannot be changed.
- In the event of the Lead Partner becoming defunct, selection of the new Lead Partner would be made, as may be mutually agreed between the remaining partner(s) and KoPT, without any additional financial involvement. As the approval towards such new Lead Partner is the sole discretion of KoPT, it must be approved by them, in writing.
- The said new Lead Partner shall also be jointly, as well as severally, liable with the remaining partner(s) for the satisfactory performance of the contract as per the scope of these bidding documents.
- 5.3.6.2.4 The scope and responsibilities of all the Partners of

Licensing Agreement/Technical Collaboration Agreement /Joint Venture Agreement, in terms of financial & technical commitment/contribution, should be explicitly mentioned and the Partners should be severally & jointly responsible for the satisfactory performance of the contract as per the scope of these bidding documents.

5.3.6.2.5 In case of successful bidder, the Contract Agreement is to be signed by legally authorised signatories of all the Partners.

5.3.6.3 In the event of default of any Partner in the execution of his part of the contract, the Lead Partner shall have authority to assign the work to any other party acceptable to the Employer (KoPT), to ensure the execution of the part of the contract. The said party shall also be jointly [with the remaining Partner(s)] as well as severally liable so far as the unfinished part of the contract is concerned.

5.4 Authority in signing the bid / offer

- 5.4.1 In case the bid is submitted by a **Proprietorship Firm**, the same should be signed either by the **Proprietor** or other person(s), holding a valid **power of attorney / authorisation** from the proprietor, in connection with this bidding process. The signature of such power of attorney holder(s) / authorised person(s) should be attested by the proprietor. Such **power of attorney / authorisation** should be uploaded along with **Techno-commercial Bid [Part I]**.
- 5.4.2 In case the bid is submitted by a **Partnership Firm**, the same should be signed either by the partner(s), holding valid **power of attorney** from the partners or other person(s), holding valid **authorisation** from such power of attorney holder(s) , subject to approval of the partner(s) in the matter of giving such authorization, in connection with this bid. The signature of such **power of attorney holder(s) / authorised person(s)** should be attested by the **partners or power of attorney holder**, as the case may be. Such **power of attorney / authorisation** should be uploaded along with **Techno-commercial Bid [Part I]**.
- 5.4.3 In case the bid is submitted by a **Limited Company**, the same should be signed by the person(s) holding valid **power of attorney / authorisation**, executed in his / their favour (in connection with this bid) and the signature of such **power of attorney holder(s) / authorised person(s)** should also be attested, in accordance with the constitution of the Limited Company. Such **power of attorney / authorisation** should be uploaded along with **Techno-commercial Bid [Part I]**.
- 5.4.4 Such **power of attorney holder(s) / authorised person(s)** should put his / their signature identical with the attested one, in the relevant documents submitted / uploaded, in connection with the instant bidding process [including “**Techno-commercial Bid**”]. In case of putting different

signatures in different documents / offers, all such signatures should be attested by the same person in line with the above.

B. **CONTENTS OF BIDDING DOCUMENTS**

5.5 Sections of Bidding Documents

- 5.5.1** The contents of the **Bidding Documents** as detailed at “TABLE OF CONTENTS” should be read in conjunction with any addendum / corrigendum issued in accordance with **ITB Clause No. 5.7**.
- 5.5.2** The Employer (KoPT) is not responsible for the completeness or correctness of the bidding documents and their Addenda, if they were not obtained directly from the source indicated in Notice Inviting e-Tender .
- 5.5.3** The bidder is expected to examine all instructions, forms, terms, and specifications in the Bidding Documents. Failure to furnish all information or documentation required by the Bidding Documents [considering all addenda / corrigenda issued] may result in the rejection of the bid.

5.6 Pre-Bid Meeting

- 5.6.1** A prospective bidder requiring any clarification of the instant Bidding Documents shall contact **Sr. Dy. Manager (P&E), HDC**, in writing, or raise their enquiries during the **Pre-bid meeting**.

The **prospective bidders** are requested to submit their queries / observations / suggestions / requests for clarification, in connection with the instant Bidding Documents, in advance, to enable **KoPT** to prepare response / clarifications and make pre-bid meeting meaningful.

- 5.6.2** As indicated in the Schedule Of Tender, pre-bid meeting will be conducted off-line on behalf of HDC, KoPT. The purpose of this pre-bid meeting will be to clarify issues and to answer questions on any matter (in connection with the instant Bidding Documents only) that may be raised at that stage.

Authorised representative(s) of the prospective bidders will be allowed to attend the **Pre-bid meeting**, which will be held on the date, time & at the venue stipulated in the **Schedule Of Tender (SOT)**.

The **designated representative(s)**, who will be deputed to attend the **pre-bid meeting**, should submit their authorization in this regard. The signature of such designated person(s) should be attested by the authorized signatory of the prospective bidders. Otherwise, the designated person should have to submit the proof of his identity through other means.

- 5.6.3** The prospective bidders are advised to attend the pre-bid meeting. However, non-attendance at the pre-bid meeting will not be a cause for disqualification of a bidder.

- 5.6.4** Unless otherwise notified, **all the queries / observations / suggestions / requests for clarification** (related to the instant Bidding Documents only) [including the **queries / observations / suggestions / requests for clarification raised during pre-bid meeting**], received till the date of **pre-bid meeting**, will be considered. **KoPT's** response / clarifications

(including description of queries / observations / suggestions / requests for clarifications, but without identifying its source), in this regard, will be communicated to all the known prospective bidders (i.e. who would **attend pre-bid meeting** or **submit queries / observations / suggestions or requested for clarification**), in writing, well in advance to the last date of submission of bids. The aforesaid **queries / observations / suggestions / requests for clarification** and **KoPT's** response / clarifications will also be hosted in the websites, as specified in the **Notice Inviting e-Tender**.

Any modification to the Bidding Documents, which may become necessary as a result of the **KoPT's response / clarifications**, so issued, shall be made through the issue of an addendum / corrigendum, pursuant to **ITB**.

- 5.6.5** The Bidder shall be deemed to have **examined** thoroughly the instant Bidding Documents, in full, [considering all addenda / corrigenda issued (if any)], **visited the site & surroundings** and to have **obtained all necessary information in all the matters** whatsoever that might influence while carrying out the job as per the conditions of the instant **Bidding Documents** [considering all addenda / corrigenda issued (if any)] and to satisfy themselves to sufficiency of their bid, etc. If they shall have any issue to be clarified, the same should be brought to the notice of **KoPT**, in writing, as set out in **ITB**.

The bidders are advised to acquaint themselves with the job involved at the site, like availability of labour, means of transport, communication facilities, laws and bye laws in force from Government of West Bengal & Government of India and other statutory bodies from time to time. The Bidder shall be deemed to have examined and collected all necessary information as to risk, contingencies and other circumstances, which may be necessary for preparing the Bid.

Visiting the site shall be at the bidder's own expense. Failure to visit to site will no way relieve the Contractor (successful Bidder) of any of their obligation in performing the work and liabilities & responsibilities thereof, in accordance of the contract.

- 5.6.6** Necessary Gate Pass/Dock Entry Permit, for entering into the Dock area, will be issued to the designated representative(s) of the prospective bidders, on chargeable basis [as per the extant "Scale of Rates" of KoPT, available at <http://www.kolkataporttrust.gov.in/> of Kolkata Port Trust], to visit the site, for the purpose of inspection only, on receipt of a formal written request. The signature of such designated person(s) should be attested by the authorized signatory of the prospective bidders. Otherwise, the designated person(s) should have to submit proof of his/their identity through other means.

However, during the pre-bid meeting, if the prospective bidders are willing to enter into the dock area, they will be allowed through VIP Pass of HDC free of cost.

Such prospective bidder will be fully responsible for any injury (whether fatal or otherwise) to its designated representative(s), for any loss or

damage to property, or for any other loss, damage, costs and expenses whatsoever caused, which, but for the granting of such permission, would not have arisen.

The prospective bidder will be liable to indemnify KoPT against any loss or damage to the property of KoPT or neighbouring property which may be caused due to any act of prospective bidder or their designated representative(s).

5.7 Amendment of Bidding Documents

5.7.1 At any time, prior to the last date for submission of bids, **KoPT** may, for any reason whether at its own initiative or in response to the **queries/ observations/suggestions/requests for clarification**, amend and modify the bidding documents by issuing Addenda/Corrigenda. Such Addenda/Corrigenda will be hosted in the websites, as specified in the **Notice Inviting e-Tender**.

5.7.2 Any Addendum/Corrigendum, thus issued, shall be part of the bidding documents and shall be communicated, in writing, to all the known prospective bidders (i.e., who would attend Pre-bid Meeting or submit queries / observations / suggestions or request for clarification), in writing, well in advance to the last date of submission of bids.

5.7.3 To give prospective bidders reasonable time to take the Addendum / Corrigendum into account in preparing their bids, KoPT may, at their discretion, extend the last date for submission of the bids, prior to the closing date & time of e-Tendering.

C. PREPARATION OF BIDS

5.8 Cost of bidding

The Bidder shall bear all costs associated with the preparation and submission of their bid, and **KoPT** shall not be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

5.9 Language of Bid

The Bid, as well as all correspondence and documents relating to the bid, exchanged by the Bidder and KoPT, shall be written in the **English language only**. If the supporting documents and printed literature, that are part of the bid, are in another language, they must be accompanied by an accurate translation of the relevant passages in the English language, in which case, for purposes of interpretation of the bid, such translation shall govern.

5.10 Documents comprising the Bid

5.10.1 The Bid shall comprise of the following :-

(a) Pre-qualification and Techno-commercial Bid:

The Pre-qualification & Techno-commercial Bid comprises all documents [including the Bidding Forms (provided in these bidding documents), duly filled in, signed and stamped] required to be submitted as per the Notice Inviting e-Tender, Schedule of Tender

(SoT), Instructions To Bidders (ITB) and any other relevant clause(s) of these bidding documents.

(b) Price Bid:

The Price Bid comprises the prices only and the same are to be submitted electronically, through the website of MSTC Limited only.

5.11 Form of Tender

The bidder shall have to submit (upload) the “**FORM OF TENDER**”. This form **must be completed without any alterations** to its format, and no **substitutes shall be accepted**. All blank spaces shall be filled in with the information requested. Such **duly filled in “FORM OF TENDER”** should be uploaded.

5.12 Price Schedule

5.12.1 The Bidder shall quote their price on-line (**through MSTC portal only**) as per the **Price Schedule** (Bill of Quantities) in the Price bid (Part-II), without any condition or deviation. Price indicated anywhere else, in any other form or manner, will not be considered for evaluation of Price Bid.

5.12.2 The Bidder should submit (upload) the **unpriced** format [Bidding Form VI : **PRICE SCHEDULE**], of the instant Bidding Documents, duly filled in the GST rates at appropriate places and signed & stamped as token of acceptance.

5.13 Bid Prices

5.13.1 The prices are to be quoted by the Bidder **through MSTC portal**, considering the work requirements, as detailed in **Section VI (Technical Specification)** and other terms & conditions of the Bidding Documents (considering all addenda / corrigenda issued).

5.13.2 Except where otherwise expressly provided, the contractor shall have to provide all materials, labour, plant and other things necessary in connection with the contract, although everything may not be fully specified, and although there may be errors and omissions in the specifications.

5.13.3 The prices and rates entered (electronically through MSTC Portal) **as per the Price Schedule** (Bill of Quantities), in the Price bid (Part-II), by the **Bidder**, shall include, inter alia, all costs and expenses involved in or arising out of the following:

- (a) Supply, delivery, inspection, transportation (including insurance), handling, receipt and storage of all required materials [in line with Technical Specification (Section VI)] and equipment at site.
- (b) The provision, storage, transport, handling, use, distribution & maintenance of all materials, equipment, machinery and tools, including all costs, charges, dues, demurrage or other outlays involved in transportation.
- (c) The provisions & maintenance of all their staff & labour and their payment, accommodation, transport, fares and other requirements.

- (d) All required first aid, welfare and safety requirements.
 - (e) Damage caused to the work and /or construction, plant, materials and consumable stores caused by weather.
- 5.13.4** Tools, Tackles, lifting machineries, scaffolding, temporary lighting, different vehicular transport etc. required for execution of the whole work will have to be arranged by the Contractor, at their own risk, cost & arrangement, which may be considered, while submitting their rates in the offer.
- 5.13.5** Rates & amounts quoted by the bidders in the “PRICE SCHEDULE”, include all incidental charges [excluding Goods and Services Tax (GST)], as applicable, and charges for packing, forwarding, loading, handling, carrying to any lead, stacking, transportation, permits, overheads & profit, etc. necessary for the complete services as described in this Bidding Document.
- GST, as applicable, shall be paid extra against proper invoice submitted by the Contractor.
- The contractor will be required to submit GST compliant invoice with all required details and also be required to file timely and proper return so as to enable KoPT to get due credit against GST paid.
- In case of any failure on the above account, GST amount, even if paid by KoPT, shall be recoverable from the Contractor.
- 5.13.6** All quoted rates will remain firm during the validity period of the bid / offer, including any / all extension thereof, agreed by the bidder.
- However, changes **in statutory taxes & duties [other than GST] will be adjusted** (within the scheduled completion period), based on documentary evidence.
- 5.13.7** The Bidder should clearly understand that they shall be strictly required to conform to all terms & conditions of the instant Bidding Documents [considering all addenda / corrigenda (if any) issued], as contained in each of its clauses and **plea of “Customs Prevailing”** will not be, in any case, admitted as excuse on their part, for infringing any of the terms & conditions.
- No request for change or variation in rates or terms & conditions of the contract shall be entertained on the ground that the successful Bidder has not understood the work envisaged in the instant contract.
- 5.14 Currencies of Bid**
- The **Bidders** should quote the prices in **Indian Rupees (Rs)** only.
- 5.15 Period of validity of bids**
- 5.15.1** Bids shall remain valid for the period of **120 days** after the bid submission deadline date (considering extension thereof, if any) as prescribed in **ITB**. A bid, valid for a shorter period, shall be rejected by **KoPT**, treating the same as non-responsive.

- 5.15.2** In exceptional circumstances, prior to the expiration of the bid validity period, **KoPT** may request the bidders to extend the period of validity of their bids. The request and the responses shall be made in writing.

A Bidder may refuse the request, without forfeiting their **Earnest Money Deposit (EMD)**. A Bidder granting the request shall not be required or permitted to modify its bid, except when option to do the same has been specifically granted by **KoPT**, in writing.

5.16 Earnest Money Deposit (EMD)

- 5.16.1** The intending bidders should deposit an amount specified in the **Schedule of Tender (SoT)**, as **Earnest Money Deposit (EMD)**, in accordance with the procedure mentioned therein.

- 5.16.2** Failing to deposit the Earnest Money, in accordance with ITB, shall be rejected by the Employer (KoPT), treating the same as non-responsive.

For exemption of EMD the bidder is required to upload the scanned copy of the certificate from MSME / Micro & Small Enterprises (MSEs) / DIC / SSI / National Small Industries Corporation (NSIC) or any empowered Central / State Govt. authority.

5.16.3 Refund of Earnest Money Deposit:

Earnest Money Deposit of the successful bidder shall be retained by KoPT and Earnest Money Deposit of the unsuccessful bidders [including the bidder(s) whose Price Bid would not be opened in line with **ITB**] shall be refunded, without interest, within 2 (two) months from the date of opening of Price Bids or on finalization/acceptance of tender, whichever is earlier.

In case the bid of the **successful bidder** is found acceptable to **KoPT** and contract is awarded with them, the **Earnest Money Deposit** of the **successful bidder (Contractor)** shall be retained by **KoPT** till submission of **Performance Guarantee / Security Deposit** (in accordance with **ITB**) and signing of the **Contract Agreement** by **KoPT** and the Contractor (in accordance with **ITB**), and shall be refunded thereafter.

In case, the successful bid is not found acceptable to KoPT, Earnest Money Deposit of the successful bidder shall be refunded after the decision, in this regard, is finalized by KoPT.

- 5.16.4** No interest shall be payable on the account of Earnest Money Deposit in any case.

5.16.5 Forfeiture of Earnest Money Deposit :

The EMD may be forfeited

- (a) if a Bidder withdraws their offer within the validity period of the bid / offer; and / or, alters / amends any terms and / or condition and / or quoted rate(s), within the validity period of the offer (excepting when option to do the same has been specifically granted by Kolkata Port Trust , Haldia Dock Complex in writing) making it unacceptable to the Kolkata Port Trust , Haldia Dock Complex;

or,

- (b) if the successful bidder,
 - i) fails to submit the Performance Guarantee / Security Deposit (as per SCC) for the specified sum and in the specified form, within the stipulated time;
- and / or,
- ii) fails to carry out the work or to perform / observe any of the conditions of the contract,

For the purpose of this provision, the validity period (of the bid / offer) shall include any / all extension thereof, agreed by the Bidder in writing. KoPT shall also be at liberty to deduct any of their dues from Earnest Money. It should be however be clearly understood that in case of any default in any terms and or condition of the contract after placement of order but before submission of Performance Guarantee / Security Deposit (as per SCC), the same shall be dealt with in accordance with the relevant provisions of contract, including forfeiture of Earnest Money.

D. SUBMISSION OF BIDS AND OPENING OF BIDS (EXCEPT PRICE BID)

5.17 Submission of bids

- 5.17.1** Bidders shall have to submit their bids [both **Pre-qualification & Techno-commercial Bid** and **Price Bid**] on-line **through MSTC portal only**.
- 5.17.2** The Bidder should submit (upload) the scanned copies of all the relevant and required documents, statements, filled up formats, certificates, etc. [in accordance with **ITB**], in the aforesaid portal, in support of their **Pr-qualification Criteria and Techno-commercial Bid**.
- 5.17.3** Before scanning the aforesaid documents, all pages are to be signed by a person duly authorised to sign on behalf of the bidder, pursuant to **ITB**, and are to be embossed with their official seal, owing responsibility for their correctness / authenticity. All pages of the aforesaid documents should be serially marked.
- 5.17.4** Any inter-lineation, erasures, or overwriting, in the aforesaid scanned & uploaded documents, shall be valid only if they are signed by the aforesaid authorised person.
- 5.17.5** The Bidder will have to produce the original documents or any additional documents, if asked for, to satisfy **Haldia Dock Complex, Kolkata Port Trust**.
- 5.17.6** The **Price Bid** comprised the prices only and the same are to be submitted electronically, through the website of **MSTC Ltd.** only. ***No hardcopy of priced "Price Schedule" is required to be uploaded.***

5.18 Techno-commercial offer

- 5.18.1** No techno-commercial deviation and variation will be considered by KoPT, except where the Techno-commercial terms and conditions, will be found

as impossible and irrelevant to the bidder.

- 5.18.2** If the Bidder deliberately gives wrong information or conceals any information / fact in their bid, which shall be favourable for acceptance of their bid, fraudulently, then the right to reject such bid at any stage of execution, without any financial liability, is reserved by **KoPT**.

5.19 Priced offer

The Bidder should quote the offered rate appropriately in the PRICE BID, electronically, through the website of **MSTC Ltd.** only. *Price indicated anywhere else, in any other form or manner, would not be considered for evaluation of **Price Bid**.*

5.20 Deadline for submission of bids

- 5.20.1** Bids must be submitted within the closing date & time **indicated in the Schedule Of Tender (SOT)**.

- 5.20.2** **KoPT** may, at its discretion, *extend the deadline for the submission of bids, prior to the closing date & time of e-Tendering*, by amending the Bidding Documents, in accordance with **ITB**, in which case all rights and obligations of **KoPT** and bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.

5.21 Late Bids

This e-Procurement System would not allow any late submission of bid, after the closing date & time, as per the **Schedule Of Tender (SOT)** or extension, if any.

5.22 Withdrawal of bids

- 5.22.1** A Bidder may withdraw, substitute, or modify their bid on the e-Procurement System, before the closing date and time specified, but not beyond.

- 5.22.2** No bid may be withdrawn, substituted, or modified in the interval between the deadline for submission of bids and the expiration of the period of bid validity specified by the bidder on the “**FORM OF TENDER [for Techno-commercial (un-priced) Bid]**.” or any extension thereof. Modification / Withdrawal of the bid sent through any other means shall not be considered by **KoPT**.

- 5.22.3** Withdrawal of bid during the interval between such closing time on due date and expiring of the bid validity period, may result in forfeiture of EMD in accordance with **ITB**.

5.23 Bid opening [except Price Bid]

- 5.23.1** The bids **[except Price Bids]**, will be opened at the date & time, indicated in the **Schedule Of Tender (SOT)**.

- 5.23.2** The on-line bid-opening event may be viewed by the bidders at their remote end, by logging on to the e-Procurement System. A copy of the bid opening record shall be made available on the e-Procurement System.

E. EVALUATION OF BIDS

5.24 Confidentiality

- 5.24.1** Information relating to the evaluation of bids and recommendation of contract award shall not be disclosed to bidders or any other persons not officially concerned with such process until publication of the contract award.
- 5.24.2** Any attempt by a Bidder to influence KoPT in the examination, evaluation and comparison of the bids, or contract award decisions may result in the rejection of their bid and forfeiture of **EMD**.
- 5.24.3** Notwithstanding **ITB Clause No. 5.24.2**, from the time of bid opening to the time of contract award, if any Bidder wishes to contact KoPT on any matter related to the bidding process, they should do so in writing.

5.25 Clarification of bids

To assist in examination, evaluation & comparison of the bids and qualification of the bidders, the Employer (KoPT) may, at their discretion, ask any bidder for a clarification of their bid. The Employer (KoPT) may also ask any bidder to withdraw any terms/conditions mentioned by them in their offer, which are not in conformity with the terms & conditions specified in the bidding documents. In case any bidder fails to submit required clarification within the time stipulated by the Employer (KoPT), in this regard, the tender would be processed in absence of the clarifications, which may result in disqualification of the corresponding bidder for the instant tender. Any clarification submitted by a bidder, which is not in response to a request by the Employer (KoPT), shall not be considered. The Employer's (KoPT's) request for clarification and the response shall be in writing.

No change in the prices or substance of the bid shall be sought, offered or permitted, nor will the bidder be permitted to withdraw their bid before expiry of the validity period of the bid.

5.26 Deviations, reservations and omissions

During the evaluation of bids, the following definitions apply:

- (a) "Deviation" is a departure from the requirements specified in the bidding documents ;
- (b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the bidding documents ; and
- (c) "Omission" is the failure to submit part or all of the information or documentation required in the bidding documents.

5.27 Responsiveness of bids

- 5.27.1** Responsiveness of a bid would be determined on the basis of the contents of the bid itself, and clarification(s) in accordance with **ITB**.
- 5.27.2** A substantially responsive bid is one that meets the requirements of the Bidding Documents without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that,

- (a) if accepted, would
 - i) affect in any substantial way the scope, quality, or performance of the work specified in the Contract; or
 - ii) limit in any substantial way, inconsistent with the Bidding Documents, KoPT's rights or the bidder's obligations under the proposed contract; or
 - (b) if rectified, would unfairly affect the competitive position of other bidders presenting substantially responsive bids.
- 5.27.3** Bidders shall not contain the following information / conditions to consider them responsive :
 - (a) Either direct or indirect reference leading to reveal the prices of the bids in the Techno-commercial offers;
 - (b) Adjustable prices, other than the provisions stated in **ITB**.
- 5.27.4** If a bid is not substantially responsive to the requirements of the bidding documents, it shall be rejected by KoPT and may not subsequently be made responsive by the bidder, by correction of the material deviation, reservation, or omission.
- 5.28 Nonconformities, errors and omissions**
 - 5.28.1** During examination, evaluation & comparison of the bids and qualification of the bidders, the Employer (KoPT) may, at their discretion, ask any bidder for submitting any document(s) [in case of shortfall in required documents (relating to capacity or otherwise)]. In case any bidder fails to submit required documents within the time stipulated by the Employer (KoPT), in this regard, the tender would be processed in absence of the documents, which may result in disqualification of the corresponding bidder for the instant tender.

Any document submitted by a bidder, which is not in response to a request by the Employer (KoPT), shall not be considered. The Employer's (KoPT's) request for submission of further document(s) shall be in writing.
 - 5.28.2** **KoPT** shall examine the bids [including the further documents / clarifications received in accordance with **ITB**] to confirm that all documents requested in **ITB** have been provided and to determine the completeness of each document submitted.
 - 5.28.3** Provided that a bid is substantially responsive, **KoPT** may waive any nonconformities or omissions in the bid that do not constitute a material deviation.
- 5.29 Examination of Pre-qualification Criteria**
 - 5.29.1** At first, the contents of the documents, submitted in support of the Pre-qualification Criteria [including the further documents / clarifications received in accordance with **ITB**] will be scrutinized and evaluated.
 - 5.29.2** KoPT may, at their discretion, seek any other detail(s)/document(s), in subsequent course, to ascertain and get confirmed about the competence of the bidder. In case any bidder fails to submit required detail(s)/document(s)

within the time stipulated by the Employer (KoPT), in this regard, the tender would be processed in absence of the documents, which may result in disqualification of the corresponding bidder for the instant tender. While evaluating Pre-qualification Criteria, regard would be paid to National Defence and Security considerations of the Indian Government.

- 5.29.3** In case it is found that the Pre-qualification Criteria has not been fulfilled by the bidder or otherwise their participation has not been found acceptable to **KoPT**, the respective bid will be treated as non-responsive and “Price Bid” of the respective Bidder will not be considered further.

5.30 Examination of Techno-commercial offer

- 5.30.1** After scrutiny of the **Pre-qualification Criteria, Techno-commercial Bids** of the Pre-qualified bidders [as indicated above] will be scrutinized & evaluated.

- 5.30.2** **KoPT** shall examine the bid to confirm that all terms and conditions specified in the **Technical Specification (Section VI)**, **GCC (Section VII)** and **SCC (Section VIII)** have been accepted by the bidder without any material deviation or reservation or omission.

- 5.30.3** If on examination of the “**Techno-commercial Bid**” of pre-qualified bidders, it is found that they have not accepted all Techno-commercial terms & conditions of the Bidding Documents [considering all addenda / corrigenda, issued], “**Price Bid**” part of such bidder(s) will not be opened. “**Price Bid**” part of other bidder(s) will be opened subsequently as per procedure. Decision of **KoPT** on this matter shall be final.

5.31 Opening of Price Bid

PRICE BIDS of the bidders, who qualifies in the “Pre-qualification & Techno-commercial Bid”, will be opened on a later date, upon due intimation to the concerned bidders at their address furnished by them in their bid.

The on-line price-bid opening event may be viewed by the bidders at their remote end, by logging on to the e-Procurement System. A copy of the price-bid opening record shall be made available on the e-Procurement System

5.32 Comparison & Evaluation of Price-Bid and selection of Successful Bidder

- 5.32.1** While evaluating the Price Bids, the Price quoted by the Bidders against all items of the **Price Schedule** shall be taken into account and the **TOTAL PRICE**, which would be arrived at, by adding quoted prices of all items of the **Price Schedule**, will be considered for evaluation. Selection of the successful bidder will be made on the basis of the “**lowest TOTAL PRICE**” thus arrived.

- 5.32.2** In case it is found that the quoted “**TOTAL PRICE**” is same for two or more bidders and their bids become the lowest, the respective bidders will be given chance to submit their fresh Price Bid, subject to the condition that the fresh rate so quoted must be less than the rate quoted by the respective bidders earlier. Selection of the successful bidder will be made on the basis of the revised “**lowest TOTAL PRICE**” thus obtained.

5.33 KoPT's right to accept any bid and to reject any or all bids

5.33.1 KoPT reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to contract award, without thereby incurring any liability to Bidders.

E. AWARD OF CONTRACT

5.34 Subject to **ITB Clause No. 5.33.1**, KoPT shall award the contract to the Bidder whose offer has been determined to be the lowest evaluated bid [as per **ITB Clause No. 5.32**] and is substantially responsive to the Bidding Documents.

5.35 Notification of award

Prior to the expiration of the period of bid validity or extended validity in accordance with **ITB**, KoPT shall notify the **Successful Bidder**, in writing, that their bid has been accepted. The notification letter (hereinafter called the "**Letter of Acceptance**") will be treated as "**Order Letter**" and will constitute the formation of the contract. Such order letter shall specify the "**Contract Price**" in line with **SCC Clause No. 11.1.4 a**).

5.36 Signing of contract agreement

5.36.1 After placement of order, **contract agreement** [as per the form furnished in **Section- XI**] should be executed between **Kolkata Port Trust** and the **Contractor (Successful Bidder)**. In this respect, within a week of receipt of intimation regarding acceptance of their bid, the successful bidder shall have to submit, at their cost, required **Stamp Paper** [Non-judicial Stamp Paper of worth not less than **Rs. 50.00**] & **dummy papers** (for three sets).

Immediately after receipt of the above papers & documents, KoPT will send three sets of **contract agreement form** [one set printed on Stamp Paper & dummy papers and two sets printed on dummy papers], photocopy of **one set of documentary transactions between them and KoPT** (till finalisation & award of the Contract) and **Contract Documents** [incorporating all accepted changes and addenda / corrigenda issued, if any], duly signed by the representative of KoPT at appropriate places on each pages.

Within a week, thereafter, the Contractor (Successful Bidder) shall have to return **Contract Agreement forms** (three sets) [after affixing their common seal], the set of **documentary transactions** and **Contract Documents**, duly signed by them at appropriate places on each page.

5.36.2 The **contract agreement form & Contract Documents** should be signed by the authorized persons of the Contractor, authorized in this respect.

5.36.3 After receipt of the **contract agreement forms** (three sets), duly signed by authorised person of KoPT & authorized person of the Contractor (Successful Bidder), the same shall be kept under KoPT's custody, after affixing the Common Seal of KoPT.

One copy of such **executed contract agreement** (on dummy paper), along with one photocopy of signed **documentary transactions** and **Contract Documents** will be handed over to the Contractor for their record & future reference.

- 5.36.4** Until such contract agreement is executed, the other documents referred to the definition of the term “Contract” [**GCC Clause**], shall collectively be the contract.
- 5.37 Performance Guarantee / Security Deposit**
- 5.37.1** Within **twenty-eight (28) days** of issuance of “**Letter of Acceptance**” by **KoPT**, the Successful Bidder shall provide the **Performance Bank Guarantee** in accordance with the **Special Conditions of Contract**, using the form furnished in **Section XI**.
- 5.37.2** Failure of the successful bidder to submit the above-mentioned **Bank Guarantee for Performance Guarantee / Security Deposit** or sign the contract agreement shall constitute sufficient grounds for the annulment of the award and forfeiture of the **EMD** in accordance with **ITB**.
- 5.37.3** All costs, charges & expenses, including Stamp Duty, shall be borne by the Successful Bidder.
- 5.37.4** No interest / charge, of whatsoever nature, shall be paid by **KoPT** on the amount of Performance Guarantee / Security Deposit, held by them (as per **SCC**) at any stage.

SECTION - VI

TECHNICAL SPECIFICATION

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DISCLAIMER:

1. Though adequate care has been taken while preparing the Bidding documents, the Bidders/ Applicants shall satisfy themselves that the document is complete in all respects. Intimation of any discrepancy shall be given to this office immediately. If no intimation is received from any Bidder within twenty (20) days from the date of notification of this bidding documents, it shall be considered that the bidding documents are complete in all respects has been received by the Bidder.
2. Haldia Dock Complex (HDC), Kolkata Port Trust (KoPT) reserves the right to modify, amend or supplement this bidding documents including all formats and Annexures.
3. While this bidding documents have been prepared in good faith, neither Employer or its authorized representatives nor their employees or advisors make any representation or warranty, express or implied, or accept any responsibility or liability, whatsoever, in respect of any statements or omissions herein, or the accuracy, completeness or reliability of information, and shall incur no liability under any law, statute, rules or regulations as to the accuracy, reliability or completeness of this bidding documents, even if any loss or damage is caused by any act or omission on their part.
4. The specification mentioned for all the equipment which include Solar Modules, PCU, combiner boxes, DC cables, module mounting structures, transformer, CT, PT, LT/ HT cables, interfacing panels, switch gears & other associated equipment etc., to complete the power generation and evacuation to the designated substation, in the present bidding documents is for the **reference** only. It is subject to revise/ alter as per the design/ planning/ Good engineering practices etc., to be carried out by the selected bidder, to the satisfaction of the Employer or its authorized representatives. It is advised that the bidders must satisfy himself with the prevailing site conditions before design/ plan. The design must be optimized for the site conditions and directed to achieve the maximum output from the installed capacity at all times. Moreover, the components not separately mentioned, but are required to complete the plant for operation is also included in the scope of bidder and shall be vetted by the Employer or its authorised representatives.

Place :

Date:

Signature
Name and Designation of Bidder

A. Introduction

1. Site Description

1.1 The land for the proposed project is located at Haldia at Purba Medinipur District of State of West Bengal. Haldia Port is well connected with road, rail and sea route.

1.2 Proposed Land Details:

Particulars	Description
Details of proposed capacity of the solar power plant	1 MW (AC) SPV (Mono/ Multi crystalline) SPV plant
Village	Haldia
Taluk	Haldia
District	Purba Medinipur
State	West Bengal
Location	Haldia Dock Complex, Kolkata Port Trust
Nearest Substation Details	11 kV Sub-stations of Haldia Dock Complex namely Sub-station No. 4 and 3 rd Oil Jetty Sub-station
Power Evacuation required	500 Meters (approx.) through Underground 11 KV grade cable up to nearby 11 KV overhead line.
Estimated life of PV Power plant	25 Years
Plot No./ Khasara No. & land details.	Haldia Dock Complex Area
Type of Land	Port Land
Nearest Urban Area	Haldia Township
Nearest Highway	NH 41; 6 km approximately
Nearest Railway Station	Haldia Railway Station (5 km)
Nearest Domestic Airport	Kolkata Airport (125 km)
Minimum values of PR of the plant after netting off the auxiliary consumption.	PR : 0.75 (against installed DC capacity at STC)
Water and Power for Construction	Water & Power for construction would be supplied by HDC as per prevailing rates.

B. System Design and Philosophy

2. Design Philosophy

2.1 The main objective of the design philosophy is to construct the plant with in-built Quality and appropriate redundancy to achieve high availability and reliability with minimum maintenance efforts. In order to achieve this, the following principles shall be adopted while designing system.

- 2.1.1 Technology: Solar PV Mono/ multi-crystalline modules (>16 Multi, >18% mono) of high efficiency and the cells/ modules.
- 2.1.2 Adequate capacity of SPV module, PCUs, Junction boxes etc. to ensure generation of power as per design estimates. This to be done by applying liberal de-rating factors for the array and recognizing the efficiency parameters of PCUs, transformers, conductor loss etc.
- 2.1.3 Use of equipment and systems with proven design and performance that have a high availability track record under similar service conditions.
- 2.1.4 Selection of the equipment's and adoption of a plant layout to ensure ease of maintenance.
- 2.1.5 Strict compliance with the approved and proven quality assurance systems and procedures during the different stages of the project starting from sizing, selection of make, shipment, storage (at site) , during erection, testing and commissioning.
- 2.1.6 Proper monitoring in the synchronizations which ensures the availability of power to the grid.
- 2.1.7 The plant instrumentation and control system should be designed to ensure high availability and reliability of the plant to assist the operators in the safe and efficient operation of the plant with minimum effort.
- 2.1.8 It should also provide for the analysis of the historical data and help in the plant maintenance people to take up the plant and equipment on predictive maintenance.
- 2.1.9 Inverter output voltage of 230-415V has to be stepped up to 33kV to connect it to the grid at the point of interconnection as per the TS Clause 1.2.
- 2.1.10 The power plant has to operate in parallel with the grid system which is infinite electrical system. Any faults not taken care will result in damage of only SPV power plant without affecting state Utility infinite system. Thus suitable protective measure is to be in built so that any disturbance of the grid will not **cause any damage of the equipment's** of the Solar Power Plant.
- 2.1.11 Very fast responsive microprocessor based Directional and Reverse power flow protection should be provided to ensure isolation of the solar power plant from the grid at the time of any fault or/and any additional suitable protection.
- 2.2 The basic and detailed engineering of the plant shall aim at achieving high standards of operational performance especially considering following:
 - 2.2.1 Plant layout to ensure optimum availability for generation during the day time without any shading.
 - 2.2.2 High DC system voltage and low current handling requirements.
 - 2.2.3 Selection of PCUs with proven reliability and minimum downtime. Ready availability of requisite spares.
 - 2.2.4 Based on the SOLAR INSOLATION data from reliable sources, the solar PV system should be so designed that it shall take into account the mean energy output after allowing for various losses, temperature corrections, on an average day for each month of the year.
 - 2.2.5 Careful logging of operational data / historical information from the Data Monitoring Systems, and periodically processing it to determine abnormal or slowly deteriorating conditions.
 - 2.2.6 SPV power plant should be designed to operate satisfactorily in parallel with the grid within permissible limits of high voltage and frequency fluctuation conditions, so as to export the maximum possible units generated to the grid. It is also extremely important to safeguard the system during major disturbances, like tripping / pulling out of big generating stations and sudden overloading during falling of portion of the grid loads on the power plant unit in island mode, under fault / feeder tripping conditions.

- 2.2.7 Flat plate SPV arrays which are held fixed at an optimum tilted angle and face towards the equator, are most common. The angle of tilt should be approximately equal to the angle of latitude for the site. It should be arranged in such a manner that optimum generation is achieved.
- 2.3 The specifications provided with this bid document are a functional ones; any design provided in this document is only meant as an example. **The Bidder must submit a proposal based upon their own design. Bidder must optimize their own design for Solar Photovoltaic (SPV) system with proven technology so that it shall best meet to guarantee the performance factors as it is a part of the acceptance criteria given in this bid document.** The bidders are advised to visit the site before designing the plant.
- 2.4 The minimum array capacity at STC shall be determined to have 1.1 MWp output at the time of installation. If the bidder anticipates any degradation of the modules more than 0.75% of the module output during the first year, it shall be taken care of to meet guaranteed generation to avoid liquidated damages/ compensation on account of Generation Performance Guarantees.
- 2.5 This Bid document specifically cover the rest of the requirements for Grid Connected said (AC) capacity Solar Power Plant along with their associated equipment. The capacity of the plant shall be determined to attain minimum of said (AC) capacity at the point of evacuation.
- 2.6 Successful Bidder (Contractor) shall prepare the detailed project report & design basis report and submit a copy to Employer for evaluation within 2 weeks from the date of issue of LOI.
- 2.7 Component and equipment reliability: Each component offered by the bidder shall be of established reliability. The minimum target reliability of each equipment shall be established by the bidder considering its failure, mean time between failures and mean time to restore, such that the availability of complete system is assured. The guaranteed annual system availability shall not be less than 99%. Bidder recommendation of the spares shall be on the basis of established reliability.
- 2.8 Bidder shall design the equipment and plant in order to have sustained life of 25 years with minimum maintenance efforts.
- 2.9 The supply, erection, commissioning and all other allied works for said (AC) capacity SPV Power Plant shall be completed as per timelines under SCC Clause 8.

C. Scope of Supply and Work

3. Detailed Scope of Work

- 3.1 Scope of Supply & Work includes all design & engineering, procurement & supply of equipment and materials, testing at manufacturers works, inspection, packing and forwarding, supply, receipt, unloading and storage at site, preparation of site, reclamation work, associated civil works, services, permits, licences, installation and incidentals, insurance at all stages, erection, testing and commissioning of 1 MW (AC) Grid Interactive Solar PV Power Plant and performance demonstration with associated equipment and materials on turnkey basis at Haldia Township, near Jawahar Tower Building under Haldia Dock Complex, Kolkata Port Trust at City: Haldia, District: Purba Medinipur, State: West Bengal and 10 (ten) years comprehensive operation and maintenance from the date of commissioning or Operational Acceptance, whichever is later.
- 3.2 The equipment and materials for the said (AC) capacity Grid Interactive Solar PV Power Plant with associated system (Typical) shall include but not be limited to the receipt, unloading, storage, erection, testing and commissioning of all supplied material for the following:
- 3.2.1 Solar PV modules of suitable rating, in array totalling minimum of the said DC capacity including mounting frames, structures, fasteners, array foundation and module interconnection.

- 3.2.2 Array Junction boxes, distribution boxes and Fuse boxes: MCBs, Surge Arrestors with string monitoring capabilities and with proper lugs, glands, ferrules, terminations and mounting structures.
- 3.2.3 DC and AC cables of appropriate sizes with adequate safety and insulation
- 3.2.4 Power Conditioning Units (PCU) with SCADA compatibility, common AC power evacuation panel with bus bars and circuit breakers LT & HT Power Interfacing Panels, Plant Monitoring Desk, AC & DC Distribution boards.
- 3.2.5 230 – 415V / 33kV step up transformers in relevance with state grid code and inverter manufacturer requirements.
- 3.2.6 11 kV / 415V auxiliary transformer (s).
- 3.2.7 Metering and protection system along with adequate battery system.
- 3.2.8 LT Power and Control Cables including end terminations and other required accessories for both AC & DC power
- 3.2.9 Internal 415V interconnection & Indoor feeder panels to cater auxiliary needs of plant
- 3.2.10 11 kV indoor/ outdoor panels having incoming and outgoing feeders with VCBs, CTs, PTs, Bus bars, cables terminals kits and Bus coupler having Main and transfer Bus. Each bay shall consist of VCB, CT, Isolators with earth switch, LAs and PT s etc.
- 3.2.11 ABT meters (Main and plant take off point as well as at the substation as per CEA Metering Regulation 2006 as amended time to time and state metering code.
- 3.2.12 Data acquisition system with remote monitoring facilities with internet connectivity if needed.
- 3.2.13 Lightning protection for entire plant area.
- 3.2.14 PVC pipes, cable conduits, cable trays and accessories/trenches.
- 3.2.15 Earthing of the entire plant as per relevant standards.
- 3.2.16 Control room equipment related to solar system etc.
- 3.2.17 Testing, maintenance and monitoring of equipment.
- 3.2.18 Spares & consumables, as required or recommended, for 10 years O&M period.
- 3.2.19 CCTV cameras at Main Entrance and at Main Control room.
- 3.2.20 Fire protection system in buildings and fire extinguishers.
- 3.2.21 All safety gadgets during Construction and O&M period including but not limited to, rubber mats of appropriate grade, PPE, rubber gloves and shoes etc.
- 3.2.22 One Solar Observatory including testing facilities. The Solar Observatory with associated
 - systems shall include but not be limited to the following: Pyranometers for horizontal and tilted plane Ultrasonic Anemometer (wind speed and direction) Temperature Sensor Ambient and module surface Power source to the all sensors Data Logger Desktop and
 - Printer.
- 3.2.23 Construction of suitable infrastructures for power evacuation to near by 11 kV overhead line of Haldia Dock Complex, connecting Sub-station No. 4 with 33 kV main Sub-station of Haldia Dock Complex at Chiranjibpur, situated at around 7 KM away from the project site.

- 3.2.24 Design & underground laying of nearly 500 Meters of 11 kV cable, in between the plant and the above mentioned 11 kV overhead line, for evacuation of power generated.
- 3.2.25 Design of said (AC) capacity Grid Interactive Solar Power Plant and its associated civil, structural, electrical & mechanical auxiliary systems includes preparation of single line diagrams and installation drawings, manuals, electrical layouts, erection key diagrams, electrical and physical clearance diagrams, design calculations for Earth- mat, Bus Bar & Spacers indoor and outdoor lighting/ illumination etc. design memorandum, GTP and GA drawings for the major equipment, design basis & calculation sheets, and other relevant drawings and documents required for engineering of all facilities within the fencing to be provided under this contract, are covered under Bidders scope of work.
- 3.2.26 In addition to above, the Bidder is required to measure the Solar Radiation and other climatic conditions relevant to measure the plant performance. This is necessary to study Solar Level and Guaranteed Performance of the Solar Power Plant. The satellite based analysis is to be combined with direct ground based measurement equipment in order to achieve the necessary accuracy and level of detail in the assessment of solar levels and climatic conditions.
- 3.2.27 Estimation and determination of the plant generation on daily basis in form of look ahead scheduling of power output.
- 3.2.28 Any other equipment / material, not mentioned but essentially required to complete the said (AC) capacity Solar Power Plant in all respect.
- 3.3 During the O&M period, the Contractor shall keep the measured daily data at regular interval and provide the same to Employer in electronic form compatible in CSV format. The right to use the data shall remain with Employer.
- 3.4 Materials and accessories, which are necessary or usual for satisfactory and trouble-free operation and maintenance of the above equipment.
- 3.5 Availability of vehicles for O&M staff and for inspection by Employer as per requirement may be ensured, failing which Employer shall have full right for alternate arrangement at the risk & cost of contractor.
- 3.6 Bidders shall design suitable power evacuation system including design and construction of a suitable underground cabling infrastructure from power plant boundary to inject power from Solar Photovoltaic Power Plant to HDC's 11 kV overhead line.
- 3.7 The items of civil design and construction work shall include all works required for solar PV project and should be performed specifically with respect to following but not limited to:
- 3.7.1 Conducting contour survey of the total area identified for said (AC) capacity & complete soil investigation with bore hole details.
- 3.7.2 Earthwork for site grading, cutting, filling, levelling & compaction of land. The bidders shall judiciously decide on making the price-bid accordingly.
- 3.7.3 Construction and erection of perimeter fence/ boundary wall and main/ security gate(s) for entire area.
- 3.7.4 Construction of foundation for mounting structures for SPV panels.
- 3.7.5 Civil foundation work of transformers, switchgears, etc.
- 3.7.6 Construction of internal roads 3.5 m wide with 0.5m wide well compacted shoulders on each side with WBM base to carry safe and easy transportation of equipment and material at the project site during and after construction. Construction of Main Gate to Control room road of 3.5 m wide with 0.5m wide well compacted shoulders on each side with bitumen base for easy approach to control room.
- 3.7.7 Construction of Equipment room with necessary illumination system and finishing as

- required.
- 3.7.8 Office cum stores cum control room building with Supervisor room, pantry, wash room, conference room etc. along with requisite furniture, workstations, air conditioning, internal and external illumination, other equipment as per the specifications.
 - 3.7.9 Security cabin (s)/watch towers at strategic locations inside the boundary of the plant.
 - 3.7.10 A suitable arrangement of water shall be ensured to cater the day-to-day requirement of drinking water and permanent water supply for module cleaning and other needs of SPV power Plant during entire O&M period.
 - 3.7.11 Suitable Communication System for SCADA with remote monitoring capabilities including internet facilities if required.
 - 3.7.12 Construction of Storm water drainage & sewage network. Rain water harvesting system should also be explored to promote water conservation.
 - 3.7.13 Perimeter lighting: Fabrication, supply & erection along with required GI junction boxes, support, brackets and accessories as required.
 - 3.7.14 Galvanized steel rigid/ high density flexible conduits and their accessories and Hume pipes for crossings.
 - 3.7.15 Supply of ferrules, lugs, glands, terminal blocks, galvanized sheet steel junction boxes with powder coating paint for internal fixtures, cable fixing clamps, nuts and bolts etc. of appropriate sizes as required in the plant.
 - 3.7.16 Power Cables laying underground / over ground with proper cable tray arrangements
 - 3.7.17 Entire GI cable tray with proper support and accessories inside equipment room and control room building and other locations as required.
 - 3.7.18 Laying of 11 kV Underground cable for power evacuation from project site to nearby 11 kV overhead line of Haldia Dock Complex.
 - 3.8 Obtaining statutory approvals / clearances on behalf of the Employer from various Government Departments, in addition to Central/ State Electricity Authorities and including but not limited to, the following-
 - 3.8.1 Pollution control board clearance, if required
 - 3.8.2 Power Department, if required
 - 3.8.3 Forest Department, if required
 - 3.8.4 All other approvals, as necessary for setting up of a solar power plant including CEIG, connectivity, power evacuation, railways, PTCC etc. as per the suggested guidelines
 - 3.8.5 All other statutory approvals and permissions, not mentioned specifically but are required to carry out hassle free Construction and O&M of the plant prevailing at Site.
 - 3.9 The Bidder shall arrange deployment of qualified and suitable manpower and required necessary consumables & spares during commissioning.
 - 3.10 Construction Power & construction Water as required for construction and completion of this contract are to be arranged by the Bidder.
 - 3.11 Total Operation & Maintenance of Solar Photovoltaic Power Plant for the 10 **year's period** including deployment of engineering personnel, technicians and security personnel after the commissioning till final acceptance, during this period, the responsibility of O&M shall be with contractor.
 - 3.12 All approvals, equipment, item and works which are not specifically mentioned in this document but are required for completion of work including construction, commissioning, O&M of Solar PV Power Plant in every respect and for safe and efficient construction & erection, operation and guaranteed performance are included in the scope of this bid.

- 3.13 Submission of following documents, drawings, data design, and engineering information to Employer or its authorized representative for review and approval in hard copy and soft copy from time to time as per project schedule.
- 3.13.1 Contour plan and soil investigation data for the entire area
 - 3.13.2 GA drawings of the entire project including roads, drains, storm water drainage, sewage networks, equipment rooms, office cum control room, security gate, fire protection system etc.
 - 3.13.3 Design basis criteria along with relevant standards (list of standards and respective clause description only)
 - 3.13.4 Solar insolation data and basis for generation data.
 - 3.13.5 Design calculations and sheets.
 - 3.13.6 Detailed technical specifications of all the equipment.
 - 3.13.7 General arrangement and assembly drawings of all major equipment.
 - 3.13.8 Schematic diagram for entire electrical system.
 - 3.13.9 GTP & G.A. drawings for all types of structures/ components, 33kV switchgears & other interfacing panels.
 - 3.13.10 Relay setting charts.
 - 3.13.11 Quality assurance plans for manufacturing and field activities
 - 3.13.12 Detailed site EHS plan, fire safety & evacuation plan and disaster management plan.
 - 3.13.13 Detailed risk assessment and mitigation plan.
 - 3.13.14 Test reports (for type, acceptance, and routine tests).
 - 3.13.15 O&M Instruc and its drawings.
 - 3.13.16 As-built drawings / documents and deviation list from good for construction (GFC)
 - 3.13.17 O&M plans, schedules and operational manuals for all equipment etc. Daily/ Weekly site work progress report with catch-up plan(s), as necessary to monitor actual timelines of the project during construction period along with the real time snap shots during the time of construction.
 - 3.13.18 Weekly/ Monthly O&M reports after commissioning of the project.
- 3.14 All drawings shall be fully corrected to agree with the actual "as built" site conditions and submitted to Employer after commissioning of the project for record purpose. All as-built drawings must include the Good for Construction deviation list.
- 3.15 The contractor shall forward the following to Employer within two weeks from issue of LOI:
- 3.15.1 Schedule for various activities in the form of PERT Chart.
 - 3.15.2 Detailed engineering calculations, Design basis report and complete layout of the plant
 - 3.15.3 Equipment data sheets, Guaranteed technical particular of equipment and GA drawings of major equipment like, inverter, mounting structure and transformer.

- 3.16 Providing a detailed training plan for all operation, maintenance procedures, which shall after approval by Employer form the basis of the training program. The contractor, shall also provide training to nominated staff.
- 3.17 Employ and coordinate the training of contractors personnel who will be qualified and experienced to operate and monitor the facility and to coordinate operations of the facility with the grid system.
- 3.18 Establishing a system to maintain an inventory of spare parts, tools, equipment, consumables and other supplies required for the facility's hassle free operation.
- 3.19 Adequate and seamless insurance coverage during EPC and O&M period to cater all risks related to construction and O&M of plant to indemnify the Employer.
- 3.20 Maintain at the facility accurate and up-to-date operating logs, records and monthly reports regarding the Operation & Maintenance of facility.
- 3.21 Perform or contract for and oversee the performance of periodic overhauls or maintenance required for the facility in accordance with the recommendations of the original equipment manufacturer (OEM).
- 3.22 Procurement for spares parts, overhaul parts, tools, equipment, consumables, etc. required to operate and maintain the project in accordance with the prudent utility practices and having regarded to warranty recommendations during entire O&M period.
- 3.23 Handover the system to maintain an inventory of spare parts, tools, equipment, consumables with required details of recommended spares list with all associated information regarding replacement records, supplier details, tentative cost, storage details, specifications on the basis of replacement frequency and mean time between failures and mean time to restore at the culmination of penultimate year under O&M period.
- 3.24 Maintain and keep all administrative offices, roads, tool room, stores room, equipment, clean, green and in workable conditions.
- 3.25 Discharge obligations relating to retirement/ Superannuating benefits to employees or any other benefit accruing to them in the nature of compensation, profit in lieu / in addition to salary, etc. for the period of service with the contractor, irrespective continuance of employees with the project as employees of Contractor, after conclusion of O&M period.
- 3.26 Operation and Maintenance**
- 3.26.1 The contractor shall be entrusted to carry out the total O&M activities of the 1 MW (AC) Solar Photovoltaic Power Plant to the contractor for the 10 (ten) years after commissioning w.e.f. from the date of operational acceptance.
- 3.26.2 The Turnkey contractor shall be responsible for all the required activities for the successful running, committed energy generation & maintenance of the Solar Photovoltaic Power Plant covering:
- Deputation of qualified and experienced engineers and technicians
 - Deputation of Security personnel for the complete security of plant
 - Successful running of Solar Power Plant for committed energy generation.
 - Co-ordination with STU/SLDC/other statutory organizations as per the requirement on behalf of Employer for Joint Metering Report (JMR), furnishing generations schedules as per requirement, revising schedules as necessary and complying with grid requirements.
 - Monitoring, controlling, troubleshooting maintaining of logs & records, registers.
 - Supply of all spares, consumables and fixing / application as required.
 - Supply & use of consumables such as grease, oil etc. throughout the maintenance period as per recommendations of the equipment manufacturers.
 - Conducting periodical checking, testing, overhauling, preventive and corrective action.
 - General up keeping of all equipment, building, roads, Solar PV modules, inverter etc.

- Submission of periodical reports to Employer on the energy generation & operating conditions of the power plant.
 - Furnishing generation data monthly to Employer by 1st week of every month for the previous month to enable Employer raise commercial bills on consumers.
 - Periodic cleaning of solar modules as per the recommendations of OEM, Replacement of Modules, and other equipment as and when required.
- 3.26.3 Continuous monitoring the performance of the Solar Power Plant and regular underground cable, outdoor/indoor panels/ kiosks etc. are necessary for extracting and maintaining the maximum energy output from the Solar Power Plant.
- 3.26.4 Preventive and corrective O&M of the Solar Photovoltaic Power Plant including supply of spares, consumables, wear and tear, overhauling, replacement of damaged risks (Fire & allied perils, earth quake, terrorists, burglary and others) as required, for a period of 10 (Ten) years from the date of start of O&M of the project shall be carried out at fixed annual cost.
- 3.26.5 The period of Operation and Maintenance will be deemed to commence from the date of completion of performance demonstration/Operational acceptance and successively the complete Solar Photovoltaic Power Plant to be handed over to the O&M contractor for operation and maintenance of the same. O&M contract shall further be extended on the mutually agreed terms and conditions for the period of minimum 5 years.
- 3.26.6 All the equipment required for Testing, Commissioning and O&M for the healthy operation of the Plant must be calibrated, time to time, from the NABL accredited labs and the certificate of calibration must be provided prior to its deployment.

3.27 Operation and Performance Monitoring

- 3.27.1 Operation part consists of deputing necessary manpower necessary to operate the Solar Photovoltaic Power Plant at the full capacity. Operation procedures such as preparation to starting, running, routine operations with safety precautions, monitoring etc., operation of the complete system.
- 3.27.2 Daily work of the operation and maintenance in the Solar Photovoltaic Power Plant involves periodic cleaning of Modules, logging the voltage, current, power factor, power and energy output of the Plant at different levels. The operator shall also note down time/failures, interruption in supply and tripping of different relays, reason for such tripping, duration of such interruption etc. The other task of the operators is to check battery voltage-specific gravity and temperature. The operator shall record monthly energy output, down time, etc.

3.28 Maintenance

- 3.28.1 The contractor shall carry out the periodical/plant maintenance as given in the operations to achieve committed generation.
- 3.28.2 and other switchgears shall be carried out as a part of routine corrective & preventive maintenance. In order to meet the maintenance requirements stock of consumables are to be maintained as well as various spare as recommended by the manufacturer at least for 5 years to be kept for usage.
- 3.28.3 Maintenance of other major equipment involved in Solar Photovoltaic Power Plant are step up transformers, underground cable, indoor/ outdoor 33kV VCB kiosk, associated switchgears, other fixtures & components and metering panel. Particular care shall be taken for outdoor equipment to prevent corrosion. Cleaning of the insulators and applying Vaseline on insulators shall also be carried out at regular intervals. Earth resistivity of Plant as well as individual earth pit is to be measured and recorded every month. If the earth resistance is high suitable action is to be taken to bring down the same.
- 3.28.4 According to the recommendations stock of special tools and tackles shall be maintained switchgears and other major electrical equipment.

- 3.28.5 A maintenance record is to be maintained by the operator/engineer-in-charge to record the regular maintenance work carried out as well as any breakdown maintenance along with the date of maintenance reasons for the breakdowns steps have taken to attend the breakdown duration of the breakdown etc.
- 3.28.6 The Schedules will be drawn such that some of the jobs other than breakdown, which may require comparatively long stoppage of the Power Plant, shall be carried out preferably during the non-sunny days. An information shall be provided to Engineer-in-charge for such operation prior to start.
- 3.28.7 The Contractor shall deploy enough manpower at Solar Photovoltaic Power Plant site to carryout work instructions and preventive maintenance schedules as specified. The contractor shall keep at least one skilled and experienced supervisor at site on permanent basis to supervise the jobs that are being carried out at site.
- 3.28.8 The Contractor will attend to any breakdown jobs immediately for repair/replacement /adjustments and complete at the earliest working round the clock. During breakdowns (not attributable to normal wear and tear) at O&M period, the Contractor shall immediately report the accidents, if any, to the Engineer In-charge showing the circumstances under which it happened and the extent of damage and or injury caused.
- 3.28.9 The Contractor shall comply with the provision of all relevant acts of Central or State Governments including payment of Wages Act 1936, Minimum Wages Act 1948, Employer's Liability Act 1938, Workmen's Compensation Act 1923, Industrial Dispute Act 1947, Maturity Benefit Act 1961, Mines Act 1952, Employees State Insurance Act 1948, Contract Labour (Regulations & Abolishment) Act 1970, Electricity Act 2003, Grid Code, Metering Code, MNRE guidelines or any modification thereof or any other law relating whereto and rules made there under or amended from time to time.
- 3.28.10 The contractor shall at his own expense provide all amenities to his workmen as per applicable laws and rules.
- 3.28.11 The Contractor shall ensure that all safety measures are taken at the site to avoid accidents to his or his sub-contractor or Employer's Workmen.
- 3.28.12 If negligence / mal operation of the contractor's operator results in failure of equipment such equipment should be repaired replaced by contractor at free of cost.
- 3.28.13 If any jobs covered in O&M Scope as per O&M Plan are not carried out by the contractor during the O&M period, the Engineer-In-Charge can issue a notice to the Contractor. Repetition of such instances for more than 2 times a year may lead to the Termination of the O&M Contract by the Employer.

NOTE: (i) During Comprehensive O&M period of 10 years, the plant will have to be manned by the contractor **round the clock** by one Technician and one Helper.

- (ii) During comprehensive O&M period, as indicated at (i) above, Technician(s) and Helper(s) will have to be manned in the General Duty (i.e. from 08:00 hrs. to 17:00 Hrs. normally) to look after different maintenance activities as well as trouble shooting.
- (iii) One supervisor (Diploma in Electrical) will have to be manned in General duty, responsible for round the clock comprehensive O&M for 365 days.
- (iv) If required, to provide more as per requirement.

3.29 Quality Spares & Consumables

In order to ensure longevity and safety of the core equipment and optimum performance of the system the contractor should use only genuine spares of high quality standards.

3.30 Testing Equipment, Tools and Tackles

The Contractor shall arrange for all the necessary testing equipment, tools and tackles for

carrying out all the construction, operation and maintenance work covered under this contract. All the instruments are required to be calibrated from NABL accredited lab before put in use. The certificate of the same shall be submitted to Employer for verification.

3.31 Security services

The contractor has to arrange proper security system including deputation of security personnel at his own cost for the check vigil for the Solar Power Plant. The security staff may be organized to work on suitable shift system; proper checking & recording of all incoming & outgoing materials vehicles shall be maintained. Any occurrence of unlawful activities shall be informed to Employer immediately. A monthly report shall be sent to Employer on the security aspects.

D. Technical Specification of Solar power plant

4. Bill of Material:

The equipment and material for said (AC) capacity Grid Interactive Solar Photovoltaic Power Plant with associate system (typical) shall include, but not limited to the following:

Item Details	Unit
PV Modules	Nos.
Module Mounting Structures including fasteners and clamps	Set
Main Junction Boxes with monitoring capabilities	Lot
Solar module array to Junction box Interconnection cable (Cu)	RM
Junction box to Inverter Interconnection Cable (Cu/ Al)	RM
Connection accessories – lugs, ferrules, glands, terminations etc.	Lot
AC Cable (LT/ HT) of appropriate sizes	RM
Power Conditioning Units/ Inverters	Nos.
Meteorological station with sensors and data logger	Lot
String level monitoring system (SCADA) and ancillaries	Set
Transformers (Power and Auxiliary)	Set
Circuit breakers, CT and PT (at 11 kV) set	Set
11 kV Indoor/ outdoor interfacing panels with CT, VCB, PT, Relays etc.	Set
11 kV XLPE Outgoing feeder cable and supports	Set
11 kV outdoor bay complete in all respect	Lot
AC & DC distribution panels/ boards, PDB, LDB etc.	Lot
Control and Relay Panel	Lot
Lightning Arresters of suitable ratings	Nos.
Earth mat for switch yard, DC field array and equipment	Lot
Control and power cables	Lot
Surge Protection devices and Fuses	Set
Earth cables, flats and earthing pits	Lot
Equipment and Control cum office Building with associated equipment	Lot
Rubber Mats for specific kV ratings and safety gadgets, PPE	Lot
Fire extinguisher - Foam type, CO2 type, ABC type etc., as applicable	Lot
Sand Buckets	Lot
Discharge Rods	Lot
Cable for power evacuation with suitable H poles, towers etc.	Lot
Power efficient peripheral lighting arrangement for the plant safety	Nos.
Fire Alarm system and signboards in buildings	Lot
Metering Equipment (Meters, and associated CT and PT's)	Set

Protection Equipment	Set
Solar Observatory with remote monitoring assistance	Set
Module cleaning system	Lot
CCTV cameras	Lot
Danger sign plates, anti-climbing, bird protection etc.	Lot

All the information shown here is indicative only and may vary as per design and planning by the bidder. The bidder must provide the BOM of the plant as per the design during the time of bidding. The technical features of major equipment are described hereunder.

5. Photovoltaic Modules

Total capacity of PV Modules to be supplied for the 1 MW (AC) project is minimum of 1.1 MWp which is the cumulative rated capacity of all solar PV module under supply as per relevant IEC standards under Standard Temperature Condition (STC). The Project shall consist of Mono/poly-crystalline silicon photovoltaic modules as per the specifications given below:

- 5.1 The solar photovoltaic modules with efficiency more than 16% for multi-crystalline, 18% for mono-crystalline silicon based modules with positive tolerance only.
- 5.2 The glass used to make the crystalline silicon modules shall be toughened low iron glass with minimum thickness of 4.0 mm for 72 cell module and 3.2 mm for 60 cell module. The glass used shall have transmittance of above 90% and with bending of less than 0.3% to meet the specifications.
- 5.3 The back sheet used in the crystalline silicon based modules shall be of 3 layered structure. Outer layer of fluoropolymer, middle layer of Polyester (PET) based and Inner layer of fluoropolymer or UV resistant polymer. Back sheet with additional layer of Aluminium also will be considered. The thickness of back sheet should be of minimum 300 microns with water vapour transmission rate less than 3g/m²/day. The Back sheet shall have voltage tolerance of more than 1000 V.
- 5.4 The EVA used for the modules should be of UV resistant in nature. No yellowing of the back sheet with prolonged exposure shall occur.
- 5.5 The sealant used for edge sealing of PV modules shall have excellent moisture ingress protection with good electrical insulation (Break down voltage >15 kV/mm) and with good adhesion strength.
- 5.6 The junction box used in the modules shall have protective bypass diodes to prevent hot spots in case of cell mismatch or shading. The material used for junction box shall be made with UV resistant material to avoid degradation during module life and the Junction sealing shall comply IP65 degree of protection.

- 5.7 The crystalline silicon based modules supplied should be of Potential Induced Degradation (PID) free modules and the test certificate from third party lab complying with the same shall be provided.
- 5.8 The rated output of the modules shall have positive tolerance of +5W and no negative tolerance is allowed.
- 5.9 Modules should have rugged design to withstand tough environmental conditions and high wind speeds (as per relevant Indian Standard Specifications).
- 5.10 Modules shall perform satisfactorily in relative humidity up to 95% and temperature between -10°C and 85°C (module temperature).
- 5.11 PV modules must be warranted for their output peak watt capacity, which should not be less than 90% of the initial value at the end of 10 years and 80% of the initial value at the end of 25 years.
- 5.12 The modules shall be warranted for minimum of 10 years against all material/ manufacturing defects and workmanship.
- 5.13 All modules shall be certified
- IEC 61215 2nd Ed. (Design qualification and type approval for Crystalline Si modules),
 - IEC 61730 (PV module safety qualification testing @ 1000 V DC or higher)
 - IEC 61701: Salt Spray test for highly corrosive environment, if applicable
 - IEC 62716: Ammonia Resistant certified, if applicable
 - Test certificate from NABL approved or /ILAC member body certified labs shall be provided.
- 5.14 Not used.
- 5.15 The developer shall arrange for the details of the materials along with specifications sheets of from the manufacturers of the various components used in solar modules along with those used in the modules sent for certification. The Bill of materials (BOM) used for modules shall not differ in any case from the ones submitted for certification of modules.
- 5.16 The I-V characteristics of all modules as per specifications to be used in the systems are required to be submitted at the time of supply.
- 5.17 The Contractor would be required to maintain accessibility to the list of module IDs along with the parametric data for each module.
- 5.18 The temperature co-efficient of power for the modules shall not be more than 0.45% / °C.
- 5.19 The module mismatch of the modules connected to an inverter should be less than 2%.
- 5.20 SPV module shall have module safety class-II and should be highly reliable, light weight and must have a service life of more than 25 years.
- 5.21 The module frame shall be made of anodized Aluminium or corrosion resistant material,

which shall be electrically compatible with the structural material used for mounting the modules. In case of metal frames for modules, it is required to have provision for earthing to connect it to the earthing grid.

- 5.22 All materials used for manufacturing solar PV module shall have a proven history of reliability and stable operation in external applications. Module shall perform satisfactorily in relative humidity up to 95% with ambient temperature between -10°C to +50°C. The material shall withstand adverse climatic conditions, such as high speed wind, blow with dust, sand particles, and saline climatic / soil conditions and for wind speed of 150 km/hr.
- 5.23 Modules only with the same rating and manufacturer shall be connected to any single inverter.
- 5.24 Bidder shall provide data sheet for Solar PV Module (Under STC) along with their offer as per Guarantee Technical Particular Data Sheet- 1. Also, the bidder must provide the commercial data sheet indicating the exact power of the module, if the data sheet consists of a range of modules with varying output power.
- 5.25 The Employer or its authorized representative reserves the right to inspect the modules at the manufacturer's site prior to dispatch.
- 5.26 The Bidder is advised to check and ensure the availability of complete capacity of modules prior to submitting the NIT document.
- 5.27 Entire drawings, detailed test & flash reports and compliance certificates of the offered modules should be submitted for approval of Employer within 15 days from the date of placement of order and supply should start thereafter.

6. PV Array Configurations

The Solar array shall be configured in multiple numbers of sub-arrays, providing optimum DC power to auditable number of sub arrays. The bidder shall submit their own design indicating configuration of PCU and respective sub arrays and associated bill of material.

6.1 Module Mounting Structure:

- 6.1.1 The structure design shall be appropriate and innovative. It must follow the existing land profile.
- 6.1.2 The structure shall be designed to allow easy replacement of any module and shall be in line with the site requirements.
- 6.1.3 Design drawings with material selected and their standards shall be submitted for prior approval of Employer within 14 days of NTP.
- 6.1.4 The support structure design & foundation shall be designed with reference to the

existing soil conditions in order to withstand wind speed applicable for the zone (Site Location) or 150kmph, whichever is higher, using relevant Indian wind load codes. The structures and foundations shall also conform to the seismic conditions pertaining to the zone using relevant Standards and codes.

- 6.1.5 The structure must be designed with considering appropriate factor of safety. The bidder must provide the detail design and calculation for the structure design.
- 6.1.6 The structure shall be designed for simple mechanical and electrical installation. It shall support SPV modules at a given orientation & tilt, absorb and transfer the mechanical loads to the ground properly. Welding of structure at site shall not be allowed.
- 6.1.7 The array structure shall be made of mild steel members of suitable sizes with weather protection coating. The coating shall be as per ASTM A792/ A792M-10 standard Al– Zn alloy with hot dip process and thickness of 150GSM on both sides. It is to ensure that before application of this coating, the steel surface shall be thoroughly cleaned of any paint, grease, rust, scale, acid or alkali or such foreign material as are likely to interfere with the coating process. The bidder should ensure that inner side should also be coated.
- 6.1.8 The array structure shall be so designed that it will occupy minimum space without sacrificing the output from SPV panels at the same time.
- 6.1.9 Nut & bolts, washers (packing and spring) supporting structures including Module Mounting Structures shall have to be adequately protected from atmosphere and weather prevailing in the area.
- 6.1.10 Two numbers of anti-theft fasteners of stainless steel on two diagonally opposite corners for each module shall be provided. All the fasteners and washers for Module Mounting Structures and modules, shall be adequately protected from atmosphere and weather prevailing in the area. Fasteners and washers to be used for erection of mounting structures could be of SS 304/ UNS S 20430 or equivalent, however fasteners used for fixing modules over structures shall be of stainless steel of grade SS 316 or equivalent, and must sustain the adverse climatic conditions to ensure the life of structure for 25 years.
- 6.1.11 Modules shall be clamped & bolted with the structure properly. The material of clamps shall be Al / Steel having weather resistant properties. Clamp – bolt shall use EPDM rubber and shall be designed in such a way so as not to cast any shadow on the active part of a module.
- 6.1.12 The array structure shall be grounded properly using maintenance free earthing kit.
- 6.1.13 The bidder/manufacturer shall specify installation details of the PV modules and the support structures with appropriate diagram and drawings.
- 6.1.14 The Bidder should design the structure height considering highest flood level at the site. The minimum clearance between the lower edge of the module and the ground shall be

the higher of (i) accessed highest flood level at the site and (ii) 500 mm.

- 6.1.15 For multiple module mounting structures located in a single row, the alignment of all modules shall be within an error limit of maximum 10mm.
- 6.1.16 Civil foundation design for Module Mounting Structures (MMS) as well as control room, equipment room and power equipment shall be made in accordance with the Indian Standard Codes and prevailing soil conditions. The Successful Bidder shall submit the detailed foundation & structural design analysis along with calculations and basis/ standards in the Bid duly certified by a Chartered Structural Engineer having substantial experience in similar work.
- 6.1.17 Cable should pass from Pipes and Cable-ties shall be used to hold and guide the Pipes (cables/wires) from the modules to junction boxes or inverters. All the cables were aesthetically tied to module mounting structure.
- 6.1.18 In case the string monitoring unit (SMU or JB) is mounted on the module mounting structure, bidder to take into consideration of the load thus added on the MMS. Accordingly, suitable supporting members for mounting the SMU/ JB must be designed and supplied. Separate structure for mounting of SMU can also be proposed.
- 6.1.19 Bidder must submit the complete quality documents i.e. test certificates for all tests conducted starting from raw material stage, in process, final testing w.r.t structure.
- 6.1.20 Every major Component of the Plant should be suitably named/ numbered & marked for ease of traceability, identification and maintenance.

6.2 Junction Box/ Combiner Box:

- 6.2.1 All junction/ combiner boxes including the string junction box, array junction box and main junction box/ combiner box should be equipped with appropriate functionality, safety (including fuses, grounding, contacts etc.) and protection.
- 6.2.2 The terminals will be connected to copper bus-bar arrangement of proper sizes to be provided. The junction boxes will have suitable cable entry points fitted with cable glands of appropriate sizes for both incoming and outgoing cables. Suitable markings shall be provided on the bus-bars for easy identification and UV resistant cable ferrules will be fitted at the cable termination points for identification.
- 6.2.3 The Junction Boxes shall have suitable arrangement for the followings:
- Strings are required to be connected to the bus bar through individual fuses. However, if keeping the losses within the specified limit.
 - Provide arrangement for disconnection for each of the groups.
 - Provide a test point for each sub-group for quick fault location and to provide group array isolation.
 - SCADA Communication device with all necessary equipment for communicating with main SCADA Server.

- Suitable space for workability and natural cooling.
- Provision of adequate number of spare terminals.

- 6.2.4 The rating of all component of JB's shall be suitable with adequate factor of safety to inter connect the Solar PV array.
- 6.2.5 The junction boxes shall be dust, vermin, and waterproof and made of thermoplastic/ metallic in compliance with IEC 62208, which should be sunlight/ UV resistive as well as fire retardant & must have minimum protection to IP65 (Outdoor) and Protection Class II.
- 6.2.6 The Array Junction Box will also have suitable surge protection. In addition, over voltage protection shall be provided between positive and negative conductor and earth ground such as Surge Protection Device (SPD). The maintenance free earthing shall be done as per the relevant standards.
- 6.2.7 If the solar PV module is not equipped with reverse blocking diode, than each Array Junction Box will have suitable Reverse Blocking Diodes of maximum DC blocking voltage of 1000V with suitable arrangement for its connecting. The bypass & reverse blocking diodes should work for temperature extremes and should have efficiency of 99.98%, confirmed by appropriate IEC standards.
- 6.2.8 Adequate capacity solar DC fuses & isolating miniature circuit breakers should be provided in recommendation with the inverter manufacturer. The fuses should be so designed that it should protect the modules from the reverse current overload.
- 6.2.9 Details of junction box specifications and data sheet, including all components, shall be provided with the Bid document.
- 6.2.10 Bidder shall submit all the test reports/ test certificates and compliance certificates before installation at site.

6.3 Power Conditioning Unit (PCU)

- 6.3.1 Power Conditioning Unit (PCU)/ Inverter shall consist of an electronic inverter along with associated control, protection and data logging devices.
- 6.3.2 **The rated power/name plate capacity of the inverters shall be the AC output of the inverter at 50°C.** Any inverters with AC output at 50°C, below the name plate/rated power of the inverter shall not be allowed.
- 6.3.3 **The inverter supplied shall have minimum of 10% additional DC input Capacity. (E.g. Inverter is supplied with rated capacity of 500 kW (AC) shall accept at least 550 kW of DC power.)**

- 6.3.4 All PCUs should consist of associated control, protection and data logging devices and remote monitoring hardware and compatible with software used for string level monitoring.
- 6.3.5 Dimension, weight, cooling arrangement etc. of the PCU shall be indicated by the Bidder in the offer. Type (in- door & out-door) of installation also to be indicated.
- 6.3.6 Only those PCUs/ Inverters which are commissioned for more than said (AC) capacity solar PV projects till date in India shall be considered for this project. Bidder has to provide sufficient information to the satisfaction of the Employer before placing the final order for PCUs/Inverters.
- 6.3.7 The minimum European efficiency of the inverter shall be 98% load as per IEC 61683 standard for measuring efficiency. The Bidder shall specify the conversion efficiency of different loads i.e. 25%, 50%, 75% and 100% in its offer. The Bidder should specify the overload capacity in the bid.
- 6.3.8 The PCU shall be tropicalized and design shall be compatible with conditions prevailing at site. Provision of exhaust fan with proper ducting for cooling of PCUs should be incorporated in the PCUs, keeping in mind the extreme climatic condition of the site as per the recommendations of OEM to achieve desired performance and life expectancy.
- 6.3.9 The inverters shall have minimum protection to IP 65(Outdoor)/IP 21(indoor) and Protection Class II.
- 6.3.10 Nuts & bolts and the PCU enclosure shall have to be adequately protected taking into consideration the atmosphere and weather prevailing in the area.
- 6.3.11 Grid Connectivity: Relevant CERC regulations and grid code as amended and revised from time to time shall be complied. The system shall incorporate a unidirectional inverter and should be designed to supply the AC power to the grid at load end. The power conditioning unit shall adjust the voltage & frequency levels to suit the Grid.
- 6.3.12 All three phases shall be supervised with respect to rise/fall in programmable threshold values of frequency.
- 6.3.13 The inverter output shall always follow the grid in terms of voltage and frequency. This shall be achieved by sensing the grid voltage and phase and feeding this information to the feedback loop of the inverter. Thus control variable then controls the output voltage and frequency of the inverter, so that inverter is always synchronized with the grid. The inverter shall be self- commutated with Pulse width modulation (PWM) technology.

6.4 Operational Requirements for Inverter/ PCU

- 6.4.1 The PCU must have the feature to work in tandem with other similar PCU's and be able to be successively switched "ON" and "OFF" automatically based on solar radiation variations during the day. Inverters must operate in synergy and intelligently to optimize

the generation at all times with minimum losses.

- 6.4.2 The PCU shall be capable of controlling power factor dynamically.
- 6.4.3 Maximum power point tracker (MPPT) shall be integrated in the power conditioner unit to maximize energy drawn from the Solar PV array. The MPPT should be microprocessor based to minimize power losses. The details of working mechanism of MPPT shall be mentioned by the Bidder in its offer. The MPPT unit shall confirm to IEC 62093 for design qualification.
- 6.4.4 The system shall automatically 'wake up' in the morning and begin to export power provided there is sufficient solar energy and the grid voltage & frequency are in range.
- 6.4.5 **Sleep Mode:** Automatic sleep mode shall be provided so that unnecessary losses are minimized at night. The power conditioner must also automatically re-enter standby mode when threshold of standby mode reached.
- 6.4.6 **Stand – By Mode:** The control system shall continuously monitor the output of the solar power plant until pre-set value is exceeded & that value to be indicated.
- 6.4.7 **Basic System Operation (Full Auto Mode):** The control system shall continuously monitor the output of the solar power plant until pre-set value is exceeded & that value to be indicated.
- 6.4.8 PCU shall have provisions/features to allow interfacing with monitoring software and hardware devices.

6.5 Protection against faults for PCU

The PCU shall include appropriate self-protective and self-diagnostic feature to protect itself and the PV array from damage in the event of PCU component failure or from parameters **beyond the PCU's safe operating range due to internal or external causes**. The self-protective features shall not allow signals from the PCU front panel to cause the PCU to be operated in a manner which may be unsafe or damaging.

Faults due to malfunctioning within the PCU, including commutation failure, shall be cleared by the PCU protective devices. In addition, it shall have following minimum protection against various possible faults.

- 6.5.1 **Grounding Leakage Faults:** The PCU shall have the required protection arrangements against grounding leakage faults.
- 6.5.2 **Over Voltage & Current:** In addition, over voltage protection shall be provided between positive and negative conductor and earth ground such as Surge Protection Devices (SPD).
- 6.5.3 **Galvanic Isolation:** The PCU inverter shall have provision for galvanic isolation with external transformer, if required.
- 6.5.4 **Anti-islanding** (Protection against Islanding of grid): The PCU shall have anti islanding

protection. (IEEE 1547/UL 1741/ equivalent BIS standard)

- 6.5.5 **Unequal Phases:** The system shall tend to balance unequal phase voltage (with 3-phase systems).
- 6.5.6 **Reactive Power:** The output power factor of the PCU should be of suitable range to supply or sink reactive power. The PCU shall have internal protection arrangement against any sustained fault in the feeder line and against lightning in the feeder line.
- 6.5.7 **Isolation:** The PCU shall have provision for input & output isolation. Each solid-state electronic device shall have to be protected to ensure long life as well as smooth functioning of the PCU.
- 6.5.8 PCU shall have arrangement for adjusting DC input current and should trip against sustainable fault downstream and shall not start till the fault is rectified.
- 6.5.9 Each solid state electronic device shall have to be protected to ensure long life of the inverter as well as smooth functioning of the inverter.
- 6.5.10 All inverters/ PCUs shall be three phase using static solid state components. DC lines shall have suitably rated isolators to allow safe start up and shut down of the system. Fuses & Circuit breakers used in the DC lines must be rated suitably.

6.6 Standards & Compliances

- 6.6.1 PCU shall confirm to the following standards and appropriately certified by the labs:
- Efficiency measurement: IEC 61683
 - Environmental Testing: IEC 60068-2 or IEC 62093
 - EMC, harmonics, etc.: IEC 61000 series, 6-2, 6-4 and other relevant Standards.
 - Electrical safety: IEC 62109 (1&2), EN 50178 or equivalent
 - Recommended practice for PV – Utility interconnections: IEEE standard 929 – 2000 or equivalent
 - Protection against islanding of grid: IEEE1547/ UL1741/ IEC 62116 or equivalent
 - Grid Connectivity: Relevant CEA/ CERC regulation and grid code (amended up to date)
 - Reliability test standard: IEC 62093 or equivalent
- 6.6.2 The Bidder should select the inverter (Central) as per its own system design so as to optimize the power output.
- 6.6.3 Desired Technical Specifications of PCU.
- Sinusoidal current modulation with excellent dynamic response.
 - Compact and weather proof housing (indoor/ outdoor)
 - Comprehensive network management functions (including the LVRT and capability to inject reactive power to the grid)

- Total Harmonic Distortion (THD) <3%
- No load loss < 1% of rated power and maximum loss in sleep mode shall be less than 0.05%
- Optional VAR control
- Power factor Control range: 0.9 (lead – lag)
- Humidity: 95% Non – Condensing
- Unit wise & integrated Data logging
- Dedicated Prefabs / Ethernet for networking

6.6.4 Inverter/ Power Condition unit must provide protection against:

- Over current
- Sync loss
- Over temperature
- DC bus over voltage
- Cooling Fan failure (If provided)
- Short circuit
- Lightning
- Earth fault
- Surge voltage induced at output due to external source
- Power regulation in the event of thermal overloading
- Set point pre-selection for VAR control
- Bus communication via -interface for integration
- Remote control via telephone modem or mini web server
- Integrated protection in the DC and three phase system
- Insulation monitoring of the PV array with sequential fault location

6.6.5 Ground fault detector which is essential for large PV generators in view of appreciable discharge current with respect to ground.

6.6.6 Over voltage protection against atmospheric lightning discharge to the PV array is required.

6.6.7 The power conditioner must be entirely self-managing and stable in operation.

6.6.8 A self-diagnostic system check should occur on start up. Functions should include a test of key parameters on start up.

6.6.9 PCU/inverter front panel shall be provided with display (LCD or equivalent) to monitor, but not limited to, the following:

- DC power input
-

• 1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust.

DC input voltage

DC Current

- AC power output
- AC voltage (all the 3 phases and line)
- AC current (all the 3 phases and line)
- Power Factor

6.6.10 Documentary Requirements & Inspection

- The bill of materials associated with PCU's should be clearly indicated while delivering the equipment.
- The Contractor shall provide to the Employer, data sheet containing detailed technical specifications of all the inverters and PCUs, Type test reports and Operation & Maintenance manual before dispatch of PCUs.
- The Employer or its authorized representative reserves the right to inspect the PCUs/ Inverters at the manufacturer's site prior to dispatch.

6.7 Cable and Wires

- 6.7.1 All cables and connectors for use for installation of solar field must be of solar grade which can withstand harsh environment conditions including High temperatures, UV radiation, rain, humidity, dirt, salt, burial and attack by moss and microbes for 25 years and voltages as per latest IEC standards. (Note: DC cables for outdoor installations should comply with the TUV 2PFG 1169/09.07 for service life expectancy of 25 years)
- 6.7.2 Insulation: Outer sheath of cables shall be electron beam cross-linked XLPO type and black in colour. In addition, Cable drum no. / Batch no. to be embossed/ printed at every one meter. Cable Jacket should also be electron beam cross-linked XLPO, flame retardant, UV resistant and black in colour.
- 6.7.3 DC cables used from solar modules to array junction box shall be solar grade copper (Cu) with XLPO insulation and rated for 1.1kV only. However, the cables used from array junction box to inverter can be XLPO Aluminium with 1.1kV rating as per relevant standards. Bidder shall provide the type test report for each type of cable used before dispatch of the cable.
- 6.7.4 Wires with sufficient ampacity and parameters shall be designed and used so that maximum voltage-drop at full power from the PV modules to inverter should be less than 1.5% (including diode voltage drop). Successful Bidder shall provide voltage drop calculations in excel sheet.
- 6.7.5 Only terminal cable joints shall be accepted. No cable joint to join two cable ends shall be accepted. All wires used on the LT side shall conform to IS and should be of

appropriate voltage grade. Only copper conductor wires compliant with IEC 60228, Class 5 of reputed make shall be used.

- 6.7.6 All high voltage cables connecting the main junction box/inverters to the transformers should be XLP insulated grade conforming to IS 1554 and cables shall also conform to IEC 60189 for test and measuring the methods. The Underground Cable should be XLPE only.
- 6.7.7 Cable terminations shall be made with suitable cable lugs & sockets etc., crimped properly and passed through brass compression type cable glands at the entry & exit point of the cubicles.
- 6.7.8 All cable/wires shall be provided with UV resistant printed ferrules for DC side however, for HT cables, punched/ embossed aluminium tags are required. The marking on tags shall be done with good quality letter and number ferrules of proper sizes so that the cables can be identified easily.
- 6.7.9 The wiring for modules interconnection could be in the weather resistant pipe of reputed make. All the buried cables can be run through HD pipe/ DWC conduit. However, for crossing with road, drain and trenches etc., the cable must pass through GI pipe of appropriate size.

6.8 Switchboard box / DC Distribution Box (DCDB) / AC Distribution Box (ACDB) panels

- 6.8.1 Successful Bidder shall provide sufficient no. of switchboards / DCDB / ACDB wherever required.
- 6.8.2 All boxes/ panels should be equipped with appropriate functionality, safety (including fuses, grounding, etc.) and protection.
- 6.8.3 The terminals will be connected to bus-bar arrangement of proper sizes to be provided. The panels/ boxes will have suitable cable entry points fitted with cable glands of appropriate sizes for both incoming and outgoing cables.
- 6.8.4 Adequate rating fuses & isolating MCB/ MCCB should be provided.
- 6.8.5 The panels/ boxes shall have suitable arrangement for the followings:
 - Provide arrangement for disconnection
 - Provide a test point for quick fault location
 - To provide isolation
 - The current carrying rating of the boxes/ panels shall be suitable with adequate safety factor
 - The rating of the boxes/ panels shall be suitable with adequate safety factor to inter connect to the local/ internal grid
 - Thermal/ heat dissipation arrangement/ Vent for safe operation.
 - Adequate number of spare terminals

- 6.8.6 The boxes/ panels shall be dust, vermin, and waterproof and made of thermoplastic/ metallic in compliance with IEC 62208, which should be sunlight/ UV resistive as well as fire retardant & must have minimum protection to IP 65(Outdoor)/ IP 20(indoor) and Protection Class II.
- 6.8.7 All panels/ boxes shall be provided with adequately rated bus-bar, incoming control, outgoing control etc. as a separate compartment inside the panel to meet the requirements of the Chief Electrical Inspector General (CEIG). All live terminals and bus bars shall be shrouded. The outgoing terminals shall be suitable to receive suitable runs and size of cables required for the Inverter/Transformer rating.
- 6.8.8 The boxes/ panels must be grounded properly to ensure all safety related measures for safe operation. The parts of panel, wherever applicable, must be insulated properly.
- 6.8.9 All the Panels to be manufactured with sufficient space for working and must have temperature suitability up to 85° C with separate cable and bus bar alley.

6.9 Lightning Protection for PV Array

- 6.9.1 The source of over voltage can be lightning or other atmospheric disturbance. Main aim of over voltage protection is to reduce the over voltage to a safe level before it reaches the PV or other sub-system components as per NFC 17 – 102. Bidder to provide ESE type lightning arrester, placed at strategic locations to protect the plant from lightning and shall not cause any shadow on the solar modules.
- 6.9.2 Necessary foundation / anchoring for holding the lightning conductor in position to be made after giving due consideration to shadow on PV array, maximum wind speed and maintenance requirement at site in future.
- 6.9.3 The site is prone to lightning strikes and hence bidder is suggested to take utmost care while designing the lightning protection system. The Bidder shall submit the drawings, calculations and detailed specifications of the PV array lightning protection equipment to Employer for approval before installation of system.
- 6.9.4 The lightning conductor shall be earthed through flats and connected to the grounding mats as per applicable Indian Standards with earth pits. Three earth pits shall be provided for each lightning arrester. Each lightning conductor shall be fitted with individual earth pit as per required Standards including accessories, and providing masonry enclosure with cast iron cover plate having locking arrangement, watering pipe using charcoal or coke and salt as required as per provisions of IS.

6.10 Solar Photovoltaic Power Plant Electrical System

The technical requirements of design & engineering, testing at works, supply, installation testing & commissioning of all electrical equipment required for the Solar Photovoltaic Power

Plant starting from the local control panel of Plant and up to the Grid tie up with the State grid including all control protection, metering equipment, step up generator voltage transform, 11 kV indoor/ outdoor switchgears and balance of equipment complete in all respect shall be of high standard and quality meeting the requirement of respective Indian standard (following table). All the type test reports along with Material Despatch Clearance Certificate (MDCC) for all equipment and cables are to be submitted by the Contractor prior to the despatch of the same. Bidder has to provide the type test report for all the equipment used under this contract. If the equipment is not type tested, the bidder has to ensure conduction of such test and supply the type test to the Employer without any additional cost.

The brief particulars and requirement of equipment is as under–

IS/ IEC Reference	Specification
IEC-298	A.C. Metal enclosed and control gear for rated voltages above 1KV and including 72.5KV
IS-3427	A.C. Metal enclosed and control gear for rated voltages above 1KV and including 52KV.
IS-8623	Specification for Low Voltage Switchgear and Control gear assemblies.
IS-13118/ IEC-56	Specification for High Voltage AC Circuit Breakers.
IEC-529	Degrees of Protection.
IS-5578 & 11353	Making and arrangement for switchgear bus bar main connections and auxiliary wiring.
IS-325	Specification for 3 Phase Induction motors.
IS-2629	Recommended practice for not dip galvanizing of iron and steel.
IEC-137	Bushing for AC Voltages.
IS-3347	Porcelain Transformer Bushings.
IS-5561	Terminal Connectors
IS-3156	Voltage Transformers
IS-2705	Current Transformers
IS-3231	Electric relays for power protection.
IS-13010	Watt hour meters
IS-13779	Static Energy Meters
IS-8686	Static Protection Relays
IS-1248	Electrical measuring instruments
IS-2099	High Voltage Porcelain Bushings.
IS-10118	Minimum clearances for Outdoor Switchgear.
IEC-694	Common Clauses for High Voltage Switchgear and Control gear
IEC-60255 & IEC-61330	Numerical Relays

6.11 Step-Up Transformer

- 6.11.1 The transformer shall be copper wound, 3 phase, natural cooled, core type construction, and oil immersed and shall be suitable for outdoor applications.

- 6.11.2 The Bidder shall provide the complete turnkey design, supply, erection, testing and commissioning of transformers and transformer substation to step-up the output of the inverter to 11 kV at the location of the inverter. The power from different inverter rooms shall be collected at a common location from where it shall be transmitted to the near by 11 kV overhead line through underground cable. However, the detailed scheme of design lies with the bidder and must submit the same to Employer for approval prior to construction.
- 6.11.3 Power Transformers utilized shall be 3 phase, Oil Filled, 11 kV, 50 Hz and associated Switchgear of approved make. RTCC panel, as per design, will be provided in control room. It is recommended to have standard ratings of transformer used. Bidder is to provide the type test reports for the transformer (s) used. The vector group of transformer (s) must be in line with the system requirement and follow the prevailing grid codes at the location of Site.
- 6.11.4 All the transformers shall be suitable for outdoor installation with 3 phase 50Hz in which the neutral is effectively earthed and they should be suitable for service under fluctuations in supply voltage up to plus 10% to minus 15%.
- 6.11.5 General requirement for the transformers shall be as per below:

Standards	Relevance
IS: 2026 (Part 1 to 4)	Specifications for Power Transformer
IS: 2099	Bushings for alternating voltage above 1000 V
IS: 3639	Fittings and accessories for power transformer
IEC: 60076 (Part 1 to 5)	Specifications for Power Transformer
IS: 9921 Part 1 to 5	Alternating currents dis connectors (isolators) and earthing switches rating, design, construction, tests etc.
IS: 2705 Part 1 to 4 & IEC: 185	Current transformer
IS: 3156 Part 1 to 4	Voltage Transformer
IS: 3070 part 1 to 3	Lightning arrestors
IS: 2544	Porcelain insulators for system above 1000 V
IS: 5350	Part III – post insulator units for systems greater than 1000V
IS: 5621	Hollow Insulators for use in electrical equipment
IS: 5556	Serrated lock washers – specification

6.12 General Standards

- 6.12.1 The equipment and accessories covered by this specification shall be designed, manufactured and tested in accordance with the latest relevant standards and codes of practice published by the relevant Indian Standards (IS) as applicable.

- 6.12.2 All electrical equipment and installation shall confirm to the latest Indian Electricity Rules as regards safety, earthing and other essential provisions specified for installation and operation of electrical plants. Relevant national and international standards in this connection can be followed in order to improve the efficiency and safe operations.
- 6.12.3 All working parts, insofar as possible, are to be arranged for convenience of operation, inspection, lubrication and ease of replacement with minimum downtime. All parts of equipment or of spare equipment offered shall be interchangeable.
- 6.12.4 The quality of materials of construction and the workmanship of the finished products / components shall be in accordance with the highest standard and practices adopted for the equipment covered by the specification.
- 6.12.5 All items of equipment and materials shall be thoroughly cleaned and painted in accordance with relevant Indian Standards. The finish paint shall be done with two coats of epoxy based final paint of colour Shade RAL 7032 of IS: 5 for indoor equipment.
- 6.12.6 Any fitting or accessories which may not have been specifically mentioned in the specification but which are usual or necessary in the equipment of similar plant or for efficient working of the plant shall be deemed to be included in the contract and shall be provided by the Contractor without extra charges. All plant and apparatus shall be complete in all details whether such details are mentioned in the specifications or not.
- 6.12.7 All equipment shall be designed for operation in tropical humid climate at the required capacity. The reference parameters for which the transformers are to be designed are as under:-

Particulars	Condition
Maximum ambient temperature	50°C
Maximum daily average ambient temp	40°C
Maximum yearly weighted average ambient temp	35°C
Minimum ambient air temperature (Cooling)	-5°C
Max. Relative Humidity	95%
Yearly Avg. number of thunder storms	30-50
Average Number of rainy days	60 days
Fog	In winter
Number of months during which topical monsoon prevail	5 months
Dust storms	May not occur
Average Annual rain fall	100 cms.
Maximum wind speed	150 kmph

6.13 Ratings and specifications (415V / 11 kV Transformer)

The typical rating and electrical characteristics of the 0.415kV/ 11 kV ONAF type inverter duty transformer shall be as under however, the ratings may vary subjected to design by the bidder and relevant to the respective IS codes :

Particulars	415V / 11 kV Transformer Specs.
Continuous kVA ratings	As per design
Type	Oil immersed
Frequency	50 Hz
Type of cooling	Oil Natural Air Forced (ONAF)
No. of phases	3 (Three)
Rating voltage H.V. side	11 kV
Highest System voltage on H.V. side	12 kV r.m.s.
Rated voltage on L.V. side	0.433 kV r.m.s.
Vector Group	Dyn11
Max core windings	3
Connections	
a. H.V. Winding	Delta
b. L.V. winding	Star with Neutral solidly earthed(as per state grid code)
On load taps on H.V. Side (for H.V. Variation)	+ 5 to 10.0 % (in steps of 1.25%)
Tap changer type	OLTC

Impedance voltage (%)as per IS 2026	4%
Transformer connections	LV side Cables/ Bus Duct with weather proof enclosure as per design
	HV Side Bushing with enclosure

6.13.1 Efficiency:

The percentage loading for the maximum efficiency shall be clearly stated at unity power factor as well as 0.8 and 0.9 power factor (lead and lag).

6.13.2 Insulation:

The dielectric strength of the winding, given insulation and the bushings shall conform to the values given in IS: 2026 (Part III)/1981 (or its latest amendment) for highest system voltage of 12 kV, 1.1 kV and shall be suitable for the impulse test\power frequency test voltages.

6.13.3 Factory Assembly and Tests:

The transformer shall be completely assembled and tested at the Factory. Routine and Acceptance tests as per specification/ standards are to be conducted and no deviation in respect of conducting these tests will be acceptable. No extra charges for these tests will be paid. Test charges shall be part of cost of the equipment. If purchaser selects to

send a representative, all tests shall be carried out in his presence. Type test certificate shall be furnished before start of supply.

6.13.4 Routine Tests:

Each completed transformer shall be subjected to following routine tests as per IS: 2026 Part. I & III (latest amendment). No extra charges for any of the tests shall be paid. No deviation shall be acceptable. If the supplier desires, he may not fix radiators on transformers (other than the one which is to be type tested) during routine testing. However in that case, radiator manufacturer's test certificate shall be furnished for reference of inspecting officer with undertaking that supplier shall be responsible for proper alignment/fixing of radiator on transformer at site.

- Measurement of resistance of each winding.
- Measurement of turn's ratio between HV-LV windings at each tap.
- Checking of polarity and phase relation-ships for each winding.
- Measurement of no load loss and no load current.
- Positive phase sequence impedance/short circuit impedance between HV-LV windings on minimum, maximum and normal taps.
- Separate source voltage withstand test.
- BDV test on transformer oil.
- Induced over voltage withstand test.
- Measurement of neutral unbalance current.
- Regulation at rated load at unity, 0.90 and 0.80 lagging power factor.
- Load losses measured at rated frequency by applying voltage sufficient to produce the rated relevant current in one winding with the other winding short circuited.
- Measurement of insulation resistance.
- The total losses shall comprise of the No Load Losses, load losses at rated output duly converted at 75°C average winding temperature and shall also be indicated in the test report. Load losses shall be that corresponding to rated load on HV & LV winding.
- Routine dielectric tests as per IS: 2026(Part. I & III), 1981 and any amendments thereto.
- Check complete transformer against approved outline drawing, provision for all fittings, finish oil level etc.

6.13.5 Tests at Site

After erection at site all transformer(s) shall be subjected to the following tests:

- a) Insulation resistance test.
- b) Ratio and polarity test.

- c) Dielectric test on oil.
- d) Physical check

In case the equipment is not found as per the requirements of the purchase order, all expenses incurred during site testing will be to the tenderer's account and the material shall be replaced by him at site, free of cost.

6.13.6 Further Tests:

The purchaser reserves the right of having other reasonable tests carried out at his own expenses either before dispatch or during performance guarantee period from Govt. approved/ Govt. recognized lab to ensure that the transformer complies with the requirements of this specification after due intimation to the supplier. In case the equipment is not found meeting the requirement of PO / specification, all expenses incurred for such testing will be on supplier's account and the material shall be replaced by the supplier at site free of cost

6.13.7 Frequency and System Voltage:

The transformer shall be suitable for continuous operation with a frequency variation of $\pm 2.5\%$ from normal of 50Hz without exceeding the specified temperature rise. The highest system rated voltage shall be 12 kV. However the flux density requirements shall be as per this specification.

6.13.8 Installation & Commissioning

Mainly following activities are required to be carried out before commissioning of Power Transformers:-

- Assembling of Power Transformer accessories as per GA drawing.
- Testing activities in presence of Purchaser such as
 - Ratio Test
 - Megger Value
 - Magnetic balance.
 - Oil BDV
 - Earth Resistance
 - Buchhloz Relay checking.
 - WTI/OTI/MOLG (oil level) checking.
 - Checking of points of leakage of oil from Transformer body/ Radiator/Valve
 - Setting of Relays in Panel

6.14 Auxiliary transformer

The transformer used for auxiliary distribution within the plant must be in accordance with the reference standards. The ratings of the transformer shall be suitably designed by the bidder in order to maximize the net generation from the plant. The guaranteed technical particulars of the auxiliary transformer must be supplied along with the bid.

The bidder shall also provide the list of auxiliary loads considered for the project.

6.15 Instrument Transformer

- 6.15.1 The instrument transformers i.e. current and voltage transformers shall be single phase transformer units and shall be supplied with a common marshalling box for a set of three single phase units. The tank as well as top metallic shall be hot dip galvanized or painted Grey colour as per RAL 9002.
- 6.15.2 The instrument transformers shall be oil filled hermetically sealed units. The instrument transformers shall be provided with filling and drain plugs.
- 6.15.3 Polarity marks shall indelibly be marked on each instrument transformer and at the lead terminals at the associated terminal block. The insulators shall have cantilever strength of more than 500 kg.
- 6.15.4 Current Transformer, Voltage Transformer, Circuit Breaker and Relays should match state Utility requirements.

6.16 Current Transformer (CT)

- 6.16.1 Current transformers may be either of the bushing type or wound type. The bushing types are normally accommodated within the transformer bushings and the wound types are invariably separately mounted. The location of the current transformer with respect to associated circuit breaker has an important bearing upon the protection scheme as well as layout of, substation. Current transformer class and ratio is determined by electrical protection, metering consideration.
- 6.16.2 Technical specifications - Current ratings, design, Temperature rise and testing etc. should be in accordance with IS: 2705 (part I to IV)

6.17 Type and Rating

- 6.17.1 The current transformer should be of indoor/ outdoor type, single phase, oil immersed, self-cooled and suitable for operation in 3 phase solidly grounded system.
- 6.17.2 Type test certificate for the proposed CT shall be provided to the bidder before dispatch.
- 6.17.3 Each current transformers should have the following particulars under the site conditions for the system under design

6.17.4 General Parameters: 11 kV CT

Particulars	Details
Highest system Voltage (Vm)	12 kV rms
Rated frequency	50 Hz
System Neutral Earthing	Effective earthed
Installation	Indoor (IP 20)/ Outdoor (IP 65)
Rated dynamic current	63 kA (Peak) appropriate dynamic current as per design calculations

Rated min power frequency withstand voltage (RMS value)	70 kV
Rated lightning impulse withstand voltage (peak value)	170 kVp
Partial discharge level	10 Pico coulomb max.
Temperature rise	As per IEC 60044
Type of insulation	Class A
Number of cores	Two (2) with One (1) protection core and one (1) metering core of accuracy 0.5 class
CT secondary current	Protection cores 1 Amp. Metering Core 1 Amp
Number of terminals in marshalling box	All terminals of control circuits wired up to marshalling box plus 20% spare terminals
CT ratio & Rated VA Burden, short time thermal rating ,class of accuracy	Minimum burden required (as per design): 1. Metering core 40 VA 2. Protection core 10 VA

6.18 Voltage Transformer (VT/ PT)

6.18.1 Voltage transformers shall be electro-magnetic (EMU) type and shall comprise of compensating reactor, intermediate transformer, and protective and damping devices.

The oil level indicator of EMU with danger level marking shall be clearly visible to maintenance personnel standing on ground.

6.18.2 The secondary shall be protected by 3A HRC cartridge type fuses for all windings. In addition fuses shall also be provided for protection and metering windings. The secondary terminals shall be terminated on stud type non-disconnecting terminal blocks via the fuse inside the terminal box of degree of protection IP 55. The access to secondary terminals shall be without the danger of access to high voltage circuit.

6.18.3 The accuracy of metering core shall be maintained through the entire burden range up to 75 VA on all three windings without any adjustments during operations.

6.18.4 The PTs should be single phase oil immersed self-cooled type suitable for outdoor.

6.18.5 The core should be of high grade non-ageing electrical silicon laminated steel of high permeability. The PTs should be hermetically sealed to eliminate breathing and prevent air and moisture entering the tank.

6.18.6 Bidder has to provide the type test certificate for the proposed VT before dispatch.

6.18.7 Each voltage transformers should have the following particulars under the site conditions for the system under design

6.18.8 General Parameters: **11 kV VT**

Particulars	Details
Highest system voltage (Um)	12 kV
System neutral earthing	effective earthed
Installation	Indoor (IP 20)/ Outdoor (IP 65)
System fault level	Appropriate

Rated min power frequency withstand voltage (rms value)	70 kV
Rated lightning impulse withstand voltage	170 kVp
Standard reference range of frequencies for which the accuracy are valid	96% to 102% for protection and 99% to 101% for measurement
Rated voltage factor	1.2 continuous & 1.5 for 30 sec
Class of Accuracy	0.5 / 3P
Stray capacitance and stray conductance of LV terminal over entire carrier frequency range	As per IEC:358
One Minute Power frequency withstand voltage for secondary winding	2 kV rms
Temp rise over an ambient temp. of 50°C	As per IEC 60044
Number of terminals in control Cabinet	All terminals of control circuits wired up to marshalling box plus 10 terminals spare
Rated total thermal burden	350 VA (or as per design)
Partial discharge level	10 pico Coulombs max.
Number of cores	2 (two) 1 for protection and 1 for metering with 0.5 class accuracy.
Rated Output, insulation level, transformation ratio, rated voltage factor	Should be provided by Bidder

6.19 11 kV METERING BAY (Owner Substation)

- 6.19.1 The current & potential transformers shall be of outdoor type single phase, 50 Hz, oil immersed self-cooled suitable for operation in the climate conditions specified shall be complete in all respects.
- 6.19.2 The instrument transformers shall be hermitically sealed to eliminate breathing and entering of air and moisture in the tank. Provision of pressure releasing device is not permitted.
- 6.19.3 The CT core, to be used for protective relays shall be of accuracy class, specified or appropriate class suitable for back up, over current and earth fault, differential, bus bar and other protections as prescribed
- 6.19.4 Applicable Standards:
Unless otherwise modified in this specification, 11 KV CT-PT Metering Sets shall comply with the following Indian Standard Specification (latest version):
- | | |
|---------------|--|
| IS: 2705-1992 | Specification for current transformers. |
| IS: 3156-1992 | Specification for voltage transformers. |
| IS: 5621-1980 | Specification for Hollow insulators and accessories |
| IS: 2099-1986 | Specification for insulators/ bushing |
| IS: 3347-1986 | Specification for the dimension of Porcelain transformer |
| IS: 335-1983 | Specification for new insulating oil |
- 6.19.5 The core of instrument transformers to be used for metering and instrumentations shall

have saturation factor, low enough to avoid damage to the instruments, in the event of maximum short circuit current.

- 6.19.6 Nuts and bolts (or screws used for fixation of interfacing porcelain bushings for taking out terminals) shall be provided on flanges, cemented to the bushing and not on the porcelain i.e. Flange type 11 KV bushing for CT/PT, shall be provided.
- 6.19.7 For gasket joints, wherever used, Nitrile Butyl rubber gaskets shall be used. The gasket shall be fitted properly with adequate space for accommodating the gasket under compression.
- 6.19.8 The metering sets shall be supplied with first filling of insulating oil conforming to IS: 335 (including latest amendment).
- 6.19.9 The outer surface of metal tank shall be Hot Dip Galvanised, whereas, the inner portion shall be painted with oil resistive, insoluble paint. The purchaser reserves right for stage inspection during manufacturing process of tank / CT/PT.
- 6.19.10 The external surfaces of tanks of CT-PT sets shall be painted with one coat of primer and two coats of synthetic enamel paint of shade No.631 of IS: 5, the internal surfaces of the tank shall be painted with two coats of suitable heat resistant oil insoluble paint.
- 6.19.11 The instrument transformers shall be suitable for mounting on steel structures or concrete pedestals.
- 6.19.12 For load shading single phasing is adopted in the 11 kV system. The offered 11 kV CT PT set shall be suitable for working under such abnormal operation condition.
- 6.19.13 The 11 kV CT PT sets shall three nos. of single phase PTs. The primary winding of 3 single phase PT shall be connected in star formation in the tank with common neutral of 11 KV brought outside the tank through 3 KV bushing for earthing.
- 6.19.14 The secondary terminal box shall have cable gland/ flange suitable to receive two Nos. control cable of size 6x4 sq.mm and 4x2.5 sq.mm at the bottom of the secondary box for metering connections to secondary winding of 33 kV CT-PT circuits respectively.
- 6.19.15 The 11 kV CT – PT Set shall have 3 Nos. incoming and 3 Nos. outgoing outdoor type bushing complete with 6 Nos. bimetallic terminal connectors suitable for Dog/ Panther Conductor
- 6.19.16 General Parameters: **11 kV CT (Owners Bay and Metering Bay)**

Particulars	Details
Normal system voltage (kV rms)	11 kV
Highest system voltage (kV rms)	12 kV
Frequency	50 Hz
Impulse withstand voltage (kVp) (on assembled CT/ PT set)	170

One minute power frequency dry withstand voltage (on assembled CT-PT set)	
Primary (r.m.s.)	70 kV
Secondary (r.m.s.)	3 kV
Transformation ratio (CT Ratio)	400/1 A or as per requirement
Rated output (VA burden)	10 VA
Class of accuracy	0.2S
Rated continuous thermal current	1.2 times of rated primary current.
Short time thermal current rating for 1sec.	25kA for 400/1 A Current density corresponding to Short Time Thermal Current should not exceed 160A /mm sq.
Rated dynamic current	2.5 times of short time thermal current rating.
Number of cores	One
Instrument security factor	Not exceeding 5
Max. ratio error	As per IS:2/05/1992

6.19.17 General Parameters: **11 kV VT (Owner's Bay & Metering Bay)**

Particulars	Details
Nominal system voltage (kV rms)	11 kV
Highest system voltage (kV rms)	12 kV
Nos. of phases	Three
Impulse withstand voltage (kVP) (on assembled CT-PT set)	170kVp
One minute power frequency dry withstand voltage (on assembled CT-PT set)	
Primary	70 kV r.m.s
Dry secondary	3 kV r.m.s

Frequency	50 Hz
Transformation ratio (PT Ratio)	11 kV/ 110V
Rated output (VA burden)	30 VA per phase
Class of accuracy	0.2 (As per IS:3156/1992)
Winding connection	Star/ Star
Rated voltage factor and time	1.2 Continuous & 1.9 for 30 seconds.
Temp. Rise over max. Ambient temp.	Within limits of IS:3156/1992
Phase angle error max.	-do-
Max. Phase angle error	-do-
Ratio error (Max.)	-do-

6.20 Circuit Breaker

6.20.1 The circuit breakers shall be capable of rapid and smooth interruption of currents under

1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust.

all conditions completely suppressing all undesirable phenomena even under the most severe and persistent short circuit conditions or when interrupting small currents or leading or lagging reactive currents. The circuit breakers shall be 'Restrike-Free' under all operating conditions. The details of any device incorporated to limit or control the rate of rise of re-striking voltage across, the circuit breaker contacts shall be stated. The over voltage across, the circuit breaker contacts shall be stated. The over voltage caused by circuit breaker while switching inductive or capacitive loads shall not exceed 2.5 times the highest phase to neutral voltage. The actual make and break times for the circuit breakers throughout the ranges of their operating duties shall be stated in the offer and guaranteed

6.20.2 Applicable Standards: The materials shall conform in all respects to the relevant Indian Standard Specifications/ IEC Standards, with latest amendments indicated (reference only) below:

IS-13118/1991	General requirements for Circuit breakers for voltage above 1000 V IEC 62271-100-1/2001
IS-2705/1992	Current Transformers
IS-2099/1986	Bushings for alternating voltages above 1000 V
ISS-2633/1964	Methods of testing uniformity of coating of zinc coated articles
IS-3231/1986	Electrical relays for power system protection
IS-1248/1983	Specification for Ammeters & Voltmeters
IS-335/1983	New insulating oils Electrical IEC 71 (For oils in CTs) Clearances
IS-2147/1962	Degree of protection provided by enclosures for low voltage switchgear & control gear

6.20.3 The arc quenching chambers shall have devices to ensure almost uniform distribution of voltage across the interrupters.

6.20.4 Appropriate & adequate Capacity 415V AC indoor air Circuit Breaker as per the IEC 60898 / IEC 62271 – 100 or equivalent Indian Standards along with control circuit and protection relay circuit, fuses, annunciations and remote operating and controlling facility from the Main Control Room.

6.20.5 Circuit breaker shall be C2/MI class under all duty conditions and shall be capable of performing their duties without opening resistor. The circuit breaker shall meet the duty requirement of any type of fault or fault location and shall be suitable for line charging and dropping when used on 6kV effectively grounded or ungrounded systems and perform make and break operations as per the stipulated duty cycles satisfactorily.

6.20.6 The circuit breaker shall be capable for breaking the steady & transient magnetizing current corresponding to 11 kV transformers. It shall also be capable of breaking line charging currents as per IEC- 62271-100 with a voltage factor of 1.4.

6.20.7 The rated transient recovery voltage for terminal fault and short line faults shall be as per

IEC: 62271-100.

- 6.20.8 The Bidder may note that total break time of the breaker shall not be exceeded under any duty conditions specified such as with the combined variation of the trip coil voltage, pneumatic pressure etc. While furnishing the proof of the total break time of complete circuit breaker, the Bidder may specifically bring out the effect of non-simultaneity between same pole and poles and show how it is covered in the guaranteed total break time.
- 6.20.9 Bidder shall indicate the noise level of breaker at distance of 50 to 150 m from base of the breaker.
- 6.20.10 While furnishing particulars regarding the D.C. component of the circuit breaker, the Bidder shall note that IEC-62271-100 requires that this value should correspond to the guaranteed minimum opening time under any condition of operation.
- 6.20.11 The critical current which gives the longest arc duration at lock out pressure of extinguishing medium and arc duration shall be indicated.
- 6.20.12 Bidder has to provide the type test reports for the CB before the dispatch.
- 6.20.13 All the duty requirements specified above shall be provided with the support of adequate test reports.

6.21 Operating Mechanism

- 6.21.1 Circuit shall be vacuum type with electrically spring charged mechanism.
- 6.21.2 The operating mechanism shall be anti-pumping and trip free (as per IEC definition) electrically under every method of closing. The mechanism of the breaker shall be such that the position of the breaker is maintained even after the leakage of operating media and / or gas. The circuit breaker shall be able to perform the duty cycle without any interruption.
 - 6.21.3 Electrical tripping shall be performed by shunt trip coil. Provision shall also be made for local electrical control. 'Local / remote' selector switch and close & trip push buttons shall be provided in the breaker central control cabinet. Remote located push buttons and indicating lamps shall also be provided. The VCB coil DC supply through appropriately rated battery bank and charger to be supplied by the Bidder.
- 6.21.4 Operating mechanism and all accessories shall be in local control cabinet. A central control cabinet for the three poles of the breaker shall be provided along with supply of necessary tubing, cables, etc.
- 6.21.5 Mounting and supporting structure for Circuit Breaker: The circuit breakers should be self-supporting type. However, if necessary for the purpose of minimum ground clearance the circuit breakers should be mounted on raised steel structures which should be included in the scope of supply of circuit breaker. Bidder to obtain the necessary information and data

required for design of foundations of the circuit breaker be obtained from the CB supplier.

6.21.6 Max. Impact loading in terms of equivalent static load both compression and upward due to opening/closing of the breakers. It shall be clearly stated whether these forces shall act simultaneously or at different timing.

6.21.7 Necessary connecting materials such as clamps, bolts, nuts, washers etc. and fixing bolts for mounting the equipment on the supporting structures wherever required should be obtained from the circuit breaker supplier.

6.21.8 General parameters: **Vacuum type Circuit Breaker:**

Particulars	Details
Type of circuit breaker	Vacuum type
Highest System Voltage	12 kV
Rated operating voltage	11 kV
Rated frequency	50 Hz (+3% to -5%)
Number of poles	Three (3)
Rated/ minimum power frequency Withstand voltage	70 kV
Rated lightning impulse Withstand voltage	170 kV
Rated operating duty cycle	0 - 0.3 sec. - CO – 3 min. – CO
Rated line charging breaking	As per IEC
Reclosing	Single and three phase high speed auto reclosing
Maximum fault level	25 kA (r. m. s.) for 1 sec.
Auxiliary contacts	As required plus 6NO and 6NC contacts per pole as spare.
Noise level	Maximum 140dB at 50m distance from base of circuit breaker
Seismic acceleration	0.4 g horizontal

6.21.9 Co-ordination of rated voltages, short circuit breaking current and rated normal current for guidance as per IS 13118 for rated voltage 33 kV and above as commonly used are as given in bellow table.

Rated voltage (kV)	Rated short-circuit breaking current (kA)	Rated normal current (A)				
36	8	630	1250	1600	2500	4000
	16	630	1250	1600		
	40					

6.21.10 Circuit Breaker Protection against

- Over Current

- Earth fault
- Under voltage & over voltage protection
- Under frequency & over frequency
- SF6 gas pressure low (where applicable)
- DC supply failure

6.22 Isolators

6.22.1 The isolators and accessories shall conform in general to IEC 62271-102 (or equivalent Indian standard) except to the extent explicitly modified in specification.

6.22.2 Each isolating switch should have the following particulars under the site conditions for the system under design (typical values for 12 kV system are given).

6.22.3 General Parameters: 11 kV Isolators

Particulars	Details
Operating mechanism of Isolator and Earth Switch	Motor operated
Nominal system voltage	11 kV
Highest system voltage	12 kV
Type	Outdoor (IP 65)
Rated short time current of isolator and earth switch	40 kA (rms) for 1 sec. Or appropriate as per design
Rated dynamic short time with stand current of isolator and earth switch	80 kA (peak) Or appropriate as per design
Impulse withstand voltage with 1.2/50 micro sec. wave	325kVp to earth 195kVp across isolating distance
One minute power frequency withstand Voltage	140 kV (rms) to earth & 150 kV (rms) across isolating distance
Temperature rise	As per Table-IV of IS: 9921
Rated mechanical terminal load	As per 62271-102

6.23 Indicating and Integrating Meters/Instruments:

All indicating instruments shall be of switchboard type, back connected, suitable for flush mounting and provided with dust and vermin proof cases for tropical use and finished in suitable colour. All instruments shall have practical laboratory means for adjustment of accuracy. The limits of errors for ammeters/voltmeters shall be those permissible for class

1.5 instruments as per IS: 1248.

6.23.1 A.C. Static HT Tri vector Meter:

A.C. Static HT Tri vector Meter shall be as per NMPT/State Utility norms and shall be intimated while placement of order. The meters shall be located at eye level to facilitate observations of readings correctly.

6.23.2 The ammeters and voltmeters shall be suitably scaled to indicate the current/voltage for all the rating of current/voltage transformers. A phase selector switch with four/six position shall be used to measure the current/voltage of each phase/line. The Bidder shall provide test certificate and calibration certificate along with the supply of the instrument.

6.23.3 The meters shall be located at normal eye level to facilitate observation of readings correctly.

6.24 Surge Arrestors

6.24.1 The surge arrestors (SAs) shall conform in general to IEC 60099-4 or IS: 3070 except to the extent modified in the specification. Arresters shall be of hermetically sealed units, self-supporting construction, suitable for mounting on lattice type support structures. Bidder shall furnish the technical particulars of Surge arrester.

6.24.2 series or shunt gaps. The SAs shall be capable of discharging over-voltages occurring during switching of unloaded transformers, and long lines.

6.24.3 Arrestors shall be complete with insulating base for mounting on structure. Suitably enclosed for outdoor use and requiring no auxiliary or battery supply for operation shall be provided for each single pole unit with necessary connection.

6.24.4 The surge arrestors shall conform to type tests and shall be subjected to routine and acceptance tests in accordance with IEC-60099-4.

6.24.5 Each lightning arrestors should have the following particulars under the site conditions for the system under design.

6.24.6 Technical requirements for metal oxide (gapless) lightning arrestors

6.24.7 Typical values of **Isolator for 12 kV system are given**

Particulars	Details
Rate System Voltage	12 kV
Rate Arrester Voltage	10 kV
Nominal discharge current	10 kA of 8/20 micro-sec wave
Minimum discharge capability	5 kilo joule/kV (referred to rated arrester voltage corresponding to minimum discharge characteristics)
Class	Station class

Maximum Continuous Operating	11 kV rms
Max. residual voltage (1 kA)	10 kVp
Max. residual voltage at 10 kA nominal discharge current(8/20 micro sec wave)	170 kVp

Max. switching impulse residual Voltage at 1000 A peak	140 kVp
Max. steep current residual voltage	186 kVp at 10kA
High current short duration test Value (4/10 micro-sec-wave)	100 kAp
Current for pressure relief test	40 kA rms
One minute power frequency withstand voltage of arrestor housing (dry and wet)	140 kV (rms)
Impulse withstand voltage of arrestor housing with 1.2/50 micro sec. Wave	325 kV (Peak)
Radio interference voltage at 156 kV	Not more than 1000 micro volt
Partial discharge at 1.05 MCOV (continuous operating voltage)	Not more than 50pC
Whether insulating base and discharge counter with milli- ammeter are required.	Yes

6.25 Protective Relays

- 6.25.1 The Solar PV system and the associated power evacuation system interconnections should be protected as per IEC 61727 Ed.2, norms. Over current relays, reverse power relays, differential protection relays and earth fault relays have to be essentially provided. All relay should be numerical type & should be remote operating and controlling facility from the control room.
- 6.25.2 All the relays must be solid state type and based on open access communication protocol. The numerical relays shall have RS 485 port for communication.
- 6.25.3 The operating voltage of the relays shall be 110 V DC/220 V DC as per battery bank rating.
- 6.25.4 Necessary battery bank shall also be provided in order to supply uninterrupted power to relays and control & protection circuit of the plant.
- 6.25.5 Detailed Design calculations shall be provided on fault power computations and the philosophy of protective relaying with respect to short circuit kA calculations. Design, drawing and model of protection relay shall be approved by Employer/ state utility.
- 6.25.6 The bidder must submit the relay setting chart as a part of design documents in coordination with the connecting substation.

6.26 Earthing for PV Array

- 6.26.1 The photovoltaic modules, BOS and other components of power plant requires adequate earthing for protecting against any serious faults as guided by IEC 60364.
- 6.26.2 The earthing system shall be designed with consideration of the earth resistivity of the project area. The earth resistivity values shall be measured prior to designing the earthing system. Unless otherwise specified, earthing system shall be in accordance with IS: 3043

and IEEE 80, Indian Electricity Rules, Codes of practice and regulations existing in the location where the system is being installed.

- 6.26.3 The permissible system fault power level at 33 kV also shall be kept in consideration while designing the earthing system. Each array structure of the PV yard, LT power system, earthing grid for switchyard, all electrical equipment, control room, PCU, All junction boxes, ACDB & DCDB, all motors, pumps and any special earthing as required (electrical/electronics) shall be grounded properly as per IS 3043 - 1987. All metal casing / shielding of the plant shall be thoroughly grounded in accordance with Indian electricity act / IE Rules.
- 6.26.4 The earthing for array and LT power system shall be made of 3.0 m long 40 mm diameter perforated GI pipe / chemical compound filled, double walled earthing electrodes including accessories, and providing masonry enclosure.
- 6.26.5 with cast iron cover plate having pad-locking arrangement, watering pipe using charcoal or coke and salt as required as per provisions of IS: 3043.
- 6.26.6 Necessary provision shall be made for bolted isolating joints of each earthing pit for periodic checking of earth resistance.
- 6.26.7 Each string/ array and MMS of the plant shall be grounded properly.
- 6.26.8 For each earth pit, a necessary test point shall be provided.
- 6.26.9 Earthing Mesh is to be prepared and installed in entire power plant.
- 6.26.10 The array structures are to be connected to earth pits as per IS standards. Necessary provision shall be made for bolted isolating joints of each earthing pit for periodic checking of earth resistance.
- 6.26.11 The complete earthing system shall be mechanically & electrically connected to provide independent return to earth.
- 6.26.12 In compliance to Rule 11 and 61 of Indian Electricity Rules, 1956 (as amended up to date), all non-current carrying metal parts shall be earthed with two separate and distinct earth continuity conductors to an efficient earth electrode.
- 6.26.13 The Bidder should submit the earthing system design calculations along with the system layout for Owner approval. Prior to the installation of the system.
- 6.26.14 Unless otherwise specified, the earthing system primary and secondary grid conductors, equipment connections shall be constructed with galvanized iron flat. However the earthing of transformer neutrals, plc and inverter terminals and electronic earthing shall be provided using copper earthing conductor only.

6.27 Isolator and Isolator-cum-Earthing Switches

- 6.27.1 The Isolators and Isolator-cum-Earthing Switched shall comply with the requirements of the

IS: 9921 and IEC: 129 (latest edition) except specified herein. The Insulators shall comply with the requirements of IS: 2544 and IEC: 168-1988 (latest edition).

- 6.27.2 The Isolators shall be double break, outdoor, gang operated type, with blades rotating in horizontal plane. The design shall be for upright mounting. If required, and the Isolators shall be convertible for right or left hand control with minimum labour and replacement of part. The live parts shall be so designed that as far as possible, sharp points, edges and other corona producing surface are eliminated. Except the Insulator caps and bases, all other live parts shall be non-ferrous. Bolts, Screws and Pins shall be provided with locking arrangement and shall be of the best materials.
- 6.27.3 Each pole shall have three **Pedestal type of Insulator's** stacks. Necessary arrangements shall be provided for proper alignment of the contacts. Gang operated links shall be so designed that all phases shall make and break simultaneously.
- 6.27.4 The design of Isolators and Isolator-cum-Earthing Switches shall be provided for positive control of blades in all positions with minimum mechanical stress on the Insulators. Fixed guides shall be so provided that proper setting of contacts shall be obtained, when a blade is out of alignment even by 25mm in either direction. All movable parts which may be in current path shall be shunted by flexible copper conductor of adequate cross-section and capacity, which shall be furnished under bill of material.
- 6.27.5 The length of the handle for manual operation shall not be more than one meter and shall be stated on the drawing. The rotating parts shall have a smooth movement.
- 6.27.6 The clearance of 4000 mm from live parts to ground as per provision of I.E. Rules shall be considered while manufacturing of isolators & to decide location of operating mechanism box. Height of structure of isolator from ground is to be considered as 2900 mm including 150 mm for muffing.
- 6.27.7 Contacts:
- The moving & fixed contacts shall be made of hard drawn electrolytic grade copper strips and shall be heavy duty self-aligning & high pressure type preferably which applies pressure to the contact surfaces after the blades are fully closed and release the pressure before they start to open. High pressure type contacts shall wipe the contact surfaces, while opening and closing. The contacts shall be so designed that wiping, action shall not cause securing or abrasion on the contact surfaces. The wiping action shall be sufficient to remove oxide film, formed during the operation of the switches. The pressure shall be developed by rotation of the entire blade.
 - The temperature rise of contacts due to the flow of rated short circuit current for a period of 3 seconds shall not cause any annealing or welding of contacts.
 - The moving contacts, if provided, shall close first and open last so that no damage is caused due to arcing whatever to the main contacts. The Bidder shall give full details of such contacts with necessary drawings.

- The arcing contacts, if provided shall close first and open last so that no damage is caused due to arcing whatever to the main contacts. The tender shall give full details of such contacts with necessary drawings.
- The female contact and its tensioning by spring shall be such that there will, always, be a positive contact with adequate pressure to give enough contact surface for the passing of current. The springs provided should not go out of alignment or get entangled with the male contact during operation. The details of springs shall be furnished on the G.A. drawing.

6.28 Earthing Blades

- 6.28.1 The Isolators controlling the underground line shall be equipped with earthing blades. The Earthing blades shall be counter balanced to ensure easy operation.
- 6.28.2 Line earth switch shall consist of three Earthing links per Isolator which will normally rest against the frames, when the connected Isolator is in closed position. The Earthing links of all three phases shall be suitable for fitting on either side of the Isolator.
- 6.28.3 Short time current withstand capacity of earthing blades of Isolator Earthing Switch shall be same as that of the main blades of Isolator. The material of the earthing Isolator, Each earthing blade shall be provide with flexible copper connections of adequate length of not less than 60mm² are for connection between the operating shall and the base frame.
- 6.28.4 The rated making capacity of earthing switches shall be as specified in the applicable standard of isolators

6.29 Insulators

- 6.29.1 Bushings shall be manufactured and tested in accordance with IS: 2099 & IEC: 137. Hollow column insulators shall be manufactured and tested in accordance with IEC: 60233/IS: 5261. The support insulators shall be manufactured and tested as per IS: 2544 / IEC: 600168/IEC: 600273. The insulators shall also conform to IEC 815 as applicable. Bidder shall furnish the technical particulars of all type of insulators used.
- 6.29.2 Porcelain insulator shall comply IS: 731-1976 or equivalent international standard and shall be homogenous, free from laminations, cavities and other flaws or imperfections that might affect the mechanical or dielectric quality and shall be thoroughly vitrified, tough and impervious to moisture. Hollow porcelain should be in one integral piece in green & fired stage.
- 6.29.3 Bidder may offer silicone rubber housed composite type insulator as an alternative to the above porcelain insulator with equivalent creep age distance.

6.29.4 Data sheets for the insulators with cantilever strength and compression strength, etc. shall be submitted.

6.29.5 Insulators shall be rated for not less than 6kN for bus bar supports and 4kN for isolators.

6.30 Bus Bar

6.30.1 The outdoor bus-bars and equipment connections shall be with ACSR conductor (suitable size as per design).

6.30.2 The bus-bars and the connection jumpers shall be supported on post insulators wherever required.

6.30.3 The ACSR bus bars are an over ground system of wires strung between two supporting structures and supported by strain type insulators. The stringing tension may be limited to 500-900 kg depending upon the size of the conductor used. These types of bus bars are suitable for earthquake prone areas. All the bus bars are to be provided with insulating sleeves with appropriate colour code.

6.30.4 Bus bar Material - The materials in common use for bus bars and connections of the strain type are ACSR conductor.

6.30.5 Since aluminium oxides rapidly, great care is necessary in making connections. In the case of long spans expansion joints should be provided to avoid strain on the supporting insulators due to thermal expansion or contraction of pipe.

6.30.6 The bus bar sizes should meet the electrical and mechanical requirements of the specific application for which they are chosen.

Note: Unless otherwise specified, all equipment and materials shall confirm to the latest applicable Indian Standards. Equipment complying with any other International Standards will also be considered if it ensures performance of equipment equal to a superior to Indian Standard.

6.31 Control & Relay Panel Specifications

General Requirement:

6.31.1 The control & relay panel shall be free standing, simplex type, floor mounting type, fabricated from 2 mm thick MS sheet for main enclosure and 1.6 mm thick MS sheet for internals and partitions. The main enclosure shall be mounted on a base frame fabricated out of 100x50 ISMC mild steel section.

6.31.2 The enclosure external finish colour shade shall be decided by the Employer, The internal surface shall have a glossy white finish all over.

6.31.3 The control & relay panel shall contain the following metering and protection devices :

- Metering, Indications & Controls
- Ammeter: 0 A
- Ammeter selector switch
- Voltmeter: 0 -12 kV
- Voltmeter selector switch
- Load Manager to Display the following parameters: MW, MVA, MVarh, MVar CosΦ, Hz.

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- **Indication lamps for R, Y, B phases, Breaker 'ON' (R), Breaker 'OFF' (G), Breaker 'TRIP' (A), Spring charged (W), Trip Circuit Healthy (B)**
- TNC switch, spring return to neutral position shall be provided for circuit breaker operation.
- Local / Remote selection switch for circuit breaker operation.
- Semaphore indicators (LED type) for CB and Isolator 'Open & Close' positions.
- Mimic diagram for the 11 kV systems with aluminium strips and 'ON' 'OFF' indications for isolators.

6.32 Low/ High Voltage Switchgear Panels

- 6.32.1 The LT/ HT switchgear panels shall be designed as per the relevant IS codes and as per the approved design for the panel. All the parts of the panels must be rated as per the relevant rated voltage level. All the panels must have multifunction meters (MFM) flushed with the surface of the panels. However, the outgoing feeder can have Tri vector meter (TVM) for the energy accounting.
- 6.32.2 The Power Control Centre (PCC)/ Switchgear shall be rated for the maximum output of the supply transformer feeding the system. The short circuit withstand rating (1 sec) at rated voltage of the switchgear shall be relevant to the existing electrical system short circuit ratings.
- 6.32.3 The configuration of the PCCs shall be as per the Single Line Diagram of the system.
- 6.32.4 Power Control Centres (Construction)
- Single front / compartmentalized, modular design, degree of protection IP52 with provision of extension on both sides.
 - Incomer feeders: mains incomer - Electrically operated draw out type Air Circuit Breakers (ACBs)/ Vacuum Circuit breakers (VCBs), as applicable.
 - Outgoing feeders: Moulded Case Circuit Breakers (MCCBs)/ electrically operated draw out type Air Circuit Breakers (ACBs) / Vacuum Circuit Breakers (VCBs), as applicable.
 - The colour finish shade of switchgear enclosure for interior shall be glossy white & for exterior it shall be light grey, semi glossy shade 631 of IS: 5. if a different exterior shade is desired by the Employer, the same shall be intimated to the supplier.
 - The PCC shall be fabricated out of CRGO sheet steel; 2 mm thick for the outer shall all- round. The internal walls and separators shall be of 1.6 mm thick CRGO sheet steel
 - The gland plates shall be 3 mm thick

6.33 Control Circuit

- 6.33.1 Control supply for breaker closing / tripping - 110V DC
- 6.33.2 Air Circuit Breaker spring charge motor - 240 V AC, 1 phase
- 6.33.3 Moulded Case Circuit Breakers- 240 V AC, 1 phase
- 6.33.4 Indications, annunciation -110V DC

6.33.5 Space heater, sockets, etc. 240 V AC, 1 phase

6.34 Bus Bar & Cable Cavity

- 6.34.1 The material for main bus bars and tap off bus bars shall be electrolytic grade aluminium with properly colour coded HR PVC sleeved insulation.
- 6.34.2 Bus bars shall be suitable for short circuit rating and current suitable for all connected load.
- 6.34.3 Cable entry for incoming and outgoing cables shall be from Bottom.
- 6.34.4 A suitable gland plate shall be supplied for termination of power, control and instrumentation cables.
- 6.34.5 Whenever feeders are housed in multi-tier configuration, these tiers shall be segregated by sheet metal barriers.
- 6.34.6 Earthing: Earthing bus bar shall be terminated at both ends of the switchgear to suit the connections to outside earthing conductor. All components inside the module are required to be earthed individually and are to be looped and connected to the horizontal earth bus. All the non-current carrying parts of the panels, e.g., enclosure, must be connected to earth as per the regulations.

6.35 Terminals:

- 6.35.1 CT circuit - Isolating link type terminals with shorting facility
- 6.35.2 PT circuit clip on type terminals
- 6.35.3 Spare contacts shall be wired up to terminal block. 10% spare terminals shall be provided for each module

6.36 Specific Requirement

- 6.36.1 All ACBs/ VCBs, as applicable, shall be 4 pole, electrically operated, draw-out type, with closing coil, spring charge motor, trip coil, TNC switch for close and trip, manual closing and tripping push buttons, door I/L, test and service position micro switches, emergency P.B., safety shutters, etc. The circuit breaker shall be provided with anti-pumping feature.
- 6.36.2 ACBs/ VCBs, as applicable, shall be complete with microprocessor release and shall be provided with over current, short circuit and earth fault protections.
- 6.36.3 Minimum 10% spare feeders of each rating shall be provided in the switchgear.
- 6.36.4 All current transformers shall have 5/1A secondary and all meters shall be suitable for 5/1A operation.
- 6.36.5 All indicating lamps shall be of LED cluster type. ACB feeders shall be provided with ON, OFF, AUTOTRIP, SPRING CHARGED, TEST, SERVICE, TRIP CIRCUIT HEALTHY indications
- 6.36.6 All indicating instruments, including MFM, shall be flush mounting, Digital type and of standard size.

- 6.36.7 Window annunciator with hooter and accept, test, reset button shall be provided. Necessary auxiliary relays for contact multiplication shall be provided in the panel.
- 6.36.8 The maximum temperature of the bus bars, droppers and contacts at continuous current rating under site reference ambient temperature of 50° C shall not exceed 105° C.
- 6.36.9 Instrumentation: Switchgear instrumentation shall be provided as follows:
- Mains Incomer – Voltmeter with selector switch
 - Ammeter with selector switch Power Factor
 - meter Frequency meter
 - TVM + MD meter
 - Potential indicating lamps
 - Outgoing Feeders
 - Ammeter with selector switch on all feeders

6.37 General Technical Specifications (LT/ HT Switch gear Panel)

- 6.37.1 The panel shall be self-supporting, free standing, floor mounted, modular type with construction having degree of protection of IP 54 as per IS 2147.
- 6.37.2 The panel shall be fabricated from 14 SWG CRCA sheet steel for frame & load bearing surfaces. Partitions may be fabricated from 16 SWG CRCA if no components are mounted on them.
- 6.37.3 The panel shall be painted with 2 coats of primer after pre-treatment and 2 coats of Polyurethane / epoxy paint with shade as decided by the Owner
- 6.37.4 Stiffeners shall be provided at corners & between modules to make panel rugged. The stiffeners will necessarily be required for relay compartments or doors where heavy components are mounted.
- 6.37.5 The openable covers will be provided with lift off type hinges, quarter turn door locks and flexible copper wire for earth connection.
- 6.37.6 The panel shall be dust and vermin proof. Synthetic or neoprene gaskets shall be provided at all openings.
- 6.37.7 The panel shall be of dead front construction suitable for front operated and back maintained functioning.
- 6.37.8 Panel shall be provided with fluorescent lamp of 20W capacity operated by door operated limit switch. Panel shall also have space heaters and thermostat arrangement.
- 6.37.9 Panel shall be provided with 3 pin switch socket combined unit of 5 Amp capacity.
- 6.37.10 Lifting hooks shall be provided at the top of the panel.
- 6.37.11 The hardware components used in the panel shall be hot dipped galvanized.
- 6.37.12 The control components shall be fixed on mounting plate by drilling & tapping.
- 6.37.13 Aluminium anodized legend plates shall be provided for all the components. For components mounted on front face, legend plate from inside shall also be provided.

- 6.37.14 Pre-treatment by 7 tank process shall be done before painting / powder coating the panel.
- 6.37.15 Panel shall have provision of drawing pocket.
- 6.37.16 The panel shall be designed to ensure maximum safety during operation inspection, connection of cables and maintenance. Inside panel, checking and removal of components shall be possible without disturbing other units.
- 6.37.17 Cable entries will be from bottom. The opening of cable entry shall be covered by 3 mm thick gland plates.
- 6.37.18 The panel shall be provided with all necessary components / devices and instruments as per the recommended schematic diagram and functional requirements.
- 6.37.19 The components such as protective relays, auxiliary relays, push buttons, switches, instruments shall be flush mounted on the front side of a panel.
- 6.37.20 The control wiring shall be done with PVC insulated flexible copper wire. For CT secondary circuits 2.5 sq.mm wire shall be used. For control wiring 1.5 sq.mm wire will be used.
- 6.37.21 Earthing bus bar of suitable cross section shall be provided throughout the length of panel.
- 6.37.22 The panel shall be fully wired all the terminals shall be brought out for cable connections.
10% spare terminals shall be provided on each terminal block. Separate terminal block shall be provided for different voltages. All wire shall have P.V.C. ferrules as per wiring diagram.
- 6.37.23 Proper shrouding to incoming and outgoing terminals shall be provided to ensure safety during operation, inspection and maintenance.
- 6.37.24 Indicating lamps shall be with multiple LEDs & shall be suitable for the voltage specified.
- 6.37.25 All the components in the panel shall be properly labelled. The labels shall be made of non- rusting metal or engraved PVC material properly fixed by screws.
- 6.37.26 The panel layout shall be made in such a way that it will always facilitate easy removal and reconnection of control cables without disturbing other wiring.
- 6.37.27 Centre lines of control switches, push buttons and indicating lamps shall be matched so as to give neat appearance. Similarly top lines of indicating instruments and relays shall also be matched.
- 6.37.28 The panel shall be provided with electrolytic grade aluminium bus bar of suitable cross section so as to maintain max current density of 0.8 AMP/ Sq.mm.
- 6.37.29 Bus bars shall be provided with colour coded heat shrinkable insulating sleeves.
- 6.37.30 Bus bars shall be supported by high quality epoxy insulators provided at specified distances so as to withstand to the given fault level.
- 6.37.31 The bus bar chambers shall be provided with suitable ventilation arrangements so as to limit the maximum temperature of 85°C while carrying rated current.

- 6.37.32 Proper clearance of minimum 25 mm shall be maintained between phase bus bars and between bus bars.
- 6.37.33 The panel shall be inspected at manufactures works before dispatch to site at the discretion of Employer.
- 6.37.34 All routine tests shall be carried out on the panel in presence of Employer or their representative or its representative. These tests shall include following:
- Verification of components ratings and operation.
 - High voltage measurement test.
 - Insulation Resistance measurement.
 - Control testing
- 6.37.35 Approval on following drawings shall be obtained before manufacturing the panels
- General arrangement drawing
 - Wiring Diagram.
 - Detail bill of material
 - Bidder shall provide 33kV power evacuation with bay and metering on Turnkey basis as per Port requirement.
- 6.37.36 In case, the bidder is using bus duct at the incoming/ outgoing terminals, appropriate arrangement has to be made in the LT/HT panel for the incorporation. Construction of bus ducts shall be as per relevant IS standards. Bus ducts must be provided with the space heaters and silica gel as recommended.

6.38 Metering System

- 6.38.1 ABT energy meter shall be provided as approved by state Utility under the metering scheme, to measure the delivered quantum of energy to the grid for sale. The responsibility of arranging for the meter, its inspection/calibration/testing charges etc. rests with the Bidder. All charges incurred on Meter testing, shall be borne by the Bidder. ABT energy metering system is to be approved by state utility.
- 6.38.2 Meter must be provided with the necessary data cables.
- 6.38.3 Separate metering system has to be provided for L.T. (incoming) and H.T. (outgoing) supply.
- 6.38.4 The Bidder shall provide ABT compliant meters at the interface points.
- 6.38.5 Interface metering shall conform to the Central Electricity Authority (Installation and Operation Meters) Regulation 2006 and amendment thereof Commercial settlement of solar Photovoltaic Grid Interactive based power project.
- 6.38.6 Meter shall be suitable for interfacing for synchronizing the built-in clock of the meter by GPS time synchronization equipment existing at the station either through a synchronization pulse received from the time synchronization equipment or through a remote PC synchronized to GPS clock shall also be in the scope of Bidder.
- 6.38.7 All charges for testing and passing of the meter with relevant government agency shall be borne by Bidder, the Employer will assist Bidder for necessary document as

and when required. Bidder has to intimate the required documents at least 7 days prior of such requirements.

6.38.8 ABT compliant Energy Meters shall have technical specification as given below (not limited to specified requirement, Bidder can provide Meter with latest facilities):

6.38.9 Meters shall be microprocessor-based conforming to IEC 60687 / IEC 6205211/ IEC 62053- 22 / IS 14697

6.38.10 Meters shall carry out measurement of active energy (both import and export) and reactive energy (import) by 3-phase, 4 wire principle suitable for balanced/ unbalanced 3 phase load.

6.38.11 Meters shall have an accuracy of energy measurement of at least Class 0.2 for active energy and at least Class 0.5 for reactive energy according to IEC 60687, and shall be connected to Class 0.2 CT cores and Class 0.2 VT windings or as per state grid regulations.

6.38.12 The active and reactive energy shall be directly computed in CT & VT primary ratings.

6.38.13 Meters shall compute the net MWh and MVARh during each successive 15- minute block metering interval along with a plus/minus sign, instantaneous net MWh, instantaneous net MVARh, average frequency of each 15 minutes, net active energy at midnight, net reactive energy for voltage low and high conditions at each midnight.

6.38.14 Each energy meter shall have a display unit with a seven digit display unit. It shall display the net MWh and MVARh with a plus/minus sign and average frequency during the previous metering interval; peak MW demand since the last demand reset; accumulated total (instantaneous) MWh and MVARh with a plus/minus sign, date and time; and instantaneous current and voltage on each phases.

6.38.15 All the registers shall be stored in a non-volatile memory. Meter registers for each metering interval, as well as accumulated totals, shall be downloadable. All the net active/reactive energy values displayed or stored shall be with a plus /minus sign for export/import.

6.38.16 At least the following data shall be stored before being over-written for the following parameters.

S. No.	Parameters	Details	Min No of days
1	Net MWh	15 min. block	90 days in meter
2	Average Frequency	15 min. block	90 days in meter
3	Net MVARh for > 103%	15 min. block	90 days in meter
4	Cumulative net MWh	At every mid night	30 days in meter/ 90 days in PC
5	Cumulative net MVARh for >103%	At every mid night	30 days in meter/ 90 days in PC
6	Date & time blocks for VT failure on any phase		

- 6.38.17 Shall have a built in clock and calendar with an accuracy of less than 15 seconds per month drift without assistance of external time synchronizing pulse.
- 6.38.18 Date/time shall be displayed on demand. The clock shall be synchronized by GPS time synchronization equipment existing at the station provided by Bidder.
- 6.38.19 The meter shall be suitable to operate with power drawn from the VT supplies. The burden of the meters shall be less than maximum 2VA.
- 6.38.20 The power supply to the meter shall be healthy even with a single-phase VT supply. An automatic backup, in the event of non-availability of voltage in all the phases, shall be provided by a built in long life battery and shall not need replacement for at least 10 years with a continuous VT interruption of at least 2 years. Date and time of VT interruption and restoration shall be automatically stored in a non-volatile memory.
- 6.38.21 Even under the absence of VT input, energy meter display shall be available and it shall be possible to download data from the energy meters.
- 6.38.22 Meters shall have an optical port on the front of the meter for data collection from either a hand held meter reading instrument (MRI) having a display for energy readings or from a notebook computer with suitable software.
- 6.38.23 The meter shall have means to test MWh and MVARh accuracy and calibration at site in-situ and test terminal blocks shall be provided for the same.
- 6.38.24 The Employer/ Owner shall have the right to carry out surprise inspections of the Metering Systems from time to time to check their accuracy.

6.39 SCADA and Remote Monitoring System

- 6.39.1 The plant shall be automatically operated and shall be controlled by microprocessor based control system SCADA and should be Open Platform Communications (OPC) compliant. There shall be simultaneous data logging, recording and display system for continuous monitoring of data for different parameters of different sub systems, power supply of the power plant at DC side and AC side.
- 6.39.2 An integrated SCADA shall be supplied which should be capable of communicating with all inverters and provide information of the entire Solar PV Grid interactive power plant.
- 6.39.3 The SCADA shall be string level monitoring compatible and shall have features of remote access to the real time data. SCADA shall have features for generating the day ahead schedule of generation based on historical data/ suitable logic. Also, system must be capable of sending the telemetry data to the local SLDC via GPRS/ GSM/ suitable mode.
- 6.39.4 Computer-aided data acquisition unit shall be a separate & individual system comprising of different transducers to read the different variable parameters, A/D converter, multiplexer, de multiplexer, interfacing hardware & software, which will be robust & rugged suitable to operate in the control room Environment.
- 6.39.5 Reliable sensors for solar insolation, temperature, and other weather and electrical parameters are to be supplied with the data logger unit.
- 6.39.6 The Bill of Materials associated with the equipment must clearly indicate especially

the details about the PC and Printers, etc.

6.39.7 The Data Acquisition System should be housed in a desk made of steel sheet.

6.39.8 All data shall be recorded chronologically date wise. The data file should be MS Excel/ CSV compatible. The data, if needed, can be accessible remotely through authorized access. The data logger shall have internal reliable battery backup and data storage capacity to record all sorts of data simultaneously round the clock. All data shall be stored in a common work sheet chronologically and representation of monitored data shall be in graphics mode or in tabulation form. All instantaneous data can be shown in the Computer Screen. Provision should be available for Remote Monitoring.

6.39.9 SCADA shall measure and continuously record electrical parameters and provide following data (but not limited to) at a 5-15 minute interval.

- Energy export to grid at 33kV
- Main combiner box parameters
- Inverter level parameters
- Parameters at LV terminal (415V)
- Power characteristics of HT side
- Ambient temperature near array field
- Module surface temperature
- Wind Speed and direction
- Solar irradiation/isolation
- Any other parameter considered necessary by supplier based on current prudent practice

6.39.10 SCADA shall provide 15 minute daily, monthly and annual average of following parameters:

- Exported Energy to grid at 33 kV
- Energy, DC and AC voltage, power and pf of each inverter
- Solar Radiation (horizontal and tilted plane)
- Temperature (ambient and module surface)

6.39.11 SCADA shall have feature to be integrated with the local system as well remotely via the web using either a standard modem or a GSM/WIFI modem. The Bidder shall provide compatible software and hardware so that data can be transmitted via. Standard modem.

6.39.12 SCADA shall be provided with reliable power supply along with backup supply for at least one hour to cater to outage of grid.

6.39.13 The SCADA shall be compatible to the requirements for measuring and reporting the performance-ratio (PR) of the power plant.

6.39.14 The Contractor shall provide all administrative rights/ privileges/passwords of the SCADA system to the Employer. The Employer have rights over the data generated in the plant.

6.39.15 The Bidder shall submit the data sheet with technical specifications of the SCADA system.

6.39.16 The PC/ workstation shall be of Industrial type, rugged & robust in nature to operate in a hostile environment. The PC will have minimum Intel processor (4th generation) having 2 X 1TB HDD with 4 GB RAM. The PC shall also have 17" TFT Colour monitor, DVD Drive with Writer, USB drive, Scroll Mouse and UPS for 4 hours Power back up. The bidder can suggest the workstation best used for the purpose.

6.39.17 The printer shall be of industrial type, rugged & robust in nature and of reputed make. The printer shall be equipped for printing, colour scanning, copying and fax.

6.40 DC Battery & Charger

6.40.1 Adequate capacity DC battery Bank should be provided for control supply of inverters, control / protection system & emergency lighting at buildings. Appropriate capacity battery charger (float cum boost charger FCBC) with relevant IS/IEC standards & protection and automatic change over system should be provided to charge the battery bank along with relay circuit, fuses, annunciations and remote operating and controlling facility from the Main Control Room.

6.40.2 A DC power supply Distribution panel/board should be supplied along with the Charger (FCBC) as per relevant IS standards. Control room DC Battery Bank & DC supply system theoretical design, calculations and detailed explanations along with drawing shall be provided and approved by the Employer.

6.40.3 DC Batteries the batteries will have the following specifications:

- Type : VRLA/ MF Stationary, sealed type, storage battery.
- Rating : 110 V D.C., Minimum 80 Ah at 8 Hour rate of discharge (or as per design)
- Standard : IS 1651 – 1979; performance as per IS 8702
- Container : Plastic Resin, ABS or PP
- Terminal Posts: Designed suitably to accommodate external bolted connections

6.40.4 The battery shall be provided with epoxy paint coated exhaust fan for removal of gasses released from the battery cells.

6.40.5 The design of the battery bank and loads considered along with the data sheet for the battery and battery charger shall be submitted for approval.

6.41 Power and Control Cables specifications

6.41.1 The size of each type of cable selected shall be based on minimum voltage drop; however the maximum drop shall be limited to 2%. Due consideration shall be made for the de-rating of the cables with respect to the laying pattern in buried trenches / on cable trays, while sizing the cables.

6.41.2 All cables shall be supplied in the single largest length to restrict the straight- through joints to the minimum number.

- 6.41.3 PV Modules should be connected with USE-2/RHW-2 cables array to junction box conductors and junction box to photovoltaic dis-connector with the THHN/THWN-2 sunlight resistant with 90°C wet rated insulation cable.
- 6.41.4 Only terminal cable joints shall be accepted. No cable joint to join two cable ends shall be accepted. All cable/wires shall be marked with good quality letter and number ferrules of proper sizes so that the cables can be identified easily. The ferrules used must be UV resistant. However, for HT cables, embossed ferrules can be used.
- 6.41.5 Cable terminations shall be made with suitable cable lugs & sockets etc., crimped properly and passed through brass compression type cable glands at the entry & exit point of the cubicles.
- 6.41.6 All high voltage cables should be PVC insulated grade conforming to IS 1554 and cables shall also conform to IEC 60189 for test and measuring the methods.
- 6.41.7 Irrespective of utilization voltage and current rating all type of power cables shall be minimum of 1100 V grade PVC insulated conforming to IS 1554 / IS 694 for working voltage less than 150 V control cable shall be of minimum 500 V grade, the control and power cable has to be laid separately. All LT XLPE cables shall conform to IS: 7098 Part I & II. All HT XLPE Cables Shall confirm IS: 7098 PART-3 & IEC -60287, IEC-60332
- 6.41.8 The cables shall be adequately insulated for the voltage required and shall be suitably colour coded for the required service. Bending radii for cables shall be as per manufacturer's recommendations and IS: 1255.
- 6.41.9 Cables inside the equipment room, control room and in the switchyard shall be laid in Galvanized Cable Trays mounted on mild steel supports duly painted, in constructed trenches with RCC raft and sidewalls or bricks sidewalls and provided with removable RCC covers.
- 6.41.10 All the communication cables (RS 485, fibre optics etc.) must be supplied with type test reports and shall laid in accordance with the relevant IS codes. It must be laid so that there is no interference with the power cables.
- 6.41.11 Type test reports and Data sheets of individual cable sizes (HT, LT & DC) shall be submitted for approval by Employer. Drum numbers and drum length details shall be submitted with each consignment.

6.42 Power Evacuation and Hardware

- 6.42.1 The power from the plant must be evacuated to nearby 11 kV overhead line through 11 kV HT XLPE Cables of appropriate size as per prevailing conditions at site. The power evacuation system must be reliable, redundant and have low maintenance.
- 6.42.2 The design and arrangement for the laying of cable shall be in bidder's scope. Bidder has to take necessary precautions for easy maintenance.
- 6.42.3 The cable must be appropriately laid in order to have easy maintenance and marked with route markers for easy identification.
- 6.42.4 Metal fittings of specified material for string hardware meant for power conductor and

earth wire shall have excellent mechanical properties such as strength, toughness and high corrosion resistance. The suspension and tension clamps shall be made from aluminium alloy having high mechanical strength. Suspension and tension clamps offered shall be suitable for cable/ conductor as per design.

- 6.42.5 All hooks, eyes, pins, bolts, suspension clamps and other fittings for attaching insulators to the tower or to the power conductor shall be so designed as to reduce (to a minimum) the damage to the conductor, insulator or the fitting arising from conductor vibration.
- 6.42.6 All drop-forged parts shall be free-from flaws, cracks, or other defects and shall be smooth, close-grained and of true forms and dimensions. All machined surfaces shall be true, smooth and well-finished.
- 6.42.7 All ferrous parts of hardware shall be galvanized in accordance with IS 2629.
- 6.42.8 The galvanization shall withstand four dips of 1-minute duration each in copper-sulphate solution as per the test procedure laid down in the relevant IS Standards.
- 6.42.9 The threads in nuts and tapped holes shall be cut after galvanizing, and shall be well- lubricated/greased. All other threads shall be cut before galvanizing.
- 6.42.10 Both the suspension and the tension hardware shall be of ball and socket type, and shall be with 'R' and 'W' type security clip of stainless steel or phosphor Bronze conforming to IS 2486. The tension clamps of both compression type and bolted type as shown in the relevant drawings shall be offered. Arcing horns shall be provided on the line side for both the suspension type and compression type hardware.

6.43 Danger Plates

Size of each Danger Notice plates shall be 200 mm x 150 mm made of mild steel sheet and at least 2 mm thick, and vitreous enamelled white on both sides and with inscription in signal red colours on front side as required. The inscriptions shall be in Hindi, Telegu and English.

6.44 Fire alarm System

- 6.44.1 Buildings shall have fire detection and alarm system installed as per relevant standards and regulations. The installation shall meet all applicable statutory requirements, safety regulations in terms of fire protection.
- 6.44.2 Liquefied CO₂/ Foam/ ABC type fire extinguisher shall be upright type of capacity 5/10 kg having IS: 2171. 7 IS: 10658 marked. The fire extinguisher shall be suitable for fighting fire of Oils, Solvents, Gases, Paints, Varnishes, Electrical Wiring, Live Machinery Fires, and all Flammable Liquid & Gas. Bidder shall provide portable fire extinguisher as per the recommendation by relevant fire safety authority.
- 6.44.3 The minimum 2 no. of fire extinguishers (CO₂ and Foam type each) shall be provided at every buildings.
- 6.44.4 Sand bucket should be wall mounted made from at least 24 SWG sheet with bracket fixing

on wall conforming to IS 2546 at strategic locations.

6.44.5 The plan for fire extinguishing must be provided by the bidder to Employer for the approval.

6.45 CCTV cameras

6.45.1 CCTV cameras must be installed minimum at main entry gate and control room. Bidder may propose other locations as required to provide security for the entire plant. Bidder has to propose the locations and number of cameras required for the plant during bidding. However, Employer will decision on number of cameras shall be final.

6.45.2 The CCTV system shall be designed as a standalone IP based network architecture. System shall use video signals from different cameras at defined locations, process the video signals for viewing on monitors at control room and simultaneously record all video streams using latest compression techniques.

6.45.3 Camera shall be colour, suitable for day and night surveillance (even under complete darkness) and network compatible.

6.45.4 It shall be possible to control all cameras i.e., PTZ auto/ manual focus, selection of pre-sets, video tour selection etc. The software shall support flexible 1/2/4 windows split screen display mode or scroll mode on the display monitor for live video.

6.45.5 The system shall support video analytics in respect of the following:

- Video motion detection
- Object tracking
- Object classification

6.45.6 Camera server shall be provided with sufficient storage space to storage recordings of all cameras at HD mode for a period of 15 days. All recordings shall have camera ID, location, date and time of recording.

6.46 Testing Instruments for Electrical & Electronic

Bidder shall also provide required set of onsite testing instruments/equipment viz. earth resistance tester, rheostats, insulation tester, millimetres, clamp meters, CRO, Function Generator, Transformer oil BDV kit, Relay testing kit, infra-red thermal imaging hand held temperature meter, inverter testing kit etc. All testing equipment shall possess valid calibration certificate issued from approved NABL labs.

6.47 General Guidelines

6.47.1 Any civil or electrical work which is not mentioned or included in this tender document but necessary for the plant shall be borne by the Bidder.

6.47.2 Successful Bidder shall prepare all designs / drawings have based on the specifications given in the tender and in light of relevant BIS/IS/ equivalent standard.

6.47.3 The bidder shall provide type test reports and datasheet/ GTP for all equipment used for the project.

6.47.4 The Employer reserves right to modify the design at any stage, to meet local site conditions / project requirements.

- 6.47.5 All work shall be carried out in accordance with the latest edition of the Indian Electricity Act and rules formed there under and as amended from time to time.

6.48 Specification of Weather Monitoring System

As a part of weather monitoring system, Bidder shall provide the following measuring instrument with all necessary software and hardware required to integrate with SCADA.

6.48.1 Pyranometer

- Bidder shall provide minimum 2 (two) number of pyranometers for measuring the incidental solar radiation at horizontal and inclined plane of array.
- Specification of the pyranometer shall be as follows:

Details	Values
Spectral Response.	0.31to2.8micron
Sensitivity	Min7micro-volt/w/m2
Time response (95%):	Max15s
Nonlinearity:	±0.5%
Temperature Response:	±2%
Tilt error:	<±0.5%.
Zero offset thermal radiation:	±7w/m2
Zero offset temperature change	±2w/m2
Operating temperature range:	0 deg to+80 deg.
Uncertainty(95%confidence Level):	Hourly- Max-3%, Daily- Max-2%
Non stability:	Max±0.8%
Resolution:	Min+/- 1W/m2
Input Power for Instrument & Peripherals:	230V a.c.(If required)

- Each instrument shall be supplied with necessary cables. Calibration certificate with calibration traceability to World Radiation Reference (WRR) or World Radiation Centre (WRC) shall be furnished along with the equipment. The signal cable length shall not exceed 20m. Bidder shall provide Instrument manual in hard and soft form.

6.48.2 Thermometer

Bidder shall provide minimum two thermometers (one for ambient temperature measurement with shielding case and other for module temperature measurement). The thermometers shall be RTD/ semiconductor type measuring instrument. Instrument shall have arrange of 0°C to 80°C.The instrument shall have valid calibration certificate.

6.48.3 Anemometer

Bidder shall provide minimum one no. anemometer with wind vane of rotating cup type

Details	Values
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Velocity range with accuracy limit	$\pm 0.11\text{m/s}$ upto 10.1 m/s $\pm 1.1\%$ of true when more than 10.1 m/s
Wind direction range with accuracy limit	0 to 360° with accuracy $\pm 4^\circ$

6.49 Specification of Lighting in Solar Power Plant

6.49.1 Scope

This specification covers design of Array yard and sub-station, street light using suitable LED luminaires (to meet the required lux levels), tubular poles (from main gate up to the control room/switchyard gate and periphery wall of the plant) distribution pillar boxes, PVC cables, conduit steel trays etc. which shall be supplied by the contractor for installation of luminaires, their control gear and wiring on them. The street light shall work on the auxiliary supply and same shall be incorporated in auxiliary loads. The bidder will also design, supply and install lighting fixtures and accessories based on LED for equipment room and control room building and entry points/ gates. The Bidder shall furnish Guaranteed Technical Particulars. All LED luminaires shall be supplied with proper diffuser to avoid direct visibility of LED with proposer thermal management for longer life. Renowned brands available in the market need to be used.

6.49.2 General Technical Requirements:

The lighting system for outdoor and indoor areas of Solar Power Plant shall be designed in such a way that uniform illumination is achieved.

In outdoor yard equipment /bus bar areas and the peripheral wall are to be illuminated and luminaires shall be aimed for clear view.

6.49.3 Lighting Levels

- The average LUX level of 10 lm is to be maintained in switchyard. However, a lux level of 20 lm (10+10) additional switchable on requirement only) is to be maintained in switchyard on transformer.
- Lighting in other areas such as control room, office rooms and battery room & other areas (i.e. street light) shall be such that the average LUX level to be maintained shall be as under:

S. No	Area	LUX
1.	Control Room and equipment rooms	300
2.	Office	300
3.	Battery & other rooms	150
4.	Other areas including periphery wall	10
5.	Transformer yard	20
6.	H pole and metering point	10

6.49.4 Emergency Light Points:

- Light points using LED lamps of 15-20 W (at 240 V) shall also be provided as given below:

Control room and equipment room	4 Nos.
Battery room	1 Nos.
Office	1 Nos.
Corridor	1 Nos.

- These lights shall operate on AC/DC changeover supply from the DC distribution Board. Separate wiring and distribution board shall be provided from these lights.
- The lighting level shall take into account appropriate light output ratio of luminaires, coefficient of utilization maintenance factor (of 0.7 or less) to take into account deterioration with time and dust deposition.
- LED luminaires shall meet the following parameters

PARAMETER	SPECIFIED VALUE
	170-260 V
Input Frequency	
Power Factor	0.95 (Minimum)
Power Efficiency	>96%
LED efficacy	>130
Dispersion Angle	Minimum 120°
Usage hours	Dusk to dawn
Total Harmonic Distortion	< 15 %
Working Temperature	
Working Humidity	10% -
Index of Protection Level	Minimum IP 65
Lamp Casing	Powder coated metal / Aluminium
Life	>
LED Type	Power LEDs from reputed makes.
Colour Temperature	
Colour Rendering	>75
Junction Temperature	< 60° C
Electrical Connector	Lead wire with 2 meter long –or as required by the customer at site.
Expected Life of components	Passive electronic components life greater than >100,000 hours
Moisture protection in case of	IP 65 (preferably Totally encapsulated)

casing damage	
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- Luminaire Compliances:

Luminaire Specification:

Control gear specification:

EN 61347-2-13: Particular requirements for D.C. or A.C. supplied electronic control gear for LED modules

EN 62384: D.C. or A.C. supplied electronic control gear for LED modules.

Luminaire EMC specification:

EN 61000-3-2: Electromagnetic compatibility (EMC). Limits for harmonic current emissions (Equipment input current < 16 A per phase)

EN 61000-3-3: Limitation of voltage fluctuation and flicker in low voltage supply systems for equipment with rated current < = 16 A

- Additional information:

The LED luminaire housing, heat sink, pole mounting bracket, individual LED reflectors and front heat resistant tempered glass should be provided.

The LED luminaire housing should be made of non-corrosive high pressure die cast aluminium and the housing should be powder coated grey, so as to ensure good weatherability.

Each individual LED source should be provided with an asymmetrical distribution high reflectance aluminized reflector, which should ensure that the light distribution of the luminaire is suitable for road lighting applications (wide beam distribution) and should ensure high pole to pole spacing.

The luminaire should be provided with an in-built power unit and electronic driver.

The luminaire should be so constructed to ensure that the gear and LED modules are replaceable, if required.

The luminaire should be suitable for both standard street light poles with a typical pole diameter of 50 mm 60 mm and should be suitable for both side entry and bottom entry (post top).

E. Performance Measurement procedure

7. Performance Ratio Test Procedure

7.1 PR - Provisional Acceptance Test Verification Procedure

7.1.1 The Performance ratio test aims at the comparison of the actual PV plant energy production with the guaranteed value for a limited operation time of the PV plant of 30 consecutive days.

7.1.2 After Commissioning of the Plant and after receiving all the satisfactory results regarding the correct operation of the plant, there will be continuous monitoring of the performance for 30 days. This monitoring will be performed on the site under the supervision of the Employer / Employer's engineer.

- 7.1.3 The final tests to prove the guaranteed performance parameters shall be conducted at site by the Contractor in presence of the Employer. The Contractor's commissioning / start-up Engineer shall make the plant ready to conduct such tests. The Performance Guarantee Tests (PG tests) shall be commenced, within a period of one (1) month after successful Commissioning. Any extension of time beyond the above one (1) month shall be mutually agreed upon. These tests shall be binding on both the parties to the contract to determine compliance of the equipment with the guaranteed performance parameters.
- 7.1.4 The test will consist of guaranteeing the correct operation of plant over 30 days, by the way of the efficiency rate (performance ratio) based on the reading of the energy produced and delivered to the grid and the average incident solar radiation.
- 7.1.5 The Efficiency or performance ratio (PR) of the PV Plant is calculated as follows (according to IEC 61724)

$$\text{Performance Ratio (PR)} = \left\{ \frac{Y_A}{Y_R} \right\} * \left[1 - \alpha (T_{\text{Cell avg.}} - T_{\text{Cell}}) \right]$$

Where;

Y_A = Final PV system yield (representing the number of hours that the system would need to operate at its rated output power P_{Nom} to contribute the same energy to the grid as was monitored)

Or
$$Y_A = E_{\text{ac}} / P_{\text{Nom}}$$

Y_R = Reference yield (representing the number of hours during which the solar radiation would need to be at STC irradiance levels in order to contribute the same incident energy as was monitored)

$$Y_R = I_{\text{R Site}} / I_{\text{R STC}}$$

E_{ac} = AC energy injected into the grid during a clearly specified amount of time

(kWh) P_{Nom} = Installed nominal peak power of modules (Flash test rating at STC)
(kWp)

$I_{\text{R Site}}$ = Irradiation on the module plane of array during a clearly specified amount of time (measured with a pyranometer installed on the array plane) (kWh/sq. m)

$I_{\text{R STC}}$ = Irradiance at STC (kW/ sq. m)

T_{cellavg} = Average cell/ module temperature ($^{\circ}\text{C}$)

T_{cell} = STC cell/ module temperature ($^{\circ}\text{C}$)

α = temperature coefficient of power (negative in sign) corresponds to the installed Module ($\%/^{\circ}\text{C}$)

Minimum Performance Ratio (PR) should be 75%.

7.2 Monitoring System for PR Verification

The following instrumentation will be used to determine the Solar Plant

- Performance: Power Meter at the delivery point.
- Power Meter for each inverter/ LT panel incomer for reference only.
- One nos. calibrated pyranometer to determine irradiance on the plane of array (with a target measurement uncertainty of ± 2).
- One nos. calibrated pyranometer to determine irradiance on horizontal plane (with a target measurement uncertainty of ± 2)
- Two nos. thermocouples to measure module temperature with a measurement uncertainty of ± 1 °C.
- Shielded ventilated thermocouple with a measurement accuracy of ± 1 °C.
- An anemometer mounted on a 10m mast to measure wind speed (without additional shadowing on modules).

7.3 Data measurement shall be witnessed in the format mutually agreed before the start of PR test by the Employer and the Contractor jointly for the said period.

7.4 The bidder shall show the specified PR for Operational Acceptance and committed CUF for Final Acceptance (i.e. after one year from the date of commissioning).

7.5 Capacity Utilization Factor (CUF) shall be calculated as per the following formula : $CUF = E_N / (8760 * P_{nom})$

E_N = No. of units recorded at the ABT meter excluding the auxiliary consumption i.e. net generation

P_{nom} = Installed DC capacity

F. Civil Works

8. Detailed Contour Survey & Soil Investigation of the Site

The turnkey contractor shall be responsible for detailed soil investigation and contour survey at required location for the purposes of foundation design and other design/ planning required for the successful completion of the project. The contractor must submit the detailed reports for soil investigation, bore log records, ERT reports, contour survey, etc. to Employer.

8.1 Topographical survey

Topographical survey shall have to be done by the Successful Bidder of the proposed site at 10m interval with the help of Total Station or any other suitable standard method of survey. All necessary Reduced Levels (RL) as entered in the Field Book have to be submitted along with pre contour layout of the total site. The formation levels of the proposed power plant have to be fixed with reference to High Flood Level of the

proposed site. The ground level

and plinth level of structures shall be fixed taking into consideration the highest flood level and surrounding ground profiles. Accordingly, a detailed drawings for levelling and grading (if necessary) shall be submitted. The volume of cutting and filling of earth shall also be mentioned in the drawings. The filled earth must be well compacted as per relevant IS standards.

8.2 Soil Tests:

The Contractor is advised to and is solely responsible to carry out detailed Geotechnical investigation to ascertain soil parameters of the proposed site for the use of planning / designing / construction / providing guarantee / warranty of all civil work including but not limited to foundations / piling for module mounting structures, HT lines, etc. The Contractor shall carry out soil investigation through any Govt. approved / certified soil consultant. These reports shall be furnished to the Employer prior to commencing work. All RCC works shall be provided of required grade of concrete as per relevant IS specifications as well as soil data considering appropriate earthquake seismic zone, wind velocity, weather effect, soil characteristics etc.

8.3 Soil Investigations:

The scope of soil investigation covers execution of complete soil exploration including boring, drilling, collection of undisturbed soil sample where possible, otherwise disturbed soil samples, conducting laboratory test of samples to find out the various parameters mainly related to load bearing capacity, ground water level, settlement, and soil condition for each bore hole and submission of detail reports along with recommendation regarding suitable type of foundations including module mounting structure, equipment and buildings along with recommendation for soil improvement where necessary.

8.4 Other investigations

Successful Bidder shall obtain and study earthquake and wind velocity data for design of module mounting structure, equipment and building foundations after considering all parameters related to the weathers conditions like Temperature, humidity, flood, rainfall, ambient air etc.

The Successful Bidder shall carry out Shadow Analysis at the site and accordingly design strings and arrays layout considering optimal use of space, material and manpower and submit all the details / design to Employer for its review / suggestions / approval.

8.5 Land Development for site activities

The employer (i.e. HDC, KoPT) is responsible for making the site ready and easily approachable by clearing of bushes, felling of trees (if required with appropriate approval from concerned authority), levelling of ground (including reclamation work wherever required) etc. for commencing the project. It will be ensured that land must be graded and levelled properly for the flow of water. It is advisable to follow the natural flow of water at the ground. If the land pocket needs any filling of sand, it is to ensure that the filled earth must be well compacted as per the relevant IS standards. Bidder shall take reasonable care to ensure that the plant is aesthetically designed. The bidders shall judiciously decide on making the price-bid accordingly.

8.6 Foundations:

- 8.6.1 The contractor is responsible for the detailed soil investigation and subsequent foundation design of all the structures in the plant. The foundation of the module mounting structures, equipment, buildings and other important structures must be approved by Employer prior to construction. The contractor must provide the detailed design and calculations of the foundation. The foundation designs must be approved by Chartered Structural Engineer.
- 8.6.2 The foundations should be designed considering the weight and distribution of the structure and assembly, and a maximum wind speed as per relevant Indian Standard Specification. Seismic factors for the site have to be considered while making the design of the foundation. Successful Bidder shall also plan for transport and storage of materials at site.

8.7 Switch yard civil works

Switchyard civil work includes transformer plinth, HT Switchgear kiosk plinth, 2 pole/ 4 pole structure foundation, earth pits and surrounding masonry work, metal spreading curb wall in and around switchyard, plinth protection, trenches & precast covers and fencing. The transformer/ HT switchgear kiosk plinth shall be made of RCC/ brickwork/ Random Rubble

masonry, as required and approved, conforming to relevant standards. The height of transformer /HT Switchgear kiosk plinth shall be decided based on 11 kV ground clearance. Earth pit construction shall be of brickwork covered with RCC (1:2:4) slabs. Switchyard/ double/ four pole area must be surrounded by chain link fencing with pre-cast RCC post/ galvanized MS angle of suitable size with double leaf gate will be provided. Area enclosed within this perimeter must be filled with gravel. All the trenches shall be made up of precast sections/ brick work with plaster. The trenches must be covered with precast slabs with handles of suitable sizes.

8.8 Buildings

Buildings are required to be constructed for housing the electrical equipment/ panel and central control room with office cum store building for the operation & maintenance of Solar Photovoltaic Power Plant. Security houses/ cabins shall also be required at strategic locations to secure the plant from any theft/ burglary. The building shall be constructed with

conventional RCC framed structure with brick partition walls. Equipment room shall be designed as per the OEM recommendations to ensure desired life of equipment.

Bidder shall furnish the drawing of the proposed buildings to the Employer for approval, prior to construction. The construction of the same shall be as under-

8.8.1 RCC Works

All RCC works shall be as per IS 456 and the materials used viz. Cement, reinforcement steel etc. shall be as per relevant standards.

8.8.2 Brick Works

Brick works in cement mortar (CM) 1:6 for 9" thick and 4½" thick wall respectively. All brick works shall be using 1st class bricks of approved quality as per IS 3102.

8.8.3 Doors & Windows:

Steel framed doors, Windows and ventilators shall conform to IS 1081 with necessary float glass panels including of all fixtures and painting etc. complete. Doors and windows shall be made of aluminium sections. All sections shall be 20 microns anodized. Sections of door frame and window frame shall be adopted as per industrial standards. Door shutters shall be made of aluminium sections and combination of compact sheet and clear float/ wired glass. The control room shall require a number of windows/ louvers to provide ventilation/ fresh air circulations.

8.8.4 Plastering

Plastering in cement mortar 1:5, 1:6 and 1:3 shall be applied to all internal, external walls and ceiling of slab respectively as per IS 1542.

8.8.5 Flooring (as per relevant IS codes for selection and laying)

Store area:	Cement flooring in concrete mix (1:2:4) using 10 mm aggregates as per IS 2571: 1970
Control Room cum supervisor room:	Heavy Duty Vitrified tiles 8 mm thickness
SCADA Room:	Heavy Duty Vitrified tiles 8 mm thickness
Equipment room:	Heavy Duty Vitrified tiles 8 mm thickness
Battery Room:	Acid/ Alkali resistant tiles of suitable
thickness Toilets:	Ceramic tiles 8 mm thickness
Lobby:	Vitrified Tiles 8 mm thickness

The floor finishing must include skirting up to a suitable height. The wall tiles, if proposed, shall be glazed tiles of 6 mm thickness and provided up to lintel level.

8.8.6 Roofing

The roof of the building shall be insulated and waterproofing shall be done as per relevant IS standard.

8.8.7 Plinth Protection

Plinth protection 1000mm wide shall be provided around all the buildings as per relevant standards using brick bats.

8.8.8 White washing & colour washing.

White washing and colour washing work shall conform to relevant IS codes. The right of selection of colour/ shades shall lie with the Employer. Bidder has to follow respective and relevant IS codes of practice for the finishing process.

- Internal walls: Acrylic distempering
- External walls: Heat reflective synthetic enamel
- MMS foundations and Earth pit enclosures: Cement painting
- Steel/ Al doors, windows and ventilators: Powder coated paint

8.8.9 Rolling Shutters.

Rolling shutters made of cold rolled strips shall conforming to IS 4030 with approved gauge thickness shall be provided with all fixtures, accessories, painting all etc. complete.

8.8.10 Water supply.

GI pipes of Medium quality conforming to IS 1239 (Part I) and IS 1795 for Mild Steel pipes shall be used for all water supply and plumbing works.

8.8.11 Plumbing and Sanitary:

Sanitary fittings, which include water closet (EWC/IWC), wash basins, sink, urinal fitting including flushing tank, and necessary plumbing lines shall be provided for office cum stores building and Security house.

8.8.12 Electrification of Building

Electrification of buildings shall be carried out as per relevant IS standards. The lighting design of the buildings shall be carried out as per IS 3646. The building shall be provided with adequate quantity of light fittings, 5A/ 15A 1 phase sockets, fans etc., controlled by required ratings of MCBs and MCB, DBs. Supervisor room must be fitted with suitably sized HVAC system. It is encouraged that bidder shall use the latest energy efficient equipment for the electrification and illumination.

8.8.13 Toilet:

Toilet shall be designed for 15 persons; and constructed with following finish

- Floor: Vitrified tiles/ ceramic tiles
- Door: made out of aluminium sections/ PVC
- Ventilators: Mechanical exhaust facility
- Plumbing fixtures: Repute make
- Sanitary ware: Repute make
- EWC: 390 mm high with health facet, toilet paper roll holder and all fittings
- Urinal (430 x 260 x 350 mm size) with all fittings.
- Wash basin (550 x 400 mm) with all fittings.
- Bathroom mirror (600 x 450 x 6 mm thick) hard board backing
- CP brass towel rail (600 x 20 mm) with C.P. brass brackets
- Soap holder and liquid soap dispenser.
- GI pipes (B class) of reputed makes
- Overhead water tank equivalent of 1,000 litre capacity

8.8.14 Drainage for Toilets:

Drainage pipes shall be of PVC (6 kg/cm²) of repute make. Gully trap, inspection chambers, septic tank for 15 person and soak well to be constructed for above mentioned requirement.

8.8.15 Air Conditioner for Control Room:

The control room shall be equipped with appropriate numbers of fans for effective heat dissipation. The supervisor room and SCADA cabin shall have split type air conditioning units.

8.8.16 Fire Extinguishers:

Liquefied CO₂ / foam/ ABC type fire extinguisher shall be upright type of capacity 10 kg having IS: 2171. 7, IS: 10658 marked. The fire extinguisher shall be suitable for fighting fire of Oils, Solvents, Gases, Paints, Varnishes, Electrical Wiring, Live Machinery Fires, and all Flammable Liquid & Gas.

8.8.17 Sand Bucket:

Sand buckets should be wall mounted made from at least 24 SWG sheet with bracket fixing on wall conforming to IS 2546. Bucket stands with four buckets on each stand shall be provided in the Transformer Yard 4 Nos.

8.8.18 Sign Boards:

The sign board containing brief description of major components of the power plant as well as the complete power plant in general shall be installed at appropriate locations of the power plant as approved by Employer.

- The Signboard shall be made of steel plate of not less than 3 mm. Letters on the board

shall be with appropriate illumination arrangements.

- Safety signs, building evacuation plan and direction signs, assembly points shall also be placed at strategic locations.
- The Contractor shall provide to the Employer, detailed specifications of the sign boards.

8.9 Water supply & Cleaning

- 8.9.1 Water used for cleaning purpose shall be fit for cleaning the PV modules, cleaning procedure and pressure requirement shall be as per the recommendation of PV module manufacturer.
- 8.9.2 A suitable arrangement of water shall be ensured to cater the day-to-day requirement of drinking water and needs of Solar Photovoltaic plant during entire O&M period.
- 8.9.3 The Bidder shall estimate the water requirements for cleaning the photovoltaic modules at least once in every week or as per the soiling conditions prevailing at site, in order to operate the plant at its guaranteed plant performance. Also, bidder is required to plan the water storage accordingly.
- 8.9.4 All necessary arrangement for wet cleaning of the solar panels shall be in the scope of the bidders and accordingly the agency has to provide all the necessary equipment, accessories, tool & tackles, pumps, tankers, tractors and piping arrangement pertaining to module cleaning system.
- 8.9.5 Bidder has to plan and install the effective module cleaning system as per the prevailing conditions at Site. The system may include the storage water tanks, pumps, laying of GI/ HDPE/ UPVC pipes, flexible pipes, taps/ valves, pressure gauges etc.as per the planning by the bidder. Bidder has to submit the drawing/ plan for the proposed module cleaning system.
- 8.9.6 All the pipes thus laid must be buried in ground at least 150mm below FGL. Road crossings and drain crossings, the pipes must be passed through GI/ Hume pipes as applicable.

8.10 Roads within Solar Power Plant

- 8.10.1 Suitable approach road and internal Solar Photovoltaic roads to carry safe and easy transportation of equipment and material at the project site shall be made. The road should provide easy and fast approach to each location of the plant. These roads are to be designed optimally to carry the crane load with all necessary chambers, gradients, super elevation, and radius of curvatures for the easy movement of cranes, trucks and public transport.
- 8.10.2 Roads are to be constructed with sufficient width (minimum 3.5m) followed by 0.5m well compacted shoulders on each side. The road must be well compacted as per the relevant IS standards and MORTH updated till date.
- 8.10.3 All peripheral roads and pathways from central road to Inverter room road shall be

WBM road. Also, all cable crossings and other crossings shall be provided with GI/ Hume pipes.

8.11 Peripheral Boundary/ peripheral wall:

- 8.11.1 The objective to provide a peripheral wall/ fencing is to demarcate the boundary and to keep away the unauthorized access to plant. The contractor shall provide GI chain link/ RCC pre cast/ RR masonry wall all around the periphery of the plant. The wall height must be minimum of 2 meter from the FGL. The boundary wall must be provided with a rugged main entry gate (s). The construction of peripheral wall and the main entry gate must conform to the relevant IS standards and practice. Additionally, there should be few strands of barbed wires attached to a tilted bracket above the fencing/wall.
- 8.11.2 All the drawings/ specifications for the peripheral wall and main entry gate design/ planning must be submitted to Employer for approval prior to construction for their accord.

8.12 Drainage

- 8.12.1 The storm water drainage shall be planned for the plant to ensure no water stagnation in the plant. The drains must be constructed with brickwork/ RCC/ RR masonry as suitable for the site conditions. The drains outfall must be connected to the nearest drain outside the plant premises. It is advised that the drainage for the plant must be designed keeping the natural flow of water to the nearest exit point.
- 8.12.2 Bidder is to provide RCC Hume pipe of appropriate size at the crossing of road and drains and at required locations. The peripheral drain may be of brick pitching which is backed up by cement mortar bed and all joints are filled up with cement mortar in C.M. 1:4, no pointing and plastering is required. Alternate suitable drain can also be explored. Drains are required to provide weep holes with PVC pipes at an interval of 2m. Bidder shall submit the drain plan and drain section details for the complete plot as required for the effective water evacuation to nearest outfall point for suggestion/ approval.

8.13 Painting & Finish:

- 8.13.1 All metal surfaces and support structures shall be thoroughly cleaned of rust, scale, oil, grease, dirt etc. Fabricated structures shall be pickled and then rinsed to remove any trace of acid. The under surface shall be made free from all imperfections before undertaking the finishing coat.
- 8.13.2 After Phosphate treatment, two (2) coats of yellow zinc chromate primer will be applied followed by two (2) coats of epoxy based synthetic enamelled paint. Shade shall be Siemens Grey RAL- 7032. Thickness of paint shall be not less than 75 micron.
- 8.13.3 All unpainted steel parts shall be cadmium plated or suitably treated to prevent rust formation. If these parts are moving elements then they shall be greased.

8.14 Watchmen / Security Cabin:

Contractor shall provide adequate numbers of prefabricated Watchman's portable cabin at strategic locations within of the plant. The minimum size of Watchman's (Security Cabin) cabin is 1.2 meter x 1.8 meter size and height of 2.4 mm with appropriate roof at the top. Location of the watch cabin (Security Cabin) will be as directed by the Employer. The Prefabricated Security Cabin of size 3 metre x 3 metre at the main entrance gate shall be designed and constructed by the Successful Bidder keeping in view the safety and security of the power plant.

8.15 Underground RCC water Tank

Contractor has to estimate the water requirement for cleaning the modules with a frequency of at least once a week or as per the soiling conditions prevailing at site. The frequency of cleaning shall be mutually agreed and approved during the detail engineering in order to achieve the guaranteed performance. The bidder is required to construct overhead PVC water tank/ underground RCC water tank with silting chamber for filtration of the water before the inlet which will match with invert level of Storm water drain. Suitable sized pump shall also be installed to maintain the water pressure at the extreme ends. Design of RCC water tank shall be such that it shall resist Earth pressure and Water pressure and satisfy all IS codes. The design shall be as per relevant IS codes, bidder to take approval from Employer before the construction of water storage tank and module cleaning system.

G. Inspection & Testing

9. Inspection:

9.1 Employer shall have free access to **Bidder's manufacturer's works** to inspect, expedite and witness **shop floor** tests. Any materials or work found to be defective or which does not meet the requirements of the specification will be rejected and shall be replaced at **Bidder's cost**. Employer reserves the right to carry out stage wise inspection of fabrication and components. The Bidder shall furnish a detailed quality assurance plan (QAP) for review by the Employer.

9.2 The test & inspection shall be carried out at **manufacturer's work and at** the site with the Bidders obligation. The test and Inspection shall be done in accordance with the relevant standards and the Manufacturer's standard before the delivery to site as well as after the erection and commission at site. The bidders shall give the list of tests that they will carry out at site to show the performance of plant.

9.3 A detailed 'QAP' for Manufacturing and Inspection shall be submitted by the Bidder for Employer's approval. The data of each test and inspection shall be recorded and

submitted as soon as the test/ trials are conducted and will also be a part of final documentation.

9.4 The shop test shall be carried out to prove the performance parameters of the offered model. The testing shall be done in the presence of the representatives of the department.

9.5 The Employer will nominate its representatives (max. of 2 nos.) for inspection of stage manufacturing and testing at works & 7 days training at premises of SPV module and PCU manufacturer. The notice of such inspection shall be given 30 days in advance in case of countries outside India and 15 days in India.

9.6 Manufacturer has to submit procedure for Test carried out at their Factory:

- Start Up Trials
- Load Test
- Records & Measurements
- Safety Device List
- Setting values for all sensors for Pressure and Temperature
- Dimensional Check-up, Overall Inspection, Completeness of Scope of Supply
- Shop Test/Load Test for Solar Power Plant

10. Load Trials & Reliability test at Site

10.1 Performance Guarantee Test at Site for Grid Connect Solar Power Plant, HT Panel etc.

These tests will be conducted at site as per site conditions at available load and after performing all pre-commissioning check and trials and after readiness of the entire Solar Power Plant system which are required to carry out the load trials

10.2 All the tests which are mentioned in the load test of Solar Power Plant will be carried out in presence of Employers' Representative at Site under site conditions and the parameters checked in accordance with the data sheet and guaranteed parameters given by the Contractor.

10.3 All the equipment supplied by the vendor will be tested as per relevant standard/ Quality assurance plan at site conditions and the performance monitored.

11. Quality Considerations

11.1 Contractor will submit and get finalized detailed comprehensive Standard Field Quality Plan (SFQP) within 30 days from date of issue of the order for bought out items and items manufactured by them. The Standard Field Quality Plan shall relate to the specific and objective erection practices right from storage of equipment till final inspection and testing to be followed for bought out items and items manufactured by Contractor. Accordingly, the Manufacturing Quality Plan shall be submitted broadly under following sub-heads:-

- Raw material/Bought Out items and Components.

- In process inspection and test/checks to establish successful completion/ accomplishment of the process.
 - Final tests/checks in accordance with relevant national/ international standards/ specification.
- 11.2 The quantum of check for each and every inspection/test items shall be based on an established sampling method and the quantum of check indicated in the SFQP should be designed adequate quality protection.
- 11.3 In case reference documents/acceptance norms are indicated as per plant standards then the same shall be duly substantiated/properly explained by well-established and proven engineering practices. All submissions will be in English language only.
- 11.4 Bidder will to allow Employer to carry out Quality/Audit/Quality surveillance on bidders and vendor's work with reference to contractual obligations to ensure that the quality management practices/norms as detailed out in the Quality Manual are adhered to. To facilitate this activity, you shall keep Employer informed all progress of work in this contract on monthly basis.
- 11.5 Contractor will associate/fully witness in each inspection being carried out at their/their sub-vendor's works by our authorized inspection engineer(s).
- 11.6 Employer shall also carry out quality audit and quality surveillance of your systems, procedures and quality control activities. However, this shall not relive you of any of your contractual responsibilities under the contract.

12. Performance and Functional Warranty / Guarantees

- 12.1 PV modules used in grid connected solar power plants must be warranted for peak output wattage, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years.
- 12.2 The modules shall be warranted for at least 10 years for failures due to material defects and workmanship.
- 12.3 The mechanical structures, electrical works and overall workmanship of the grid connected solar power plant must be warranted for a minimum of 5 years.
- 12.4 The Contractor must ensure that the goods supplied under the Contract are new, unused and of most recent or current models and incorporate all recent improvements in design and materials unless provided otherwise in the Contract.
- 12.5 The warranty / guarantee period shall be as follows:
- Solar PV Modules: Modules shall be warranted for a minimum period of 25 years in the Bidder's detailed Warranty/ Guarantee Certificate

- Power Conditioning Units (PCU): PCUs shall be warranted for a period of minimum 5 years or guarantee period provided by the OEM, whichever is higher.
 - Transformers, associated switch gear and others: Bidder must furnish in detail its warranties / guarantees for these items.
 - All other associated equipment, not mentioned, but otherwise included in the scope of the contract must be warranted for minimum 5 years against its performance and workmanship.
- 12.6 During the period of Warranty / Guarantee the Contractor shall remain liable to replace any defective parts, that becomes defective in the plant, of its own manufacture or that of its sub-Contractors, under the conditions provided for by the Contract under and arising solely from faulty design, materials or workmanship, provided such defective parts are not repairable at Site. After replacement, the defective parts shall be returned to the Contractor's works at the expense of the Contractor unless otherwise arranged.
- 12.7 **At the end of guarantee period, the Contractor's liability shall cease.** In respect of goods not covered by the first paragraph of this clause, the Employer shall be entitled to the benefit of such guarantee given to the Contractor by the original Contractor or manufacturer of such goods.
- 12.8 The performance of the plant will be determined by the performance ratio (PR). The same shall be measured and recorded for a period of one month for operational acceptance of the plant as mentioned under TS Clause 7.
- 12.9 During the first year of assured performance demonstration and Operation & Maintenance thereafter, the Contractor shall be responsible for any defects in the work due to faulty workmanship or due to use of sub-standard materials in the work. Any defects in the work during the guarantee period shall therefore, be rectified by the Contractor without any extra cost to the Employer within a reasonable time as may be considered from the date of receipt of such intimation from the Employer failing which the Employer shall take up rectification work at the risk and cost of the Contractor.
- 12.10 During the O&M period, the bidder, in concurrence with the Employer, is encouraged to carry out the PR test in similar fashion for a period of 7 days, at regular intervals, in order to check the continued performance of the plant and to determine the necessary steps to meet the CUF commitment. However, for the O&M period committed CUF shall be considered only. CUF shall be determined for every year for the performance obligations of the Contract.

Guaranteed Technical Particular data Sheet for Solar PV Module

(To be furnished by the bidder)

S. No.	Particulars	Unit	Type/ value	
1	PV Module Manufacture (Name & Country)			
2	PV Module type (Crystalline- Mono/ Multi)			
3	Product Code (commercial)			
4	No. of PV cells per Module	cells	60	72
5	Mounting arrangement for Solar Module			
6	Solar Module frame material (if framed)			
7	Module dimensions			
8	Output Cables (viz., Polarized Weather Proof DC rated multi-contact connector)			
9	Availability of Reverse Blocking Diode and Bypass Diode			
10	Construction Front glass description and thickness Back sheet details Encapsulating details		60	72
11	Cell efficiency	%		
12	Module efficiency	%		
13	Nominal Wattage (P_{nom})	W		
14	Power Tolerance ($\pm 5W$)	W		
15	Peak power voltage (V_{mp})	V		
16	Peak power current (I_{mp})	A		
17	Open circuit voltage (V_{oc})	V		
18	Short circuit current (I_{sc})	A		
19	Weight of each module	kg		
20	Fill Factor	%		
21	Standards/Approvals from International Agencies	IEC 61215 IEC 61730 IEC 61646 IEC 61701 IEC 62716 Others		
22	Module is suitable to operate up to 50° ambient	Yes/No		

Technical Particular Data Sheet for Power Conditioning Unit

(To be furnished by the bidder)

Particulars	Unit	Value
Make		
Capacity		
Origin		
AC Side		
Nominal AC power @ 25°C	kW	
Nominal AC power @ 50°C	kW	
Output AC voltage	V	
Output AC Current	A	
Frequency (and Variation)	Hz	
Total Harmonic Distortion (< 3%)	%	
AC over/under voltage, over/under frequency protection		
Phase shift (cos phi)		
DC Side		
Maximum Input DC power	kW	
Maximum DC voltage	V	
MPPT voltage range	V	
Maximum DC current	A	
DC over voltage protection		
DC voltage ripple	%	
Others		
Maximum Efficiency	%	
Euro Efficiency	%	
Ambient temperature range	°C	
Humidity (non-condensing)	RH	
Quiescent power	kW	
Degree of protection	IP	
Dimensions approx. (HXWXD)	mm	
Weight	kg	
Compliances (Reference Standards)		

TECHNICAL PARTICULARS OF STEP-UP TRANSFORMER

(To be furnished by the bidder)

S. No.	Description	Guaranteed particulars to be filled in by the manufacturer
1.	Service	
2.	Type	
3.	Rating (kVA)	
4.	Rated frequency (Hz)	
5.	Number of phase HV side LV side Neutral (separate outside)	
6.	Rated Voltage a) HV winding (kV) b) LV winding (kV)	
7.	Vector group	
8.	Type of cooling (ONAN/ONAF)	
9.	Insulation level a) Power frequency withstand -kV rms. (HV/LV) b) Impulse withstand voltage -kV (HV/LV)	
10.	Method of Earthing	
11.	Duty	
12.	Short circuit level	
13.	Off circuit tap changer: a) Range % b) In steps of c) Tapping provided on HV side	
14.	Tap changer type	
15.	Impedance voltage at 75°C a) At principal tapping %	
16.	Temperature rise above 50°C ambient a) Top of oil by thermometer °C b) Womdomg by resistance °C	
17.	Terminal details a) HV side b) LV side	
18.	Losses (at 75°C and principal tapping) a) No load loss at rated voltage kW and frequency b) Load loss at rated current kW (ONAN) c) Total loss at maximum rated power kW	

S. No.	Description	Guaranteed particulars to be filled in by the manufacturer
19.	Efficiency at 75°C and 0.9 PF a) At full load (ONAN) % b) At 75% load (ONAN) % c) At 50% load (ONAN) %	
20.	Hot spot temperature in winding limit to °C	
21.	Shipping dimensions a) Height m b) Breadth m c) Length m	
22.	Painting	
23.	Reference Standards	

Guaranteed Technical Particulars of LED lights
(To Be Submitted By the Bidder)

S. No.	Parameter	Guaranteed Value
1.	LED Operating Current	
2.	Output Luminous Flux	
3.	Beam Angle	
4.	Illuminance	
5.	Photometric Curve	
6.	Material of Luminaire	
7.	Dimension	
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SECTION VII
GENERAL CONDITIONS OF CONTRACT (GCC)

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General Conditions of Contract (GCC)

A. GENERAL PROVISIONS

7.1 Definitions

In the conditions of contract (“these conditions”), which includes particular conditions and these general conditions, the following words and expressions shall have the meanings stated. Words indicating persons or parties include corporations and other legal entities, except where the context requires otherwise.

7.1.1 The Contract:

- a) **“Contract”** means and includes these **bidding documents** in entirety (**including** all Addenda and Corrigenda, if any), the **specification**, the **drawings**, the **PRICE SCHEDULE**, the **bid / offer**, the **Letter Of Acceptance**, the **Contract Agreement** (when Contract Agreement would be completed in all respect) and such further documents as may be expressly incorporated in the **Letter Of Acceptance** or **Contract Agreement** (when Contract Agreement would be completed in all respect).
- b) **“Contract Agreement”** means the executed Contract Agreement referred to in **ITB Clause No. 5.37 [Signing of Contract Agreement]**.
- c) **“Contract documents”** means the documents listed in the Contract Agreement, including any amendments thereto.
- d) **“Letter Of Acceptance (LOA)”** or **“Work order”** or **“Order letter”** means the formal acceptance of the bid (and placement of order with the successful bidder), issued by or on behalf of the Employer, including any adjustments or variation to the bid agreed between the Employer and the successful bidder and includes its enclosure(s), annexure(s), etc., if any.
- e) **“Specification”** means the specification of the work included in the contract and any modification thereof or addition thereto made under **GCC Clause No. 7.12 [Additions and alterations]** or submitted by the Contractor and approved by the Engineer, in writing.
- f) **“Drawings”** means **all drawings, calculations and technical information**, etc., provided by the Engineer to the Contractor under the contract and all **drawings, calculations, samples, patterns, models**, etc., including modification, if any, and other **technical information & manuals** of a like nature, submitted by the Contractor and approved by the Engineer.
- g) **“Tender”** or **“Bid”** means the proposal (priced offer), along with all supporting documents, submitted by the bidder to the Employer for consideration.

- h) **“Price Schedule”** means the priced schedule of items, forming part of the bid.
- i) **“Tenderer”** or **“Bidder”** means the individual firm, who submits the bid, duly filled up and signed, along with all the required documents and payment instruments, in strict compliance of the conditions / requirements stipulated in these bidding documents.
- j) **“Contract data”** means the pages completed by the Employer entitled **CONTRACT DATA**.

7.1.2 Parties and persons :

- a) **“Party”** means the **Employer** or the **Contractor**, as the context requires.
- b) **“Employer”** or **“Board”** or **“Trustees”** or **“Kolkata Port Trust”** or **“KoPT”** means the Board of Trustees for the Port of Kolkata (Calcutta), a body corporate under **Section 3 of the Major Port Trusts Act, 1963** (as amended from time to time), including their successors, representatives and assigns.
- c) **“Contractor”** or **“Successful bidder”** or **“Successful tenderer”** means the person or persons, firm or company, whose bid / offer has been accepted by the Employer and is named as such in the Contract Agreement or his representative(s), who is/are duly authorised to deal the contract.
- d) **“Contractor’s representative”** means the person(s) named by the Contractor in the contract or appointed from time to time by the Contractor, under **GCC Clause No. 7.21 [Contractor’s personnel and Contractor’s representative]**, who acts on behalf of the Contractor.
- e) **“Sub-contractor”** shall mean a person or persons, firm or company to whom a part of the work has been sub-contracted by the Contractor, with prior consent of the Employer.
- f) **“Contractor’s personnel”** means the Contractor’s representative and all personnel whom the Contractor utilises on site, who may include staff, labour and other employees of the Contractor and of each Sub-contractor, and any other personnel assisting the Contractor in the execution of the work.
- g) **“Engineer”** means the person appointed by the Employer to act as the Engineer for the purposes of the contract and named in the **Contract data**, or other person appointed from time to time by the Employer and notified to the Contractor under **GCC Clause No. 7.18 [Replacement of the Engineer]**.
- h) **“Engineer’s Representative”** means any sub-ordinate Engineer or assistant to the Engineer or any other official appointed from time to time by the Engineer to perform the duties set forth in **GCC Clause**

Nos. 7.13 to 7.15 hereof.

- i) **“Engineer-in-charge”** means employee of KoPT, authorised by the Engineer to look after the physical execution of the contract, at site level.
- j) **“Haldia Dock Complex”** or **“HDC”** means a Dock Complex situated at Haldia, under **Kolkata Port Trust**.
- k) **“Chairman”** means the Chairman of the Board of Trustees for the Port of Kolkata (Kolkata Port Trust) and includes the person appointed to act in his place under Sections 14 and 14A of the Major Port Trusts Act, 1963.
- l) **“Deputy Chairman”** means the Deputy Chairman, Haldia Dock Complex and includes the person appointed to act in his place.
- m) **“General Manager (Engineering)”** means the Officer appointed to take charge of Plant & Equipment Division, Infrastructure & Civic Facilities Division and Materials Management Division of HDC, under the supervision of the Deputy Chairman, HDC.
- n) **“Senior Deputy Manager (P&E)”** means the Officer of Plant & Equipment Division of HDC, reporting to the General Manager (Engineering).

7.1.3 Dates and periods:

- a) **“Completion period”** means the time of completion/period of execution notified under 7.65 [Completion period].
- b) **“Month”**, for the purpose of this contract, shall mean the period starting from the date of commencement in any month to the previous date of the following month, as per English Calendar.
- c) **“Week”**, for the purpose of this contract, shall mean any period of 7 (seven) consecutive English Calendar Days.
- e) **“Day”**, for the purpose of this contract, means English Calendar Day.

7.1.4 Money and payments:

- a) **“Contract price”** or **“Contract value”** means the sum named in the **“Letter of Acceptance (LOA)”** [excluding GST] of the bid /offer of the Contractor, subject to such additions thereto and deductions therefrom, as may be made by the Engineer, under the provisions contained in this bidding document.
- b) **“Cost”** means all expenditure reasonably incurred (or to be incurred), by the Contractor, whether on or off the site, including overhead and similar charges, but does not include profit.
- c) **“Foreign Currency”** means the currency other than Indian Currency.

7.1.5 Work:

- a) **“Work”** means the work to be executed in accordance with the contract and includes authorised **“Extra work”**, **“Excess work”** and **“Temporary work”**.
- b) **“Temporary work”** means all temporary work of every kind required in or about the execution, completion or maintenance of the work and includes (without thereby limiting the foregoing definitions) all temporary erections, scaffolding, ladders, timbering soaking vats, site offices, cement and other godowns, platforms and bins for stacking building materials, gantries, temporary tracks and roads, temporary culverts and mixing platforms.
- c) **“Excess work”** means the required quantities of work, in excess of the provision made in the contract, against any item of the “Price Schedule”.
- d) **“Extra work”** means those work, required by the Engineer for completion of the contract, which were not specifically and separately included in the schedule of items of the work (i.e. “Price Schedule”) of the bidding document.
- e) **“Related Services”** means the services incidental to the supply of goods / contract job, such as insurance, installation, training, initial maintenance and other obligations of the Contractor, under the contract.

7.1.6 Other definitions

- a) **“Constructional plant”** means all appliances or things, of whatsoever nature, required in or about the execution, completion or maintenance of the work or temporary work and includes (without thereby limiting the foregoing definition) all machinery and tools, but does not include materials or other things intended to form or forming part of the permanent work.
- b) **“Site”** means the land and other places, on, under, in or through which the contract is to be executed or carried out and any other lands or places provided by the Employer for the purpose of the contract.
- c) **“Excepted Risks”** means riot, in so far as it is uninsurable, war, invasion, act of foreign enemies, hostilities (whether war be declared or not), Civil War, rebellion, revolution, insurrection or military or usurped power or use or occupation by the Trustees of any portion of the works in respect of which a certificate of completion has been issued (all of which are herein collectively referred to as the excepted risks).
- d) **“Approved / approval”** means approval in writing.
- e) **“Test on Completion”** means such tests, prescribed by the applicable Design Standard, codes and described in the bidding document, to me

performed by the Contractor before the equipment / items / installations are supplied, delivered and taken over by the Employer.

- f) **“Defect Liability Period (DLP)” means the period defined in the GCC Clause No. 7.67.**
- g) **“Force Majeure” is defined in GCC Clause No. 7.86 [Definition of Force Majeure].**

7.2 Contract documents

- 7.2.1 The several documents forming the contract are to be taken as mutually explanatory of one another and should anything appear in one, which is not described in the other, no advantage shall be taken of any such omission.
- 7.2.2 In case, any discrepancies or inconsistencies however appear or should any misunderstandings arise as to the meaning and of the specifications or drawings or as to the dimensions or the quality of the materials or the due and proper execution of the work or as to the measurement or quality and valuation of the work executed under this contract or as extra thereupon, the same shall be explained by the Engineer or his authorised representative.
- 7.2.3 The explanation of Engineer or his authorised representative shall be final and binding upon the Contractor and the Contractor shall execute the work according to such explanations, and without extra charge or deductions and do all such work and things as may be necessary for the proper execution of the contract as implied by the specification and drawings, even though such work and things are not specifically shown and described therein.

7.3 Interpretations

- 7.3.1 In the contract, except where the context requires otherwise:
 - a) words indicating one gender include all genders;
 - b) words indicating the singular also include the plural and words indicating the plural also include the singular;
 - c) provisions including the word “agree”, “agreed” or “agreement” require the agreement to be recorded in writing;
 - d) **“written” or “in writing”** means hand-written (manuscript), type-written, printed or Electronically made, and resulting in a permanent record, under or over signature and seal, as the case may be;
and
 - e) the word “tender” is synonymous with “bid”, and “tenderer” with “bidder” and the words “tender documents” with “bidding documents”.

7.4 All Drawings are Trustees’ property

- 7.4.1 The Drawings, referred to in the Special Conditions of Contract / Technical Specification / Price Schedule, if and as applicable, shall be furnished by the Engineer to the Contractor, free of cost, for his use on the work, but these

shall remain the property of the Trustees and hence, the Contractor shall return them to the Engineer or his Representative on completion of the work, if not torn or mutilated on being regularly used at site.

7.5 **Language**

- 7.5.1 The contract as well as all correspondence and documents relating to the contract, exchanged between the Contractor and the Employer/Engineer, shall be written in **English Language only**. If any documents/manuals/printed literature/drawings is submitted by the Contractor in other language(s), the same should be accompanied by an accurate translation of the relevant pages in the English language. In that case, for the purposes of interpretation of the contract, such translation shall govern.
- 7.5.2 The Contractor shall have to bear all costs of translation to the English Language and all risk of the accuracy of such translation, for documents provided by the Contractor.

7.6 **Notices**

- 7.6.1 Any notice, given by one party to the other, pursuant to the contract, shall be in writing, to the address specified in the **Contract data**. The term “in writing” means communicated in written form, with proof of receipt.
- 7.6.2 A notice shall be effective when delivered or on the notice’s effective date, whichever is later.

7.7 **Governing Law**

- 7.7.1 The contract shall be governed by and interpreted in accordance with the relevant Indian Acts [considering latest amendment thereof], as applicable, within the jurisdiction of the Honourable High Court of Kolkata [Calcutta High Court] , India, including the following Acts:
- i) The Indian Contract Act, 1872.
 - ii) The Major Port Trust Act, 1963.
 - iii) The Workmen’s Compensation Act, 1923.
 - iv) The Minimum Wages Act, 1948.
 - v) The Payment of Wages Act, 1936.
 - vi) The Payment of Bonus Act, 1965.
 - vii) The Payment of Gratuity Act, 1972.
 - viii) The Equal Remuneration Act, 1976.
 - ix) The Employees Provident Fund Act, 1952.
 - x) The Employees State Insurance Act, 1948 & The Employees State Insurance (Amendment) Act, 1989.
 - xi) The Contract Labour (Regulation & Abolition) Act, 1970; Rules 1971.

- xii) Child Labour (Prohibition & Regulation) Act, 1986.
 - xiii) The Maternity Benefits Act, 1961.
 - xiv) Interstate Migrant Workmen (Regulation of Employment & Conditions of Service) Act, 1979.
 - xv) The Dock Workers (Regulation of Employment) Act, 1948.
 - xvi) The Dock Workers (Safety, Health & Welfare) Act, 1986.
 - xvii) The Indian Arbitration and Conciliation Act, 1996 [considering its latest amendment in 2015].
- 7.7.2 Unless otherwise specified, all the laws / rules / acts, etc., mentioned in different clauses of this bidding document, should be considered as laws / rules / acts, etc. applicable in India.
- 7.7.3 The Contractor shall indemnify KoPT for any proceeding taken or commenced by any authority against the Employer for any contravention of any of such laws, bye laws, rules, regulations, orders, etc., by the Contractor or their personnel / workmen / agent / supplier, etc. If, as a result of the Contractor's failure, negligence, omission, default or non-observance of any provisions of any law, bye law, rule, regulation, order, etc., the Employer is called upon by any authority to pay or reimburse or is required to pay or reimburse any amount, the Employer shall be entitled to deduct the same from any amount due or that may become due to the Contractor under this contract or any other contract or by any other means or may otherwise recover from the Contractor any sum which KoPT is required or called upon to pay or reimburse on behalf of the Contractor.
- 7.7.4 The Contractor shall indemnify KoPT for any proceeding taken or commenced by any authority against the Employer for any contravention of any of such laws, bye laws, rules, regulations, orders, etc., by the Contractor or their personnel/workmen/agent/supplier, etc. If, as a result of the Contractor's failure, negligence, omission, default or non-observance of any provisions of any law, bye law, rule, regulation, order, etc., the Employer is called upon by any authority to pay or reimburse or is required to pay or reimburse any amount, the Employer shall be entitled to deduct the same from any amount due or that may become due to the Contractor under this contract or any other contract or by any other means or may otherwise recover from the Contractor any sum which KoPT is required or called upon to pay or reimburse on behalf of the Contractor.

7.8 Patent Rights

- 7.8.1 The Contractor shall fully indemnify KoPT against any action, claim or demand, costs or expenses arising from or incurred by reason of any infringement or alleged infringements of letters, patents, design, trademark or name, copyright or other protected rights in respect of any machine, plant, work, materials or things, system or methods of using, fixing working or arrangement used for fixed or supplied by the Contractor in India, or elsewhere.

- 7.8.2 All payments, or otherwise shall be deemed to be included by the Contractor in the prices named in the bid and shall be paid by them to whom they may be payable.
- 7.8.3 In the event of any claim being made or action brought against KoPT in respect of any such matter as aforesaid, the Contractor shall be immediately notified thereof and they shall with the assistance, if they so require, of KoPT but at the sole expense of the Contractor conduct all negotiations for the settlement of the same or any litigation that may arise there from, provided that the conduct of such negotiations or litigations shall be conditional upon the Contractor giving to KoPT such security, as shall from time to time, by reasonably required by KoPT to recover the ascertained or agreed amount, as the case may be, of any compensation, damages, expenses and cost, which might be payable by the Trustees in respect of or as a result of any such negotiation or litigation.
- 7.9 **Stamp duty & other expenses**
- 7.9.1 All the costs, charges and expenses to be incurred in connection with **Contract Agreement, Indemnity Bond, Bank Guarantees, Integrity Pact**, etc., including stamp duty, shall be borne by the Contractor.
- 7.10 **Indemnity**
- 7.10.1 Notwithstanding that all reasonable and proper precautions may have been taken by the Contractor, at all times during the progress of the work, the Contractor shall, nevertheless, be wholly responsible for all damages, whether to the works themselves or to any other property of KoPT or to the lives, persons, property of others during the progress of the work.
- 7.10.2 In case any damage occurs to the existing structure due to the Contractor's operation, the same shall be made good by the Contractor, at their own risk and cost. The areas, which are likely to be unsafe for use, shall be barricaded and all necessary precautionary measures, like displaying notices, shall be taken by the Contractor, during the contract period.
- 7.10.3 In case any material, spare parts, components, sub-assemblies, accessories, etc., related to the work (under the scope of the Contractor), is required to be taken out of the Dock premises by the Contractor, for some specialised servicing, repairs, overhauling, etc. or for any other reason whatsoever, the Contractor shall have to obtain permission from the Employer. For this the Contractor shall have to submit an “**Indemnity Bond**” [in the form furnished in **Section-XI**].
- 7.11 **Employer's lien**
- 7.11.1 All constructional plant, temporary work and materials, when brought to the site by the Contractor, shall be deemed to be the property of the Employer, who will have lien on the same, until the satisfactory completion of the work and shall only be removed from the site, in part or in full, with the written permission of the Engineer or his Representative.
- 7.11.2 The Employer shall have a lien on and over all or any money that may

become due and payable to the Contractor under this contract or any other contract or from any amount lying with them or under their control and in respect of any debt or sum that may become due and payable by the Employer to the Contractor, either alone or jointly with another or other and either under this contract or under any other contracts or transaction of any nature whatsoever between the Employer and the Contractor.

7.12 **Additions and alterations**

7.12.1 KoPT shall have power and authority, from time to time and at all times, to make amendments or additions or alterations or changes in the **Technical Specification** and give such further instructions and directions, as may appear necessary and proper to KoPT for the guidance of the Contractor and good & efficient execution of the work.

7.12.2 The Contractor shall receive, obey and be bound by the same, according to the true intent and meaning thereof, as if the same had been mentioned or referred to in the **Technical Specification**.

7.12.3 KoPT may also vary or alter the levels or positions of any of the work contemplated by approved specification or may order any of the work contemplated thereby to be omitted, with or without substitution of any other works in lieu thereof, or may order any work or any portion of works executed or partially executed, to be removed, changed or altered, if required.

In this connection, KoPT may increase or decrease or split the quantity of work included in the contract or execute additional work of any kind necessary for good & efficient execution of the work.

7.12.4 The Engineer shall have the power to order for the above amendments (additions/alterations/changes, etc.) and any difference in the cost occasioned by any such diminution or alteration so ordered and directed shall be added to or deducted from the amount accepted under the contract based on the rate(s) available in the contract. Where the rate(s) is/are not available in the contract, such difference in the cost shall be determined by the Engineer, taking into account the market rate and labour cost at site for similar work, backed up by rate analysis, (to be submitted by the Contractor and agreed upon between the Contractor and KoPT).

In the event of disagreement, KoPT shall fix such rates or prices as shall, in their opinion, be reasonable and proper having regard to the circumstances.

B. THE ENGINEER

7.13 **Instructions of the Engineer or Engineer's Representative**

7.13.1 The Contractor shall execute, complete and maintain the works in terms of the contract to the entire satisfaction of the Engineer and shall comply with the Engineer's direction on any matter whatsoever. However, the Engineer shall exercise his discretion impartially, within the terms of the contract and have regard to all the circumstances.

The Contractor shall take instructions from the Engineer and subject to limitation indicated in **GCC Clause No. 7.16.1** hereof, from the Engineer's

Representative.

7.14 Engineer's power and authority

7.14.1 The Engineer shall have full power and authority:

- a) to supply to the Contractor, from time to time, during the progress of the works, such further drawings and instructions as shall be necessary for the purpose of proper and adequate execution and maintenance of the works and the Contractor shall carry out and be bound by the same.
- b) to alter or modify the specification of any material and workmanship and to inspect the work at any time.
- c) to order for any variation, alteration and modification of the work and for extra works.
- d) to issue certificates as per contract.
- e) to settle the claims & disputes of the Contractor.
- f) to grant extension of completion time.

7.15 Power of Engineer's Representative

7.15.1 The Engineer's Representative shall:

- a) watch and supervise the work.
- b) test and examine any material to be used or workmanship employed in connection with the work.
- c) have power to disapprove any material and workmanship not in accordance with the contract and the Contractor shall comply with his direction in this regard.
- d) take measurements of work done by the Contractor for the purpose of payment or otherwise.
- e) order demolition of defectively done work for its reconstruction all by the Contractor at his own expense
- f) have powers to issue alteration order not implying modification of design and extension of completion time of the work.
and
- g) have such other powers and authorities vested in the Engineer, which have been delegated to him, in writing, by the Engineer under intimation to the Contractor.

7.16 Limitation of Engineer's Representative's power

7.16.1 Provided always that the Engineer's Representative shall have no power:

- a) to order any work involving delay or any extra payment by the Trustees,
 - b) to make variation of or in the work,
- And
- c) to relieve the Contractor of any of his duties or obligations under the contract.

7.17 Engineer's over-riding power

7.17.1 Provided also as follows:

- a) Failure of Engineer's Representative to disapprove any work or materials shall not prejudice the power of the Engineer thereafter to disapprove such work or materials and to order the pulling down, removal, breaking-up thereof and re-constructing at the Contractor's cost and the Contractor shall have no claim to compensation for the loss sustained by them.
- b) If the Contractor shall be dissatisfied by reason of any decision of the Engineer's Representative, they shall be entitled to refer the matter to the Engineer, who shall thereupon confirm, reverse or vary such decision which will be final, conclusive and binding on the parties.
- c) Any written instructions or written approval given by the Engineer's Representative to the Contractor, within the terms of delegation of power and authority vested in the Engineer to his representative, in writing, shall bind the Contractor and the Trustees as though it had been given by the Engineer, who may, from time to time, make such delegation.

7.18 Replacement of the Engineer

- 7.18.1 If the Employer intends to replace the Engineer, the Employer shall give notice to the Contractor in this respect.

7.19 Determinations

- 7.19.1 Whenever these conditions provide that the Engineer shall proceed, in accordance with this clause, to agree or determine any matter, the Engineer shall consult with each party, in an endeavour to reach agreement. If agreement is not achieved, the Engineer shall make a fair determination, in accordance with the contract, taking due regard of all relevant circumstances.

The Engineer shall give notice to both parties of each agreement or determination, with supporting particulars **within 28 (twenty-eight) days** from the receipt of the corresponding claim or request, except when otherwise specified. Each party shall give effect to each agreement or determination, unless and until revised under **GCC Clause Nos. 7.94 to 7.98 [Claims, Disputes and Arbitration]**.

C. THE CONTRACTOR

7.20 Performance Guarantee / Security Deposit

- 7.20.1 As specified in the SCC, the Contractor shall have to provide **Performance Guarantee / Security Deposit** towards guaranteeing the performance of the Contractor in execution of the contract.
- 7.20.2 The **Performance Bank Guarantee(s)** shall be denominated in the currency(ies) of payment in the contract , and shall be in the form furnished in **Section-XI**.
- 7.20.3 The original Bank Guarantee should be sent by the issuing Branch of the Bank, directly to the Employer, under Registered Post (A.D), at the following address:
General Manager (Finance),
Haldia Dock Complex (HDC),
Jawahar Tower Complex,
P.O: Haldia Township,
Dist.: Purba Medinipur,
PIN – 721 607,
West Bengal, India.
A photocopy of the Bank Guarantee should also be sent to the Engineer, by the Contractor, for record.
The General Manager (Finance), HDC may require Bank's confirmation for having issued the Guarantee. In that case, the issuing Branch of the Bank should send a confirmation letter, directly to the Employer, under Registered Post (A.D), at the above address.
- 7.20.4 Failure of the Contractor to submit the required Performance Bank Guarantee, as mentioned in **GCC Clause No. 7.20.1** and in the manner stated in the SCC, shall constitute sufficient grounds for termination of the contract and forfeiting the Earnest Money Deposit.
- 7.20.5 The proceeds of **Performance Guarantee / Security Deposit** shall be payable to the Employer, as compensation, for any loss resulting from the Contractor's failure to complete its obligations under the contract.
- 7.20.6 **Performance Guarantee/Security Deposit** shall be liable to be forfeited, at the option of the Employer, if the Contractor fails to carry out the work or to perform / observe any of the conditions of the contract.
- 7.20.7 The Employer shall be at liberty to deduct/recover any of their dues from **Security Deposit/Performance Guarantee**.
In that case, if **Security Deposit / Performance Guarantee** is reduced by reason of any such deduction or encashment, the Contractor shall have to, **within 15 (fifteen) days thereafter**, make good the amount so reduced.
- 7.20.8 The cost of obtaining **Performance Bank Guarantee** or any other Bank Guarantee and / or revalidation thereof, whenever required, has to be borne by the Contractor and it shall be their sole responsibility to arrange for timely

revalidation of such Bank Guarantee, failing which and for non-fulfilment of any contractual obligation by the Contractor, the Engineer and/or the Employer shall be at liberty to raise claim / demand under Performance Guarantee and/or enforce the same unilaterally.

No interest/charge, of whatsoever nature, shall be paid by the Employer on the amount of **Security Deposit / Performance Guarantee** held by the Employer, at any stage.

- 7.20.9 On completion of execution of the work, the Contractor shall maintain the same during the “**Defect Liability Period**” (i.e. **10 years comprehensive operation & maintenance period**), as specified in **GCC Clause No. 7.67**, from the date mentioned in the “**Certificate of Completion of Work**” [as per the form furnished in **Section-XI**]. Any defect / fault, which may appear in the work during the aforesaid maintenance period, arising, in the sole opinion of the Engineer or his Representative, from materials or workmanship not in accordance with the contract or the instruction of the Engineer or his Representative, shall, upon the written notice of the Engineer or his Representative, be amended and made good by the Contractor, at his own cost, within 7 (seven) days of the date of such notice, to the satisfaction of the Engineer or his Representative, failing which, the Engineer or his Representative shall have the defects amended and made good through other agency at the Contractor’s risk and cost and all expenses, consequent thereon or incidental thereto, shall be recoverable from the Contractor in any manner deemed suitable by the Engineer.
- 7.20.10 The contract shall not be considered completed and the work shall not be treated as finally accepted by the Trustees, until a “**Certificate of Final Completion**” [as per the form furnished in **Section-XI**] shall have been signed and issued by the Engineer, after all obligations under the contract, including that in the Defect Liability Period (DLP), if any, have been fulfilled by the Contractor. Previous entry on the works or taking possession, working or using thereof by the Trustees shall not relieve the Contractor of his obligations under the contract for full and final completion of the work.
- 7.20.11 Refund of **Performance Guarantee / Security Deposit** would be guided by the procedure detailed in the **SCC**.

7.21 Contractor’s personnel and Contractor’s representative

- 7.21.1 The Contractor’s personnel shall be appropriately qualified, skilled and experienced in their respective trades or occupations. The Engineer may require the Contractor to remove (or cause to be removed) any person employed on the site of work, including the Contractor’s representative, if applicable, who:
- a) persists in any misconduct or lack of care,
 - b) carries out duties incompetently or negligently,
 - c) fails to conform with any provisions of the contract, or
 - d) persists in any conduct, which is prejudicial to safety, health or

protection of the environment.

If appropriate, the Contractor shall then appoint (or cause to be appointed) a suitable replacement person.

- 7.21.2 The Contractor shall have to communicate the names of their officials/representatives, authorized by them through **Power of Attorney** (specimen signature of such authorized representative should be attested), to make all correspondences and sign all documents/papers in relation to this contract.

Written orders or instructions, which the Employer may issue to such authorized officials/ representatives of the Contractor, shall be deemed to have been given to the Contractor.

- 7.21.3 In case any of such authorised persons fails to act as Contractor's representative, the Contractor shall similarly communicate the name and particulars of another suitable person for such authorization.

The Contractor shall have to notify the Engineer, immediately after revoking the appointment of the Contractor's representative and appointment of a replacement.

- 7.21.4 If any of the Contractor's representatives/officials is required to be temporarily replaced during the period of contract, the name of the person temporarily authorised [by any one of the authorised officials/representatives, authorized earlier through **Power of Attorney**], shall have to be notified. Specimen signature of such temporarily authorised representative(s) should be attested [by the said authorised official/representative].

7.22 Assignment and sub-contracting

- 7.22.1 The Contractor shall not, directly or indirectly, transfer, assign, sublet or sub-contract the whole of the work.

Unless otherwise stated in the contract, the Contractor shall not, directly or indirectly, transfer, assign, sublet or sub-contract any part of the work without prior consent of the Engineer. Any such consent shall not relieve the Contractor from any of their liabilities or obligations under the contract and they shall be responsible for :

- a) the acts, defaults and neglect of any Sub-contractor, their agents, servants or workmen as fully as if these were the acts, defaults or neglects of the Contractor, their agents, servants or workmen,
- b) their full and entire responsibility of the contract and active superintendence of the work by them despite being sublet.

Provided that the Contractor shall not be required to obtain such permission for:

- i) the provision of labour engaged on piece-work basis/daily rate basis,
- ii) the purchase of materials/services which are in accordance with the standards specified in the contract,

Or

- iii) the sub-contracting of any part of the work, for which the Sub-contractor is named in the contract.

The Contractor shall be responsible for observance, by all Sub-contractors, of labour laws applicable in India (for the portion of work that would be executed in India) and all other provisions of the contract.

- 7.22.2 No **participating bidder** [in connection with the instant tender] will be allowed to act as a **Sub-contractor** of the successful bidder (Contractor).
- 7.22.3 In the event of the Contractor contravening aforesaid condition [**GCC Clause No. 7.22.2**], the Employer shall be entitled to terminate the contract forthwith and award a fresh contract to some other parties at **risk and cost of the Contractor**, who shall be liable for any loss or damage, which KoPT may sustain in consequence to arising out of such replacement of the Contractor.
- 7.22.4 The Contractor shall not assign their right and interest in these presents nor assume a fresh partner or partners, dissolve the partnership existing between them in reference to this contract, without the prior written permission of the Employer.

7.23 Access to site

- 7.23.1 The Contractor shall have to abide by the **rules and regulations of Kolkata Port Trust (KoPT)** in respect of entry / exit and movement in the dock premises.
- 7.23.2 Necessary **Gate Pass / Dock Entry Permit**, for entering into the Dock area, will be issued to the personnel of the Contractor [including that of approved Sub-contractor(s)] directly connected with the work, **on chargeable basis** [as per the extant “**Scale of Rates**” of KoPT, available at <http://www.kolkataporttrust.gov.in/> of **Kolkata Port Trust**], on receipt of a formal written request.

However, for issuing such Gate Pass, the following would be required:

- i) **For Indian nationals:** A photocopy of the Voter’s Identity Card/any other Photo Identity Card.
- ii) **For foreign nationals (excluding from Nepal and Bhutan):** **Permission in the form of “No objection” for entering Haldia Dock**, from the office of the **Superintendent of Police, Purba Medinipur, West Bengal, India**, which acts as the **District Registration Office for foreigners**.

Dock Entry Permits shall not be issued to the mentioned foreign nationals without the aforesaid permission. The aforesaid “No objection”, along with photocopies of Passport and Visa of the foreign national, has to be submitted to the Administration Division of HDC, KoPT, with an application for obtaining Dock Entry Permit(s).

- 7.23.3 The Contractor will be fully responsible for any injury (whether fatal or otherwise) to their personnel [including that of approved Sub-contractor(s)],

for any loss or damage to property or for any other loss, damage, costs and expenses, whatsoever caused, which, but for the granting of such permission, would not have arisen.

7.23.4 The Contractor will be liable to indemnify the Employer against any loss or damage to the property of the Employer or neighbouring property, which may be caused due to any act of the Contractor or their personnel [including that of approved Sub-contractor(s)].

7.23.5 **No photograph within the Dock Area** shall be taken by the Contractor, without prior permission of the Engineer.

7.24 **Transportation of materials**

7.24.1 All materials, spare parts, tools, tackles, service equipment, including consumables, required under this contract, will have to be packed, securely placed and protected by the Contractor during transportation. The Contractor will be held responsible for the inefficient packing, storing and protection of the materials.

7.25 **Contractor's equipment**

7.25.1 The Contractor shall be responsible for all the equipment of the Contractor. When brought on to the site, the Contractor's equipment shall be deemed to be exclusively intended for the execution of the work. The Contractor shall not remove from the site any major items or Contractor's equipment without the consent of the Engineer. However, consent shall not be required for vehicle(s) transporting goods or Contractor's personnel off site.

7.26 **Supply of water and Electricity**

7.26.1 **Supply of water:**

Drinking water supply at the **Contractor's site office, store, workshop, assembly/erection yard, etc.** will be given **on chargeable basis**. For this, the Contractor shall have to make **all arrangements, including installation of Water Meter and laying of pipelines from the source(s) identified by KoPT, at their cost**. The Contractor will be responsible for maintenance and calibration of such water meter also. Billing against water supply will be done in line with SCC.

KoPT do not guarantee uninterrupted supply of water and the Contractor shall not be compensated for any delay or irregularity in supplying water. The Contractor shall have to arrange for the supply of water at his own cost during such periods.

However, water supply, if required for the **actual work (including erection, commissioning & cleaning work) at the site only** and / or **maintenance, repair & cleaning work** (required to be carried out at site during the "Defect Liability Period") will be provided free of cost. The Contractor shall have to make **all arrangements for laying of pipelines from the source(s) identified by KoPT, at their cost**.

7.26.2 **Supply of Electricity:**

Supply of Electricity at the **Contractor's site office, store, workshop,**

assembly / erection yard, etc. will be on **chargeable basis**. The Contractor shall have to make all arrangements, including **installation of Energy Meter** and **laying of Cables from the source(s) identified by KoPT, at their cost**. The Contractor will be responsible for maintenance and calibration of such Energy Meter also. Billing against **electricity charges** will be done in line with SCC.

KoPT do not guarantee uninterrupted supply of Electricity and the Contractor shall not be compensated for any delay or irregularity in supplying Electricity. The Contractor shall have to arrange for Electricity at his own cost during such periods.

However, Power supply, required for the **actual work (including erection and commissioning) at the site only** and/or **maintenance and repair** (required to be carried out at site during the “Defect Liability Period”) will be provided free of cost. The Contractor shall have to make all arrangements for **laying of Cables from the source(s) identified by KoPT, at their cost**.

7.27 Use of ground and land/covered space for Contractor’s establishment

- 7.27.1 The Contractor shall be allowed to use a suitable land (open space), which in the opinion of KoPT may be absolutely necessary for the proper and efficient execution of works. For this, a token lump sum licence fee of **10.00 per month or part thereof** will be charged during pendency of the contract and extension thereof, if any.
- 7.27.2 On completion of work or termination of the contract, the Contractor shall have to clear away all their tools, plants, rubbish and other materials, **within a fortnight** and hand over vacant and peaceful possession of the same to KoPT, in a tidy and clean condition. The same license fee (10.00 per month or part thereof) will be applicable for this additional period (if any) for clearing the space. If the Contractor fails to clear the space and handover the same to the Employer in a clean and tidy condition, within the period mentioned above, KoPT’s “Schedule of Rate” will be applicable for the period beyond that.
- 7.27.3 The Contractor shall be allowed to erect any temporary structures on this land [as stated in **GCC Clause No. 7.27.1**] for **office and / or store and / or workshop**, etc. and make all suitable arrangement for water supply, Electricity supply and sanitary arrangements for the same, at their own cost.
- 7.27.4 In case the Contractor is interested in taking **covered space, office room**, etc. of KoPT for the purpose of making a site office and store in the Dock area, the same may also be allotted subject to availability. The rents for such covered spaces or office room of KoPT, to be allotted to the Contractor, shall have to be paid by the Contractor, as per the ‘Schedule of Rent of KoPT, prevailing at that time. In addition to the rent, **water consumption charges** [as per **GCC Clause Nos. 7.26.1**] and **Electricity consumption charges** [as per **GCC Clause No. 7.26.2**] (if Electricity / water is supplied from KoPT sources) and other applicable charges, as per the notifications of **Tariff Authority of Major Ports (TAMP)**, have to be paid by the Contractor. The Contractor will be responsible for installation, maintenance and calibration of Water Meter and / or Energy Meter also.

7.28 Existing services

- 7.28.1 Drains, Pipes, Cables, overhead wires and similar services, whether above or below the ground, which may be encountered in the course of the work, shall be saved and kept harmless from injury and/or loss or damages by the Contractor, at their own costs and expenses, so that they continue to be in full and uninterrupted use to the Employer.
- 7.28.2 The Contractor shall not store any materials or otherwise occupy any part of the site in a manner likely to hinder the operation of such services. The Contractor shall, at their own costs and expenses and without any delay, repair and make good, to the satisfaction of the Employer, any injury and/or loss or damage caused by the Contractor to the same.

7.29 Contractor to prepare working/ progress drawings

- 7.29.1 The Contractor shall provide and make, at his own expense, any working or progress drawings, required by him or necessary for the proper execution of the works, and shall, when required, furnish copies of the same, free of cost, to the Engineer for his information and/or approval, without meaning thereby the shifting of Contractor's responsibility on the Engineer, in any way, whatsoever.

7.30 Contractor's price is inclusive of all costs

- 7.30.1 Unless otherwise specified, the Contractor shall be deemed to have included in his bid / offer all his cost for supplying and providing all constructional plant, temporary work, materials (both for temporary and permanent works), labour (including supervision thereof), transporting to and from the site and in and about the work, including loading, unloading, fencing, watching, lighting, payment of fees, taxes and duties to the appropriate authorities and other things of every kind required for the construction, erection, completion and maintenance of the work.

7.31 Contractor is responsible for all construction process, except for correctness of design and specification formulated by the Engineer

- 7.31.1 The Contractor shall be solely responsible for the adequacy, stability and safety of all site operations and methods of construction, even if any prior approval thereto has been taken from the Engineer or his Representative. The Contractor shall not be responsible for the correctness of the design or specification of the temporary and permanent works formulated by the Engineer, but the Contractor shall be fully responsible for the correct implementation thereof, as also for any design and specification prepared/proposed/used by the Contractor.

7.32 Contractor to submit his programme of work

- 7.32.1 Whenever required by the Engineer or his Representative, the Contractor shall submit to him the details of his
- (a) programme for execution of the work,
 - (b) proposed procedure and methods of work,
 - (c) proposed deployment of plant, equipment, labour, materials and temporary

works.

The submission to and/or any approval by the Engineer or his Representative to any such programme or particulars shall not relieve the Contractor of any of his obligations under the contract.

- 7.32.2 If, for any reason, the Contractor be unable to adhere to his earlier programme, he shall submit his revised programme for completion of work within the stipulated time, whenever asked to do so.

7.33 Contractor to supervise the works

- 7.33.1 Necessary and adequate supervision shall be provided by the Contractor during execution of the works and as long thereafter as the Engineer or his Representative shall consider necessary during the Defect Liability Period (DLP). The Contractor, or his competent and authorised agent or representative, shall be constantly at site and instructions given to him by the Engineer or his Representative, in writing, shall be binding upon the Contractor subject to limitation in **GCC Clause No. 7.16** hereof. The Contractor shall inform the Engineer or his Representative in writing about such representative/agent of him at site.

7.34 Contractor is responsible for line, level, setting out, etc.

- 7.34.1 The Contractor shall be responsible for the true and proper setting out of the works, in relation to reference points / lines / levels given by the Engineer, in writing. The checking of any setting out or of any alignment or level by the Engineer or his Representative shall not, in any way, relieve the Contractor of his responsibility for the correctness thereof and he shall fully provide, protect and preserve all stakes, templates, bench marks, sight rails, pegs, level marks, profile marks and other things used in setting out the works.

7.35 Contractor is responsible to protect the work

- 7.35.1 From the commencement of the works till issue of the “Certificate of Completion of Work”, vide **GCC Clause No. 9.65** hereof, the Contractor shall take full responsibility for the care thereof. Save for the excepted risks, any damage, loss or injury to the work, or any part thereof, shall be made good by the Contractor, at his own cost, as per instruction and to the satisfaction of the Engineer, failing which, the Engineer or his Representative may cause the same to be made good by any other agency and the expenses, incurred and certified by the Engineer, shall be recoverable from the Contractor, in whatever manner the Engineer shall deem proper. This clause will not apply to that part of the work, which might have been taken over by the Trustees on partial completion of the work and in such case, the Contractor’s obligation will be limited to repairs and replacement for manufacturing or construction defects during the Defect Liability Period, as per the directions of the Engineer, as also for defects/damages, if any, caused to the work by the Contractor during such repairs and replacement during the Defect Liability Period.

7.36 Contractor is responsible for all damages to other structures / persons caused by him in executing the work

7.36.1 The Contractor shall, at his own cost, protect, support and take all precautions in regard to the personnel or structure or services or properties belonging to the Trustees or not, which may be interfered with or affected or disturbed or endangered and shall indemnify and keep indemnified the Trustees against claim for injury, loss or damage caused by the Contractor in connection with the execution and maintenance of the work to the aforesaid properties, structures and services and / or to any person, including the Contractor's workmen. Cost of Insurance Cover, if any, taken by the Contractor, shall not be reimbursed by the Trustees, unless otherwise stipulated in the contract.

7.37 Fossils, Treasure troves, etc. are Trustees' property

7.37.1 The Contractor shall immediately inform the Engineer's Representative if any fossil, coins, articles of value or antiquity and structures and other remains or things of geological or archaeological importance be discovered at site, which shall remain the property of the Trustees, and protect them from being damaged by his workmen and arrange for disposal of them, at the Trustees' expense, as per the instruction of the Engineer's Representative.

7.38 Contractor to indemnify the Trustees against all claims for loss, damage, etc.

7.38.1 The Contractor shall be deemed to have indemnified the Trustees against all claims, demands, actions and proceedings and all costs arising there from on account of:

- (a) Infringement of any patent right, design, trademark or name or other protected right, in connection with the works or temporary work.
- (b) Payment of all royalties, rent, toll charges, local taxes, other payments or compensation, if any, for getting all materials and equipment required for the work.
- (c) Unauthorised obstruction or nuisance caused by the Contractor in respect of Public or Private road, railway tracks, footpaths, crane tracks, waterways, quays and other properties belonging to the Trustees or any other person.
- (d) Damage/injury caused to any highway and bridge on account of the movement of Contractor's plants and materials in connection with the work.
- (e) Pollution of waterway and damage caused to river, lock, sea-wall or other structure related to waterway, in transporting Contractor's plants and materials.
- (f) The Contractor's default in affording all reasonable facilities and accommodation, as per the direction of the Engineer or his Representative, to the workmen of the Trustees and other agencies employed by or with the permission and/or knowledge of the Trustees on or near the site of work.

7.39 Dismantled materials Trustees' property

7.39.1 Debris and materials, if obtained by demolishing any property, building or

structure, in terms of the contract, shall remain the property of the Trustees.

7.40 Contractor's quoted rates / price must be all inclusive

7.40.1 The Contractor's quoted rates shall be deemed to have been inclusive of the following:

- (a) Keeping the site free of unnecessary obstruction and removal from site of constructional plant wreckage, rubbish, surplus earth or temporary works no longer required.
- (b) Cleaning and removal from site all the surplus materials, of every kind, to leave the site clean and tidy after completion of the work, without which payment against final bill may be liable to be withheld.
- (c) Precautionary measures to secure efficient protection of Docks, the River Hooghly and other waterways against pollution, of whatever nature, during execution and maintenance of the works and to prevent rubbish, refuse and other materials from being thrown into the water by the Contractor's men or those of his agency.
- (d) Making arrangements for deployment of all labourers and workers, local or otherwise, including payment for their wages, transport, accommodation, medical and all other statutory benefits and entry permits, wherever necessary.
- (e) Making arrangements, in or around the site, as per the requirements of Calcutta Municipality Corporation or other local authority or the Engineer or his Representative, for preventing
 - (i) spread of any infectious disease like smallpox, cholera, plague, malaria or dengue, by taking effective actions for destruction of rats, mice, vermin, mosquitoes, etc. and by maintaining healthy and sanitary condition,
 - (ii) illegal storage and distribution of Drugs, Narcotics, Alcoholic liquor, Arms and Ammunitions,
 - (iii) unlawful, riotous or disorderly conduct of the Contractor's or his Sub-contractor's workmen,
 - (iv) deployment of workmen of age less than 16 (sixteen) years.

7.41 Notice to Contractor

7.41.1 Every direction or notice to be given to the Contractor shall be deemed to have been duly served on or received by the Contractor, if the same is posted or sent by hand to the address given in the bid or to the Contractor's Site Office or, in case of Trustee's enlisted Contractor, to the address as appearing in the Trustee's Register or to the Registered Office of the Contractor. The time mentioned in these conditions for doing any act after direction or notice shall be reckoned from the time of such posting or despatch.

7.42 Contractor not to publish photograph or particulars of work

7.42.1 The Contractor and his Sub-contractor or their agents and men and any firm, supplying plant, materials and equipment, shall not publish or caused to be published any photographs or description of the works, without the prior authority of the Engineer in writing.

7.43 Contractor to provide facilities to outsiders

7.43.1 The Contractor shall, at the Trustees' cost to be decided by the Engineer, render all reasonable facilities and co-operation, as per direction of the Engineer or his Representative, to any other Contractor engaged by the Trustees and their workmen, to the Trustees' own staff and to the men of other Public Body, on or near the site of work, and in default, the Contractor shall be liable to the Trustees for any delay or expense incurred by reason of such default.

7.44 Work to cause minimum possible hindrance to traffic movement

7.44.1 The work has to be carried out by the Contractor causing minimum hindrance for any maritime traffic or surface traffic.

D. STAFF AND LABOUR

7.45 Engagement of staff and labour

7.45.1 The labour, as mentioned in the respective clauses, shall include all labourers of the approved sub-contractor(s), with respect to this contract.

7.45.2 The Contractor shall have to make their own arrangements for the engagement of all staff and labour, for doing the work at site or in respect of or in connection with the execution of work, as also for the transport, housing, feeding. They shall have to ensure making payment to the above staff and labours, to be engaged by them (including the labours, to be engaged by the approved Sub-contractor, if any).

7.45.3 KoPT's store shall mean any store of Haldia Dock Complex, situated at Haldia.

7.45.4 It is expressly made clear that both before and after the completion of the work or termination of the contract, **KoPT shall have no liability, whatsoever, for the personnel to be engaged by the Contractor [or by the approved Sub-contractor(s)] for the work under this contract.**

7.46 Labour Laws

7.46.1 The Contractor shall, at all times, during the pendency of the contract [including the period of making good/rectification of deficiencies/defects, if any], have to comply fully with all existing **Acts, Regulations and Byelaws**, including all **statutory amendments** and re-enactment of **State or Central Government** and other **Local Authorities** and any other enactments and acts that may be passed in future either by the **State** or the **Central Government** or **Local Authority**, including **Workmen's Compensation Act, Labour Laws and Equal Remuneration Act, Factories Act, Minimum Wages Act, Contract Labour (Regulation & Abolition) Act**, etc., if applicable and/or as

applicable.

- 7.46.2 If, as a result of the Contractor's failure, negligence, omission, default or non-observance of any provisions of any laws, the Employer is called upon by any authority to pay or reimburse or required to pay or reimburse any amount, the Employer shall be entitled to deduct the same from any moneys due or that become due to the Contractor under this contract or any other contract or otherwise recover from the Contractor any sums, which the Employer is required or called upon to pay or reimburse on behalf of the Contractor.

All **registration** and **statutory inspection fees**, in connection with labour engagement, with respect to this contract, shall have to be paid by the Contractor, if applicable and/or as applicable.

- 7.46.3 The Contractor shall have to, immediately after the occurrence of any accident, at or near the site or in connection with the execution of the work under the contract, report (over phone or otherwise) to the Engineer or his representative(s) and shall make every arrangement to render all possible assistance to the victim(s) of such accident.

The Contractor shall also have to report such accident to the Engineer, in writing (giving reference to the earlier communication made). Based on such report, necessary communication with the competent authority would be made whenever such a report is required by law.

- 7.46.4 For any accident occurred within the entire operational area covered under the contract, the Contractor shall have to arrange prompt investigation into the matter through recording of statement of the personnel witnessing the accident. Such "Accident Report", containing the findings, along with the statements so recorded, shall have to be forwarded by the Contractor to the Engineer at the earliest.

- 7.46.5 The Contractor shall have to provide full medical treatment to their staff & labourers, in case of "**Accident on Duty**", which will inter alia include their obligations under the **Workmen's Compensation Act, 1923**, including all amendments thereof.

The Employer shall in no manner be liable to the Contractor or any person engaged/employed by them [including that of Sub-contractor] or any other person, for injuries or death caused as a result of accidents occurred, either within or outside the site of work, under the contract. The Contractor shall be responsible for such contingencies and will make good all claims for compensation, claim by their personnel/workmen or the families of the sufferer(s), as the case may be, or as per the decision of the appropriate authority/tribunal or other involved persons.

- 7.46.6 The Contractor shall have to indemnify KoPT, in the event of KoPT being held liable to pay compensation for injury to any Contractor's servants or workmen [including that of Sub-contractor] under the **Workmen's Compensation Act, 1923**, as amended from time to time.

- 7.46.7 Whenever the contract comes to an end with the efflux of time or otherwise or is terminated, the Contractor shall be required to fulfil all their obligations

towards their workmen in terms of applicable labour laws and submit necessary documents towards such effect, to the Employer in support of the same. Any deposit, which may be lying with KoPT to their credit, will be liable to be applied for this purpose, if the Contractor fails to comply with the same. In case such documents are not furnished by the Contractor, the Employer will not release the **Performance Guarantee/ Security Deposit** and any other amount as may remain due to the Contractor

7.47 **Health and safety**

- 7.47.1 In the event of any outbreak of illness or an epidemic nature, the Contractor shall have to comply with and carry out such regulations, orders & requirements, as may be made by the Government, or the local medical or sanitary authorities, for the purpose of dealing with and overcoming the same.
- 7.47.2 The Contractor shall have to ensure safety of all their working personnel to the fullest compliance of the provisions of **general safety rules/regulations**, including **Dock Workers' (Safety, Health & Welfare) Regulations, 1986**.
The Contractor shall be solely responsible for consequences arising out of non-compliance or violation of safety rules/ regulations.
- 7.47.3 The Contractor [including approved Sub-contractor(s)] shall have to provide (at their own expenses) all required **Personal Protection Equipment (PPE)** [such as **Helmets, Nose Masks, Hand Gloves**, etc.] & **Safety Gears** for all personnel and labourers engaged during the work and in case of their failing to do so, the Employer shall provide the same and recover the cost thereof from any amount due, or which may become due to the Contractor or from any amount lying with them or under their control.

7.48 **Labour licence**

- 7.48.1 Within 7 (seven) days from the date of issuance of the order, the Contractor shall have to apply for **labour licence** for the maximum number of workers proposed to be deployed for this work. Necessary certificate shall be issued by the Engineer against a request from the Contractor.
Photocopy of the application shall have to be furnished to the Engineer, immediately. However, payment will be released only on furnishing the copy of the **Labour Licence** to the Engineer. However, such license should be kept valid throughout the actual duration of contract.

7.49 **Employees' Provident Fund & Employees' State Insurance**

- 7.49.1 The Contractor should have their establishment (with respect to this contract) registered with the concerned authorities under the provision of **Employees' Provident Fund & Miscellaneous Provision Act, 1952** and **Employees' State Insurance Act, 1948**. The Contractor shall have to submit the proof of registration as mentioned above immediately after commencement of work.
- 7.49.2 As per the above mentioned Act, the Contractor is liable for remittance of monthly subscription contribution in respect of **Employees' Provident Fund (EPF)** and **Employees' State Insurance (ESI)** for the workers engaged by them, wherever applicable. The Contractor shall have to submit the

authenticated copy of the challans with respect to subscription / contribution of **Employees' Provident Fund** and **Employees' State Insurance** (against their respective Code Numbers issued by the **Employees' Provident Fund** and **Employees' State Insurance Authorities**) by 7th day of every English Calendar Month (during the currency of the contract) along with the list of labourers for whom such deposits have been made.

Payment will be held up if the up-to-date **Employees' Provident Fund** and **Employees' State Insurance** remittance challan is not submitted in time.

- 7.49.3 In case, registration with the EPF and ESI Authorities is not applicable for the employees of the Contractor [or for the employees of the Sub-contractor(s)], documentary evidence to establish non-applicability to be submitted by the Contractor.
- 7.49.4 In case of sub-contracting any part of the work, above requirements should also be fulfilled by the approved Sub-contractor and necessary documents shall have to be submitted in time, as indicated above.

E. PLANT, MATERIALS AND WORKMANSHIP

7.50 Materials to be supplied by the Employer

- 7.50.1 Regarding supply of any materials by the Trustees to the Contractor, in accordance with the contract, the following conditions shall apply:
 - a) The Contractor shall, at his own expense, arrange for transporting the materials from the Trustees' Store [store of Haldia Dock Complex, situated at Haldia], watching, storing and keeping them in his safe custody, furnishing of statement of consumption thereof in the manner required by the Engineer or his Representative, return of surplus and empty container to the Trustees' Stores, as per the direction of the Engineer or his Representative.
 - b) Being the custodian of the Trustees' materials, the Contractor shall remain solely responsible for any such materials issued to him and for any loss or damage thereof for any reason other than "Excepted Risks", the Contractor shall compensate the Trustees', in the manner decided by the Engineer, and shall, at no stage, remove or cause to be removed any such material from the site, without his permission.
 - c) The Trustees' materials will generally be supplied in stages and in accordance with the rate of progress of work, but, except for grant of suitable extension of completion time of work as decided by the Engineer, the Contractor shall not be entitled to any other compensation, monetary or otherwise, for any delay in the supply of Trustees' materials to him. The Contractor shall, however, communicate his requirement of such materials to the Engineer from time to time.
 - d) Unless stipulated otherwise in the contract, the value of the Trustees' materials issued to the Contractor shall be recovered from the Contractor's bills and/or any of his other dues, progressively,

according to the consumption thereof on the work and/or in the manner decided by the Engineer or his Representative and at the rate(s) stipulated in the contract. These rates shall only be considered by the Contractor in the preparation of his bid/offer and these will form the basis of escalation/variation, if in future the Contractor is required to procure and provide any such material on the written order of the Engineer, consequent on the Trustees' failure to effect timely supply thereof.

- e) If the Engineer decides that due to the Contractor's negligence, any of the Trustees' materials, issued to the Contractor, has been – (i) lost or damaged, (ii) consumed in excess of requirement and (iii) wasted by the Contractor in excess of normal wastage, then the value thereof shall be recovered from the Contractor's bills, or from any of his other dues, after adding 19.25 % extra over the higher one of the followings:
 - i) The issue rate of the materials at the Trustees' Stores, and
 - ii) The market price of the material on the date of issue, as would be determined by the Engineer.

7.51 Contractor's arrangement for execution of the work

- 7.51.1 The Contractor will have to arrange and provide all types of materials, etc. [in line with the Technical Specification] throughout the execution of the contract.
- 7.51.2 KoPT will not take any responsibility regarding **non-availability** of any such materials for which Contractor is responsible as per contract. The Contractor shall have to assess the requirement of such materials and keep sufficient stock.
- 7.51.3 The Contractor shall have to provide all equipment, including tools, tackles, lifting machineries, air compressor, scaffolding arrangement, different vehicular transport, etc., necessary to execute the work.
- 7.51.4 All tools & machineries to be used by the Contractor should be suitable for the particular requirement (i.e. capacity should be adequate) and the same should be checked for fitness before use. They should maintain the said equipment properly to ensure their efficient working.
- 7.51.5 The Contractor shall, at their own costs and expenses, have to provide all labour, plant, haulage, transportation of plant and equipment to be used for executing the contract, all materials, stores, etc. (except the equipments & materials to be provided by KoPT, as per contract) required for efficiently carrying out the work to the satisfaction of the Employer.
- 7.51.6 The Contractor should use calibrated measuring & testing instruments and should also ensure revalidation of such calibration as and when required. In this regard, initially the Contractor shall have to submit a list of **measuring and testing instruments** (mentioning the period of validity of Calibration Certificates) to be used. The photocopies of the Calibration Certificates (including the revalidations) of the said measuring and testing instruments,

shall have to be submitted to the Engineer.

7.52 Inspection and testing

- 7.52.1 The Engineer or his authorised Representative shall have, at all reasonable time, access to the Contractor's premises or work site or other premises [if a part of the work is being executed there or some **maintenance repair** work (during **Defect Liability Period**) is being done there] and shall have the power, at all reasonable time, to **inspect, examine and test the materials and workmanship**, as well as the **documents, equipment, tools, measuring & testing instruments**, as applicable, in connection with the instant contract (including **Defect Liability Period**).
- 7.52.2 The Engineer or his authorised Representative, on giving 7 (seven) days' notice, in writing, to the Contractor, setting out any ground of objections, in respect of the work, shall be at liberty to reject all or any material and/or workmanship in the subject of any of the said grounds of objection, which are not in accordance with the contract.
- 7.52.3 Quality of materials, to be provided by the Contractor under this contract, should be as per the satisfaction of the Engineer. Whenever asked, the Contractor shall have to provide free sample for testing.
- 7.52.4 If found necessary, KoPT reserves the rights to get the materials inspected from a **Government or Government recognized Laboratory/Test House**.
- 7.52.5 In case of sub-letting to other Contractors or manufacturers or suppliers by the Contractor, the Engineer will reserve the right as follows:
- i) that inspection and / or testing will be carried at the Sub-contractor's works; or
 - ii) that inspection will be carried out at site; or
 - iii) that inspection will be waived, subject to the Contractor furnishing a certificate of compliance with specification by a competent authority recognised by national/international institutes.
- 7.52.6 The Employer may appoint a **Third Party Inspection Agency**, as detailed at SCC, at the cost of the Employer, for stage-wise technical inspection and certification of **materials & workmanship**, including **painting, erection, commissioning**, etc. [in connection with the contract job, in part or as a whole]. In that case The relevant Certificates shall be produced by the **Third Party Inspection Agency** to the Engineer or his authorised Representative.
- 7.52.7 The stage-wise technical inspection will be carried out by the representative of the Engineer [or **Third Party Inspection Agency**] based on the approved **Quality Assurance Plan (QAP) & Field Quality Assurance Plan (FQAP)** [considering the Technical Specification of the bidding documents].
- 7.52.8 The Contractor shall have to submit a **Quality Assurance Plan (QAP)** and a **Field Quality Assurance Plan (FQAP)**, based on the Technical Specification and other terms & conditions stipulated in the bidding documents. The **QAP & FQAP** shall be approved by the "**Engineer**".

- 7.52.9 In all cases where tests are required, within the purview of QAP & FQAP, whether at the premises of the Contractor or any Sub-contractor or elsewhere, the Contractor, except where otherwise specified, shall provide free of charges such labour, materials, electricity, fuel, water, stores, apparatus and instruments, as may reasonably be demanded, to carry out sufficiently such tests and shall, at all times, facilitate the Engineer or his Representative [and / or the Third Party Inspection Agency] , to accomplish such testing.
- 7.52.10 The cost of all tests and / or analyses, within the purview of QAP & FQAP, effected at the Contractor's or Sub-contractor's works and on the site, shall be borne by the Contractor. The Contractor will be called upon to pay all expenses incurred by the Employer in respect of any work found to be defective or of inferior quality, adulterated or otherwise unacceptable.
- 7.52.11 If, during inspection by the **Third Party Inspection Agency [if appointed by KoPT]**, any material or test [within the purview of QAP & FQAP] fails to fulfil the contract conditions for **more than 2 (two) times, any additional amount charged by the Third Party Inspection Agency towards inspection of the same from the 3rd time onwards shall have to be borne by the Contractor.** If the Contractor fails to make such payment to the **Third Party Inspection Agency**, the same shall be deducted from the bill(s) of the Contractor and paid to the **Third Party Inspection Agency**
- 7.52.12 **Tests on completion:**
On **completion of installation**, the contractor with give a **7 (seven) days'** notice to the Engineer, in writing (informing the date on which they will be ready to make the tests), before carrying out such tests, in accordance with and in the manner prescribed in the specifications. The procedure specified in SCC shall be followed in this respect.
- 7.52.13 Notwithstanding the fact that the materials or installations have passed the inspection, the Contractor is not relieved from his obligations to conform to the quality, workmanship, guaranteeing the performance, etc., as per the contract.
- 7.53 **Contractor to replace materials/work not acceptable to the Engineer or his Representative**
- 7.53.1 The Engineer or his Representative shall have the power to inspect any material and work at any time and to order at any time
- for removal from the site of any material, which, in his opinion, is not in accordance with the contract or the instruction of the Engineer or his Representative,
 - for the substitution of proper and suitable materials, or
 - the removal and proper re-execution of any work, which, in respect of material and workmanship, is not in accordance with the contract or the instructions of the Engineer.
- The Contractor shall comply with such order at his own expense and within the time specified in the order. If the Contractor fails to comply, the Engineer

shall be at liberty to dispose any such materials and re-do any work in the manner convenient to the Trustees by engaging any outside agency, at the risk and expense of the Contractor and after giving him a written prior notice of 7 (seven) days.

7.54 Removal of materials on completion

7.54.1 The Contractor shall, on completion of the contract or when directed by the Employer, shall have to remove all plant, equipment, tools, materials, temporary constructions, etc. and rubbish garbage, waste, which may have accumulated during the execution of the contract, other than those permanently used into the work, at Employer's site.

7.55 Workmanship and secrecy

7.55.1 The Contractor shall carry out the services in conformity with generally accepted norms and sound standards of Engineering. The Contractor shall be responsible for the technical soundness of the services rendered. In the event of any deficiency in those services, the Contractor shall promptly re-do the same, at no additional cost to the Employer.

7.55.2 The Contractor shall use all the documents, drawings and other data & information, of proprietary nature, received from the Employer, solely for the purpose of performing and carrying out the obligations on his part under the Agreement in the performance of the works for the project and maintain utmost secrecy, in this regard. The documents, drawings and other data & information, received from the Employer, shall not be used by the Contractor for any other purpose.

F. COMMENCEMENT, EXECUTION & COMPLETION OF WORK, HANDING OVER AND TAKING OVER

7.56 Preliminary time to commence work and maintenance of steady rate of progress

7.56.1 The Contractor shall commence the work within 7 (seven) days of the receipt of Engineer's letter informing acceptance of the Contractor's bid / offer by the Trustees or within such preliminary time as mentioned by the Contractor in the "Form of Tender" or the time accepted by the Trustees. The Contractor shall then proceed with the work with due expedition and without delay, except as may be expressly sanctioned or ordered by the Engineer or his Representative, time being deemed the essence of the contract on the part of the Contractor.

7.57 Contractor's site office

7.57.1 The Contractor shall provide and maintain a suitable office at or near the site to which the Engineer's Representative may send communications and instructions for use of the Contractor.

7.58 Contractor to observe Trustees' working hours

7.58.1 Unless specified otherwise in the contract or prior permission of the Engineer has been taken, the Contractor shall not execute the work beyond the working hours observed by the Engineer's Representative and on Sundays and

Holidays observed in the Trustees' system, except in so far as it becomes essential on account of tidal work or for safety of the work. If the progress of the work lags behind schedule or the work has been endangered by any act or neglect on the part of the Contractor, then the Engineer or his Representative shall order and the Contractor, at his own expense, shall work by day and by night and on Sundays and Public Holidays. Any failure of the Engineer or his Representative to pass such an order shall not relieve the Contractor from any of his obligations. The Engineer's decision, in this regard, shall be final, binding and conclusive.

7.59 Contractor to supply all materials as per requirement of the Engineer or his Representative

7.59.1 Unless stipulated otherwise in the contract, all materials required for the work shall be procured and supplied by the Contractor with the approval of the Engineer or his Representative and subject to subsequent testing, as may be required by the Engineer or his Representative. The Engineer shall exercise his sole discretion to accept any such materials

7.60 Materials and works

7.60.1 Unless stipulated otherwise in the contract, all materials, workmanship and method of measurement shall be in accordance with the relevant Codes (Latest Revision) of the Bureau of Indian Standards and the written instructions of the Engineer or his Representative. Where no specific reference is available in the contract, the material and workmanship shall be of the best of their respective kinds to the satisfaction of the Engineer.

7.61 Contractor to submit samples for approval

7.61.1 Samples shall be prepared and submitted for approval of the Engineer or his Representative, whenever required to do so, all at the Contractor's cost.

7.62 Contractor to seek approval of Engineer or his Representative before covering up any portion of work

7.62.1 No work shall be covered up and put out of view by the Contractor without approval of the Engineer or his Representative and whenever required by him, the Contractor shall uncover any part or parts of the work or make openings in or through the same as may be directed by the Engineer or his Representative from time to time and shall reinstate or make good those part of works thus affected, to the satisfaction of the Engineer, all at the cost of the Contractor.

7.62.2 The Trustees shall reimburse such cost, as determined by the Engineer, if the initial covering up was with prior written order of the Engineer or his Representative.

7.63 Contractor to suspend work on order from Engineer or his Representative

7.63.1 On a written order of the Engineer or his Representative, the Contractor shall delay or suspend the progress of the work, till such time the written order to resume the execution is received by him. During such suspension, the Contractor shall protect and secure the work to the satisfaction of the Engineer or his Representative. All extra expenses, in giving effect to such

order, shall be considered by the Trustees, unless such suspension is:

- a) for removal from the site of any material, which, in his opinion, is not in accordance with the contract or the instruction of the Engineer or his Representative,
- b) otherwise provided for in the contract, or
- c) necessary by reason of some default on the part of the Contractor, or
- d) necessary by reason of climatic conditions on the site, or
- e) necessary for proper execution of the works or for the safety of the works or any part thereof.

7.63.2 The Engineer shall settle and determine such extra payment and/or extension of completion time to be allowed to the Contractor, as shall, in the opinion of the Engineer, be fair and reasonable.

7.63.3 If at any time, before or after commencement of the work, the Trustees do not require the whole of the work tendered for, the Engineer shall notify the same to the Contractor in writing and the Contractor shall stop further works in compliance of the same. The Contractor shall not be entitled to any claim for compensation for underived profit or for such premature stoppage of work or on account of curtailment of the originally intended work by reason of alteration made by the Engineer in the original specifications, drawings, designs and instructions.

7.64 **Completion Certificate**

7.64.1 When the whole of the work [as detailed in **GCC Clause No. 7.65 (Completion period)**] has been completed to the satisfaction of the Engineer, the Contractor shall, within 21 (twenty one) days of submission of his application to the Engineer, be entitled to receive from him a certificate for completion of work as per the form furnished in **Section – XI**.

7.65 **Completion period**

7.65.1 All the jobs, as per contract, are to be completed within the period stipulated in the SCC.

7.66 **Taking over of the Contract job by KoPT**

7.66.1 The **Contract job** will be taken over by HDC, KoPT after completion of the works in accordance with the contract, having passed all the tests under “Tests on completion”.

7.66.2 However, the actual date of completion of the contract will be considered as per **GCC Clause No. 7.65 [Completion period]**.

7.67 **Defect Liability Period (DLP)**

7.67.1 “**Defect Liability Period**” shall mean the **Guarantee Period**, as specified in SCC.

- 7.67.2 During “**Defect Liability Period**” [as specified in SCC], the Contractor shall nominate 1 (one) competent, experienced and responsible technical person, to co-ordinate and execute all works to be attended by the Contractor, as per contractual obligations, without any extra cost to HDC, KoPT.
- 7.67.3 The Contractor shall be responsible for making good (including replacement of defective items, if required), with all possible speed, at their expense, any defect in or damage to any portion of the work, which may appear or occur after the Contract job has been taken over [as per GCC Clause No. 7.66 (Taking over of the Contract job by KoPT)] and before expiry of Defect Liability Period [as specified in SCC] and which arises either:
- a) from any defective materials, workmanship or design, or
 - b) from any act or omission of the Contractor done or omitted during the said period.
- 7.68 **Defects after taking over**
- 7.68.1 If any such defects shall appear or damage occur (as detailed in 7.67.3), the Engineer shall forthwith inform the Contractor thereof, stating in writing the nature of defect or damage.
- The provision of this clause shall apply to all replacements or renewals carried out by the Contractor to remedy defects and damage as if the said replacements and renewals had been taken over on the date they were completed to the satisfaction of Engineer. After the taking over, if the Contract job cannot be used (for the purpose for which it is intended), during any period, by the reason of a defect or damage, the **Defect Liability Period** shall be extended accordingly, as specified in SCC.
- 7.68.2 If any such defect or damage be not remedied by the Contractor within a reasonable time, HDC, KoPT may proceed to do the work at the Contractor’s risk and expense, but without prejudice to any other rights which HDC, KoPT may have against the Contractor in respect of such defects.
- 7.68.3 All inspection, adjustments, replacement or renewal carried out by the Contractor during the period referred in this clause shall be subject to the conditions of this contract, which shall be binding on the contractor in all respects during the **Defect Liability Period** and its extension, if any.
- 7.69 **Extension of completion period and liquidated damage**
- 7.69.1 **Extension of completion period:**
- Should the quantum of extra or additional work of any kind or delayed availability of the Trustees’ materials to be supplied as per contract or **Force Majeure** condition (as per **GCC Clause No. 7.86**) or other special circumstances, of any kind, beyond the control of the Contractor or any other reason not attributable to the Contractor [including hindrance at site of work, causes indicated as “**Excepted Risks**”, etc.] cause delay in completing the work, the Contractor shall apply to the Engineer, in writing, for suitable extension of completion period, within **7 (seven) days** from the date of occurrence of the reason and the Engineer shall thereupon consider the stated

reasons in the manner deemed necessary and shall either reject the application or determine and allow, in writing, the extension period as he would deem proper for completion of the work, with or without the imposition of “**Liquidated Damage**” (GCC Clause No. 7.69.2 hereof) on the Contractor and his decision shall be binding on the Contractor. If an extension of completion period is granted by the Engineer, “**Liquidated Damage**” (GCC Clause No. 7.69.2 hereof) shall apply from its date of expiry, if the work be not completed within the extended time, unless stated otherwise in the decision communicated by the Engineer, as aforesaid.

7.69.2 **Liquidated Damage:**

If the Contractor fails to complete the work within the stipulated dates [as per **GCC Clause No. 7.65 (Completion period)**] or such extension thereof, as communicated by the Engineer, in writing, the Contractor shall pay as compensation (**Liquidated Damage**) to the Trustees and not as a penalty, as per the following:

In case of handing over the Contract Job after the scheduled completion period, **Liquidated Damage @ ½%** of the Contract Price [excluding GST] , for every week or part thereof, beyond the scheduled date of completion, will be deducted from the Contractor’s bill. Provided always the amount of such compensation shall not exceed **10%** of the cost the Contract Price [excluding GST].

7.69.3 Without prejudice to any of their legal rights, the Trustees shall have the power to recover the said amount of compensation/damage, as per **GCC Clause No. 7.69.2** from any money due or likely to become due to the Contractor. The payment or deduction of such compensation/damage shall not relieve the Contractor from his obligation to complete the work or from any of his other obligations/liabilities under the contract and in case of the Contractor’s failure and at the absolute discretion of the Engineer, the work may be ordered to be completed by some other agency, at the risk and expense of the Contractor, after a minimum **3 (three) days** notice, in writing, has been given to the Contractor by the Engineer or his Representative.

G. CONTRACT PRICE , PAYMENT AND DEDUCTIONS

7.70 Contract Price

7.70.1 Price charged by the Contractor for the related services performed under the contract shall not vary from the rates accepted by the Employer, based on the bid/offer of the successful bidder and stated in the “Letter Of Acceptance”, with the exception of any price adjustment, if provided for in the contract.

7.70.2 Changes **in statutory taxes & duties will be adjusted** time to time.

7.70.3 No claim whatsoever of the Contractor for their man & material resources remaining idle for any reason or for any other expenses incurred by them due to the flow of work not being continuous or for stoppage of work, will be entertained by the Employer.

7.71 Terms of payment

7.71.1 **Payment of Goods & Services Tax (GST):**

Amount of GST will be borne by HDC, KoPT on production of suitable document(s) by the Contractor.

7.71.2 **Time of payment:**

The Contractor shall have to submit **bills in triplicate** to the Engineer, in accordance with the stage-wise payments specified in SCC. In normal circumstances, payment of the bills, accompanied by **Inspection Certificates** & other relevant documents, duly recommended by the Engineer, will be passed within 30 (thirty) days from the date of receipt of such bills, if found in order.

7.71.3 **Income Tax deduction:**

Income Tax, if any, as per the relevant provision of the Income Tax Act, shall be **deducted at source** from amount payable to the Contractor.

7.71.4 **No interest on account of delayed payments:**

Any claim for interest will not be entertained by KoPT with respect to any delay on the part of KoPT for making payment, or for any dispute. The decision of the Engineer is final in such matters.

7.72 **Extra expenses incurred by the Employer**

7.72.1 Any extra expenses incurred in connection to the work by the Employer in the performance of the work owing to the neglect or omission on the part of the Contractor in any of the case mentioned in this contract shall be deducted from any sum due or which may thereafter become due to the Contractor or from any amount lying with them or under their control or they may be called upon to pay the amount of such extra expense to such person or persons as the Employer may appoint to receive the same and in the event of the Contractor failing to make such payment, the said amount shall be recoverable from them in such manner as the Employer may determine,

7.73 **Recovery of deducted amount**

7.73.1 Without prejudice to any of their legal rights, the Trustees shall have the power to recover the amount of **DEDUCTION**, from any money due or likely to become due to the Contractor. Such payment or deduction shall not relieve the Contractor from their obligation to complete the work or from any of their other obligations / liabilities under the contract.

7.74 **Variation and its valuation**

7.74.1 The Engineer shall have the power to order the Contractor, in writing, to make any variation of the quantity, quality or form of the works or any part thereof that may, in his opinion, be necessary and the Contractor upon receipt of such an order shall act as follows:

- a) Increase or decrease the quantity of any work included in the contract.
- b) Omit any work included in the contract.

- c) Change the character or quality or kind of any work included in the contract.
 - d) Change the levels, lines, position and dimensions of any part of the work, and
 - e) Execute extra and additional work, of any kind, necessary for completion of the works.
- 7.74.2 No such variation shall, in any way, vitiate or invalidate the contract or be treated as revocation of the contract, but the value (if any) of all such variations, evaluated in accordance with the Engineer's sole decision, shall be taken into account and the contract price shall be varied accordingly.
- 7.74.3 Provided always that written order of the Engineer shall not be required for increase or decrease in the quantity of any work up to 15%, where such increase or decrease is not the result of any variation order given under this clause but is the result of the quantities exceeding or being less than those stated in the "Price Schedule". Provided also that verbal order of variation from the Engineer shall be complied with by the Contractor and the Engineer's subsequent written confirmation of such verbal order shall be deemed to be an order in writing within the meaning of this clause.
- 7.74.4 The Contractor shall not be entitled to any claim of extra or additional work, unless they have been carried out under the written orders of the Engineer.
- 7.74.5 The Engineer shall solely determine the amount (if any) to be added to or deducted from the sum named in the tender in respect of any extra work done or work omitted by his order.
- 7.74.6 All extra, additional or substituted work done or work omitted by order of the Engineer shall be valued on the basis of the rates and prices set out in the contract, if in the opinion of the Engineer, the same shall be applicable. If the contract does not contain any rates or prices directly applicable to the extra, additional or substituted work, then the Engineer may decide the suitable rates on the basis of "Schedule of Rates" (including surcharge in force at the time of acceptance of bid), if any, adopted by the Trustees with due regard to the accepted contractual percentage, if any thereon. In all other cases, the Engineer shall solely determine suitable rates in the manner deemed by him as fair and reasonable and his decision shall be final, binding and conclusive.
- 7.74.7 If the nature or amount of any omission or addition relative to the nature or amount of the whole of the contract work or to any part thereof shall be such that, in the opinion of the Engineer, the rate of prices contained in the contract for any item of the works or the rate as evaluated under **GCC Clause Nos. 7.74.5 & 7.74.6**, is by reason of such omission or addition rendered unreasonable or in-applicable, the Engineer shall fix such other rate or price as he deems proper and the Engineer's decision shall be final, binding and conclusive.

H. TERMINATION BY EMPLOYER

7.75 Notice to correct

- 7.75.1 If the Contractor fails to carry out any of their obligations under the contract, the Engineer may give notice to the Contractor, requiring them to make good the failure and to remedy the same within a specified reasonable time.

7.76 Termination by Employer

7.76.1 The Employer shall be entitled to terminate the contract if:

- a) the Contractor fails to comply with **GCC Clause No. 7.20 [Performance Guarantee / Security Deposit]**
or
with a notice under **GCC Clause No. 7.75 [Notice to correct]**,
- b) the Contractor **abandons** the work, or **repudiates** the contract, or otherwise plainly demonstrates the intention not to continue performance of their obligations under the contract,
- c) the Contractor, without reasonable or lawful excuse under this contract,
 - i) fails to proceed with the work, **within 14 days** from the scheduled date for commencement of work, in accordance with **GCC Clause No. 7.56 [Preliminary time to commence work and maintenance of steady rate of progress]**,
 - ii) keeps the work suspended for **at least 14 days**, despite receiving Engineer's written notice to proceed with the work,
or
 - iii) fails to comply with a notice issued regarding rejection of material(s)/work and/or remedial work, **within 28 days** after receiving it,
- d) the Contractor **assigns/sub-contracts the whole of the work**
Or
sub-contracts any portion of the work, without the required consent, in line with **GCC Clause No. 7.22.**
- e) the Contractor becomes **bankrupt** or **insolvent**, goes into liquidation, have a receiving or administrative order made against them, compounds with their creditors, or carries on business under a receiver, trustees or manager for the benefit of their creditors, or if any act is done or event occurs which (under applicable laws) has a similar effect to any of these acts or events,
- f) the Contractor gives or offers to give (directly or indirectly) to any person any bribe, gift, gratuity, commission or other thing of value, as an inducement or reward,

- i) for doing or forbearing to do any action in relation to the contract, or
- ii) for showing or forbearing to show favour or disfavour to any person in relation to the contract,
or, if any of the Contractor's personnel, Agents or Sub-contractors gives or offers to give (directly or indirectly) to any person any such inducement or reward as is described in this **sub-paragraph (f)**. However, lawful inducement and reward to the Contractor's personnel shall not entitle termination
- g) the Contractor fails to execute the work in accordance with the contract or
persistently or flagrantly neglects to carry out their obligations under the contract.
- h) the Contractor fail to make payment of wages to their personnel in relation to this contract,
- i) the Contractor fails to carry out the work satisfactorily (as stated in these bidding documents or otherwise decided by the Engineer) or may not be able to complete the work within the agreed period on account of Contractor's lapses.
- j) any accident occurs due to improper way of working by the Contractor's personnel, or
- k) any misconduct done by Contractor's personnel (including that of Agents or Sub-contractors) to KoPT's employees.

In any of these event or circumstances, the Employer may, upon giving a **minimum 14 days' notice** [communicated by the Engineer] to the Contractor, **terminate the contract** and expel the Contractor from the site, without being liable for any compensation to the Contractor. However, in case of **sub-paragraph (e) or (f)**, the Employer may, by notice [communicated by the Engineer], terminate the contract immediately.

The Employer's election to terminate the contract shall not prejudice any other rights of the Employer, under the contract or otherwise.

7.76.2 Upon receipt of the letter of termination of work, which may be issued by the Engineer on behalf of the Employer, the Contractor shall have to leave the site of work and deliver any **required goods**, all **Contractor's documents**, and other **design documents**, made by or for them, all the **Trustees' tools, plant and materials** issued to them, at the place to be ascertained by the Engineer, **within 7 days** of receipt of such letter. However, the Contractor shall use their best efforts to comply immediately with any reasonable instructions included in the notice

- i) for the assignment of any Sub-contractor,
- and

- ii) for the protection of life or property or for the safety of the equipment/work.

The Contractor shall not be released from any of their obligations or liability under the contract and the rights & authorities conferred on the Employer and Engineer, by the contract, shall not be affected.

- 7.76.3 Upon such termination of work, the Employer shall have the power to complete the work by **themselves** and/or through **any other agency** at the **Contractor's risk & expense** and the Contractor shall be debited **any sum or sums that may be expended in completing the work beyond the amount that would have been due to the Contractor, had they duly completed the whole of the work in accordance with the contract.**

The Employer or such other agency may use, for such completion, so much of the Contractor's documents, other design documents, made by or on behalf of the Contractor, Contractor's equipment, temporary work, plant & materials, as they think proper.

Upon completion of the work, or at such earlier date, as the Engineer shall give notice that the Contractor's equipment and temporary work will be released to the Contractor at or near the site, the Contractor shall remove or arrange removal of the same from such place without delay and at their risk & cost. However, if by this time the Contractor has failed to make a payment due to the Employer, these items may be sold by the Employer in order to recover this payment. Any balance of the proceeds shall be paid to the Contractor.

7.77 Valuation at date of termination

- 7.77.1 As soon as practicable after a notice of termination under **GCC Clause No. 7.76 [Termination by Employer]**, has taken effect, the Engineer shall proceed in accordance with **GCC Clause No. 7.19 [Determinations]** to agree or determine the value of the work, goods & Contractor's documents, and any other sums due to the Contractor for work executed, in accordance with the contract. The value of such work (executed in accordance to the Contract) shall be determined based on measurements of actual work done and approved rate(s), as per contract or other rates, as decided by the Engineer. The Engineer's decision, in such case, shall be final, binding and conclusive.

7.78 Payment after termination

- 7.78.1 After a Notice of termination, under **GCC Clause No. 7.76 [Termination by Employer]** has taken effect, the Employer may
 - a) give notice to the Contractor, indicating the particulars, for which Employer is entitled to any payment under any Clause or otherwise in connection with the contract, and or any extension of the **Defect Notification Period.**

However , Notice is not required for payments due under **GCC Clause No. 7.26 [Supply of water and Electricity]**, under **GCC Clause No. 7.27 [Use of ground and land/covered space for Contractor's**

establishment], or for other services requested by the Contractor,

- b) withhold further payments to the Contractor until the cost of execution, completion and remedying of any defects, damage, and all other costs incurred by the Employer, have been established, and / or
- c) recover from the Contractor any losses and damages incurred by the Employer and any extra costs of completing the work, after allowing for any sum due to the Contractor under **GCC Clause No. 7.77 [Valuation at date of termination]**. After recovering any such losses, damages and extra costs, the Employer shall pay any balance to the Contractor.

7.79 Employer's entitlement to termination for convenience

- 7.79.1 The Employer, by notice [communicated by the Engineer] sent to the Contractor, may terminate the Contract, in whole or in part, at any time **for Employer's convenience**. Such termination shall take effect **28 days** after the date on which the Contractor receives this notice or the Employer returns the Performance Guarantee. The notice of such termination shall specify that termination is for **Employer's convenience**, the extent to which performance of the Contractor under the contract is terminated, and the date upon which such termination become effective.

The Employer shall not terminate the contract under this Sub-clause in order to execute the work exclusively by themselves or to arrange for work to be executed exclusively by another Contractor or to avoid a termination of the contract by the Contractor under **GCC Clause No. 7.82 [Termination by Contractor]**.

After such termination, the Contractor shall proceed in accordance with **GCC Clause No. 7.83 [Cessation of work and removal of Contractor's equipment]** and shall be paid in accordance with **GCC Clause No. 7.90 [Optional termination, payment and release]**.

7.80 Corrupt or fraudulent practices

- 7.80.1 If the Employer determines that the Contractor has engaged in **corrupt, fraudulent, collusive, coercive, or obstructive** practices, in competing for or in executing the Contract, then the Employer may, after giving **14 days notice** to the Contractor, terminate the Contractor's employment under the Contract and expel them from the Site, and the provisions of **GCC Clause Nos. 7.75 to 7.78** shall apply as if such expulsion had been made under **GCC Clause No. 7.76 [Termination by Employer]**.

Should any employee of the Contractor be determined to have engaged in corrupt, fraudulent, collusive, coercive, or obstructive practice during the execution of the work, then that employee shall be removed in accordance with **GCC Clause No. 9.21 [Contractor's personnel and Contractor's representative]**.

For the purposes of this clause:

- i) “corrupt practice” is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;
- ii) “fraudulent practice” is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;
- iii) “collusive practice” is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;
- iv) “coercive practice” is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;
- v) “obstructive practice” is deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede the Employer investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and / or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation.

I. SUSPENSION AND TERMINATION BY CONTRACTOR

7.81 Contractor’s entitlement to suspend work

- 7.81.1 The Contractor may, if the Employer fails to pay the Contractor the amount due under any certificate of the Engineer **within 28 days** after the expiry of the time stated in **GCC Clause No. 7.71 [Terms of payment]** within which payment is to be made, subject to any deduction that the Employer is entitled to make under the Contract, after giving 28 days’ prior notice to the Employer, with a copy to the Engineer, suspended work or reduce the rate of work.
- 7.81.2 If the Contractor subsequently receives the due payment (as described in the relevant Clause and in the above notice) before giving a notice of termination, the Contractor shall resume normal working as soon as is reasonably practicable.
- 7.81.3 If the Contractor suspends work or reduces the rate of work in accordance with the provisions of this Clause and thereby suffers delay, the Engineer shall, after due consultation with the Contractor, determine any extension of time or minimum criteria for satisfactory performance, to which the Contractor is entitled and shall notify the Contractor accordingly.

7.82 Termination by Contractor

- 7.82.1 The Contractor will be entitled to terminate the Contract if:

- a) the Contractor does not receive the reasonable evidence within **42 days after** giving notice under **GCC Clause No. 7.81 [Contractor's entitlement to suspend work]** in respect of a failure of the Employer to pay the Contractor the amount due,
 - b) the Employer obstruct or refuse any required approval to the issue of any such certificate, which is essentially required for further progress of the work without notifying any reason for such obstruction or refusal for a unreasonably long period of time, or
 - c) the Employer become bankrupt or insolvent, go into liquidation, or enter into composition with the creditors,
- or
- d) the Employer give notice to the Contractor that for unforeseen reasons, due to economic dislocation, it is impossible for them to continue to meet their contractual obligations.

In any of these events or circumstances, the Contractor may, upon giving **28 days' notice** to the Employer (with a copy to the Engineer), terminate the Contract.

The Contractor's election to terminate the Contract shall not prejudice any other rights of the Contractor, under the Contract or otherwise.

7.83 **Cessation of work and removal of Contractor's equipment**

7.83.1 After a notice of termination under **GCC Clause No. 7.79 [Employer's entitlement to termination for convenience]**, **GCC Clause No. 7.82 [Termination by Contractor]** or **GCC Clause No. 7.90 [Optional termination, payment and release]** has taken effect, the Contractor shall promptly:

- a) cease all further work, except for such work as may be necessary and instructed by the Engineer for the purpose of making safe or protecting those parts of the work already executed and any work required to leave the site in a clean and safe condition.
 - b) hand over all construction documents, Plant and Materials for which the Contractor has received payment.
 - c) hand over those other parts of the Works executed by the Contractor up to the date of termination
 - d) remove all Contractor's equipment, which is on the site and repatriate all their staff and labour from the site.
- and
- e) remove all other goods from the site, except as necessary for safety, and leave the site.

Any such termination shall be without prejudice to any other right of the Contractor under the contract.

7.84 Payment on termination

- 7.84.1 After a notice of termination under **GCC Clause No. 7.82 [Termination by Contractor]** has taken effect, the Employer shall promptly:
- a) return the Performance Guarantee / Security Deposit to the Contractor
 - b) pay the Contractor in accordance with **GCC Clause No. 7.90 [Optional termination, payment and release]** ,
and
 - c) pay to the Contractor the amount of any loss or damage sustained by the Contractor as a result of this termination.

J. INSURANCE

7.85 General requirements for insurances

- 7.85.1 The contractor during the contract period shall provide for insurance of 110% of the contract value including manning upto the commissioning and taking over of the installation.

K. FORCE MAJEURE

7.86 Definition of Force Majeure

- 7.86.1 In this clause “**Force Majeure** “ means an exceptional event or circumstance
- a) which is beyond the control of the Employer and the Contractor,
 - b) which such party (Employer / Contractor) could not reasonably have provided against before entering into the contract,
 - c) which, having arisen, such party could not reasonably have avoided or overcome,
and
 - d) which is not attributable to other party.

Force Majeure may include, but not limited to, exceptional events or circumstances of the kind listed below, so long as conditions a) to d) above are satisfied:

- i) **war, hostilities** (whether war be declared or not) , **invasion, act of foreign enemies;**
- ii) **rebellion, terrorism, sabotage by persons other than the Contractor’s personnel, revolution, insurrection , military or usurped power, or Civil War;**
- iii) **riot, commotion, disorder, strike or lockout by persons other than the Contractor’s personnel;**

- iv) **munitions of war, explosive materials, ionisation radiation or contamination by radio-activity**, except as may be attributable to the Contractor's use of such munitions, explosives, radiations or radio-activity;
- v) **natural catastrophes** such as **earthquake, tsunami** (caused by earthquake at the ocean bed), **fire, floods, hurricane, cyclone, typhoon or volcanic activity**,
and
- vi) **pressure waves** caused by air craft or other aerial devices travelling at sonic or supersonic speed at the site of the work.

7.87 Notice of Force Majeure

- 7.87.1 If a party is or will be prevented from performing its obligations under the Contract by Force Majeure, then it shall give notice to the other party of the event or circumstances constituting the Force Majeure and shall specify the obligations, the performance of which is or will be prevented. The notice shall be given **within 48 (forty eight) hours** of the alleged beginning of the relevant event or circumstance constituting Force Majeure, giving full particulars and satisfactory evidence.

The party shall, having given notice, be excused performance of its obligations for so long as such Force Majeure prevents it from performing them.

Notwithstanding any other provision of this clause, Force Majeure shall not apply to obligations of either party to make payments to the other party under the contract.

7.88 Duty to minimise delay

- 7.88.1 Each party shall at all times use all reasonable endeavours to minimise any delay in the performance of the contract as a result of Force Majeure.

A Party shall give notice to the other party when it ceases to be affected by the Force Majeure, **within 48 (forty eight) hours** of such ending.

7.89 Consequences of Force Majeure

- 7.89.1 If the Contractor is prevented from performing its substantial obligations under the Contract by Force Majeure of which notice has been given under **GCC Clause No. 7.87 [Notice of Force Majeure]**, and suffers delay and/or non-performance as per the contractual obligations, by reason of such Force Majeure, the Contractor shall be entitled, subject to **GCC Clause No. 7.91 [Engineer's decision]**, to:

- a) an extension of time for any such delay, if completion is or will be delayed, under **GCC Clause No. 7.69 [Extension of completion period and liquidated damage]**,
and

- b) non-imposition of penalty due to non-performance as per the contractual obligations.

After receiving this notice, the Engineer shall proceed in accordance with **GCC Clause No. 7.19 [Determinations]** to agree or determine these matters.

7.90 **Optional termination, payment and release**

- 7.90.1 If the execution of all the work in progress is prevented for a **continuous period of 84 days** by reason of **Force Majeure** of which notice has been given under **GCC Clause No. 7.87 [Notice of Force Majeure]**, or for **multiple periods which total more than 140 days** due to the same notified Force Majeure, then either party may give to the other party a notice of termination of the contract. In this event, the **termination shall take effect 7 days after the notice is given**, and the Contractor shall proceed in accordance with **GCC Clause No. 7.83 [Cessation of work and removal of Contractor's equipment]**.

Upon such termination, the Engineer shall determine the value of the work done and issue a payment certificate which shall include:

- a) The amounts payable for any work carried out for which a price is stated in the Contract;
 - b) the cost of plant and materials ordered for the work which have been delivered to the Contractor, or of which the Contractor is liable to accept delivery. Such Plant and Materials shall become the property of (and be at the risk of) the Employer when paid for by the Employer and the Contractor shall place the same at the Employer's disposal;
 - c) any other cost or liability, which in the circumstances was reasonably incurred by the Contractor in the expectation of completing the Works;
 - d) the **reasonable Cost** of removal of temporary work and Contractor's equipment from the site and the return of such items to the Contractor's premises,
- and
- e) the reasonable cost of repatriation of the Contractor's staff and labour employed wholly in connection with the work at the date of such termination.

L. CLAIMS, DISPUTES AND ARBITRATION

7.91 **Engineer's decision**

- 7.91.1 If a dispute of any kind whatsoever arises between the Employer and the Contractor in connection with, or arising out of, the contract or the execution of the works, whether during the execution of the works or after their completion and whether before or after repudiation or other termination of the contract, including any dispute as to any opinion, instruction, determination certificate or valuation of the Engineer, the matter in dispute shall, in the first place, be referred, in writing, to the Engineer within **30 (thirty) days**, with a copy to the other party. Such reference shall state that it is made pursuant to

this clause. No later than the **thirtieth day** after the day on which he received such reference, the Engineer shall give notice of his decision to the Employer and the Contractor. Such decision shall state that it is made pursuant to this clause.

Unless the contract has already been repudiated or terminated, the Contractor shall, in every case, continue to proceed with the works with all due diligence and the Contractor and the Employer shall give effect forthwith to every such decision of the Engineer unless and until the same shall be revised, as hereinafter provided, in an amicable settlement or an arbitral award.

If either the Employer or the Contractor be dissatisfied with any decision of the Engineer, or if the Engineer fails to give notice of his decision on or before the **thirtieth day** after the day on which he received the reference, then either the Employer or the Contractor may, on or before the **seventieth day** after the day on which he received notice of such decision, or on or before the seventieth day after the day on which the said period of thirty days expires, as the case may be, give notice to the other party, with a copy for information to the Engineer, of his intention to commence arbitration, as hereinafter provided, as to the matter in dispute. Such notice shall establish the entitlement of the party giving the same to commence arbitration, as hereinafter provided, as to such dispute and, subject to **GCC Clause No. 7.94 (Failure to comply with Engineer's decision)**, no arbitration in respect thereof may be commenced unless such notice is given.

If the Engineer has given notice of his decision as to a matter in dispute to the Employer and the Contractor and no notice of intention to commence arbitration as to such dispute has been given by either the Employer or the Contractor on or before the **seventieth day** after the day on which the parties received notice as to such decision from the Engineer, the said decision shall become final and binding upon the Employer and the Contractor.

7.92 Amicable settlement

- 7.92.1 Where notice of intention to commence arbitration as to a dispute has been given in accordance with **GCC Clause No. 7.91 (Engineer's decision)** above, both parties shall attempt to settle the dispute amicably before the commencement of arbitration. However, unless both parties agree otherwise, arbitration may be commenced on or **after the fifty-sixth day after the day on which a notice of intention to commence arbitration of such dispute was given**, even if no attempt at amicable settlement thereof has been made.

7.93 Arbitration

- 7.93.1 Any dispute in respect of which
- a) the decision, if any, of the Engineer, has not become final and binding pursuant to **GCC Clause No. 7.91 (Engineer's decision)** and
 - b) amicable settlement has not been reached within the period stated in **GCC Clause No. 7.92 (Amicable settlement)**,

shall be finally settled by arbitration, in accordance with the **Arbitration and Conciliation Act, 1996 (considering its amendment in 2015)** or any statutory modification or re-enactment thereof and rules made there under and for the time being in force. The **Arbitration Tribunal** shall be composed as per provision of the **Arbitration and Conciliation Act, 1996 (considering its amendment in 2015)** or any statutory modification or re-enactment thereof and rules made there under and for the time being in force.

7.93.2 In connection with the instant contract:

- a) the place of arbitration shall be **Kolkata** or **Haldia**, West Bengal, India,
- b) the arbitration shall be conducted in **English language**,
and
- c) the fees, if any, of the Arbitrators, if required to be paid before the award of work in respect to disputes is made and published, shall be shared equally by each of the parties

7.93.3 The Arbitrators shall have full power to open up, review and revise any certificate, determination, instruction, opinion, valuation or decision of the Engineer, relevant to the dispute. Nothing shall disqualify representatives of the parties and the Engineer from being called as a witness and giving evidence before the Arbitrators on any matter, whatsoever, relevant to the dispute.

7.93.4 Neither party shall be limited in the proceedings before such Arbitrators to the evidence or arguments put before the Engineer for the purpose of obtaining his said decision pursuant to **GCC Clause No. 7.91 (Engineer's decision)**. No such decision shall disqualify the Engineer from being called as a witness and giving evidence before the Arbitrators on any matter whatsoever relevant to the dispute.

7.93.5 Arbitration may be commenced prior to or after completion of the works, provided that the obligations of the Employer, the Engineer and the Contractor shall not be altered by reason of the arbitration being conducted during the progress of the works.

7.94 **Failure to comply with Engineer's decisions**

7.94.1 Whether neither the Employer nor the Contractor has given notice of intention to commence arbitration of dispute within the period stated in **GCC Clause No. 7.91 (Engineer's decision)** and the related decision has become final and binding, either party may, if the other party fails to comply with such decisions, and without prejudice to any other rights it may have, refer the failure to arbitration, in accordance with **GCC Clause No. 7.93 (Arbitration)**. The provision of **GCC Clause No. 7.91 (Engineer's decision)** and **GCC Clause No. 7.92 (Amicable settlement)** shall not apply to any such reference.

7.95 **Progress of work not to be interrupted**

7.95.1 The Contractor must, at all the times, fulfil their obligations under the contract and shall not slow down or stop the progress of work during the

period any dispute is under settlement either through reference to the Engineer or through arbitration, pursuant to the preceding clauses. Even if the works to be carried out during such a period involve matters under dispute, the Contractor shall nevertheless proceed with the works as per direction of the Engineer, pending settlement of the dispute. Failure of the Contractor, in this respect, shall constitute default on their part and render them liable to actions under the provisions of **GCC Clause No. 7.76 [Termination by Employer]**.

SECTION - VIII

SPECIAL CONDITIONS OF CONTRACT (SCC)

The following **Special Conditions of Contract (SCC)** shall supplement the **General Conditions of Contract (GCC)**. Whenever there is a conflict, the provisions herein shall prevail over those in the **GCC**.

Clause No. 7.20

**Performance
Guarantee /
Security Deposit**

Clause No. 7.20.1

i) Performance Guarantee / Security Deposit for the EPC Work, as a whole:

Within **28 (twenty-eight) days** of issuance of “Letter of Acceptance (LOA)”, the Contractor shall have to provide an irrevocable and unconditional Bank Guarantee, from a Nationalized Bank/ Scheduled Bank in India, in the amount, **10%** of the Capital Cost of the work with 3 (three) months claim period.

Failure of the Contractor to submit the aforesaid Performance Bank Guarantee and in the manner stated above, shall constitute sufficient grounds for termination of the contract and forfeiting the Earnest Money Deposit.

ii) Performance Guarantee / Security Deposit for the 10 years Comprehensive Operation & Maintenance Work, as a whole:

On successful completion of the EPC work and taking over of the project, Performance Guarantee/ Security Deposit submitted against i) above may be released on providing an irrevocable and unconditional Bank Guarantee, from a Nationalized Bank/ Scheduled Bank in India, in the amount, **10%** of the Capital Cost of the work with 3 (three) months claim period. The said Performance Guarantee/ Security Deposit submitted would be released after successful completion of 10 years Comprehensive Operation & Maintenance Work.

Otherwise, the Performance Guarantee/ Security Deposit submitted against i) above may be converted in to Performance Guarantee / Security Deposit for the 10 years Comprehensive Operation & Maintenance Work with 3 (three) months claim period and the same would be released after successful completion of 10 years Comprehensive Operation & Maintenance Work.

Failure of the Contractor to submit the aforesaid Performance Bank Guarantee and in the manner stated above, shall constitute sufficient grounds for forfeiting the Performance Bank Guarantee.

Clause No. 7.20.11

The procedure of release / refund of Performance Guarantee / Security Deposit would be as follows:

i) Performance Guarantee / Security Deposit for the materials, installations & workmanship, with respect to the instant work , as a whole:

On submission of Performance Guarantee/ Security Deposit and on successful completion of the ‘Operation & Maintenance Period’ (considering extension, if any) of the Contract job [for the materials, installations & workmanship, with respect to the instant work, as a whole], the Contractor may apply for release / refund of his Performance Guarantee/ Security Deposit by submitting an application to the Engineer, in this regard, whereupon the Engineer shall issue necessary recommendation for release of the said Performance Guarantee/ Security Deposit or refund the balance due against the Performance Guarantee/ Security Deposit to the Contractor, after making deduction there from in respect of any sum due to the Trustees from the Contractor.

Clause No. 7.26

**Supply of water
and Electricity**

Clause No. 7.26.1

Supply of water:

Billing against supply of water will be done on the basis of actual consumption recorded through water meter at the rate **INR 38.65 (including overhead charges @ 19.25%) per KL of Fresh Water** [As directed by TAMP (Tariff Authority for Major Ports)], with escalation @ 5% per annum.

The **water consumption charges** [based on the prevalent rates of KoPT, as may be amended from time to time] shall have to be paid by the Contractor immediately, on receipt of the bill from the office of the Finance Division, Haldia Dock Complex. All payment on this account should be updated, otherwise the pending bill amount, along with late payment surcharge, will be recovered from the Contractor's bill(s).

Clause No. 7.26.2

Supply of Electricity:

Electricity charges will be determined on the basis of **Chargeable Unit (kWh)** [actual **Unit (kWh) consumed** (recorded through Energy Meter) plus 3% on actual Unit consumed] and applicable rate of **West Bengal State Electricity Distribution Company Limited (WBSEDCL)**. Billing will be done on the basis of **Electricity charges** and overhead charges @ 19.25% [on the aforesaid **Electricity charges**] as per the notifications of **Tariff Authority of Major Ports (TAMP)**.

The **Electricity consumption charges** [based on the prevalent rates of **WBSEDCL**, as may be amended from time to time] shall have to be paid by the Contractor immediately, on receipt of the bill from the office of Finance Division, Haldia Dock Complex. All payment on this account should be updated, otherwise the pending bill amount, along with late payment surcharge, will be recovered from the Contractor's bill(s).

Clause No. 7.52

**Inspection and
testing**

Clause No. 7.52.1

The Employer shall appoint a **Third Party Inspection Agency**, at the cost of the Employer, for stage-wise technical inspection and certification of **materials & workmanship**, including **painting, erection, commissioning**, etc. [in connection with the contract job, as a whole]. The relevant Certificates shall be produced by the **Third Party Inspection Agency** to the Engineer or his authorised Representative.

The stage-wise technical inspection will be carried out by the **Third Party Inspection Agency** based on the approved **Quality Assurance Plan (QAP) & Field Quality Assurance Plan (FQAP)** [considering the Technical Specification of the bidding documents].

The Contractor shall have to submit a **Quality Assurance Plan (QAP)** and a **Field Quality Assurance Plan (FQAP)**, based on the Technical Specification and other terms & conditions stipulated in the bidding documents. The **QAP & FQAP** shall be approved by the “**Engineer**”, after the same are duly recommended by the **Third Party Inspection Agency**. The **Technical Inspection & Certification** will be carried out by the **Third Party Inspection Agency**, in accordance with approved **QAP & FQAP**.

In all cases where tests are required, within the purview of QAP & FQAP, whether at the premises of the Contractor or any Sub-contractor or elsewhere, the Contractor, except where otherwise specified, shall provide free of charges such labour, materials, electricity, fuel, water, stores, apparatus and instruments, as may reasonably be demanded, to carry out sufficiently such tests and shall, at all times, facilitate the Engineer or his Representative and the Third Party Inspection Agency, to accomplish such testing.

The cost of all tests and/or analyses, within the purview of QAP & FQAP, effected at the Contractor's or Sub-contractor's works and on the site, shall be borne by the Contractor. The Contractor will be called upon to pay all expenses incurred by the Employer in respect of any work found to be defective or of inferior quality, adulterated or otherwise unacceptable.

If, during inspection by the **Third Party Inspection Agency [appointed by KoPT]**, any material or test [within the purview of QAP & FQAP] fails to fulfil the contract conditions for **more than 2 (two) times**, any **additional amount charged by the Third Party Inspection Agency towards inspection of the same from the 3rd time onwards shall have to be borne by the Contractor**. If the Contractor fails to make such payment to the **Third Party Inspection Agency**, the same shall be deducted from the bill(s) of the Contractor and paid to the **Third Party Inspection Agency**.

Clause No. 7.52.12

Tests on completion:

On **completion of installation**, the contractor shall give a **7 (seven) days'** notice to the Engineer [with a copy to the **Third Party Inspection Agency, appointed by KoPT**], in writing (informing the date on which they will be ready to make the tests), before carrying out such tests, in accordance with and in the manner prescribed in the specifications.

If any portion of work fails under the tests to fulfil the contract conditions, tests of the faulty portion shall, if required by the **Third Party Inspection Agency (appointed by KoPT)** or the Engineer or by the Contractor, be repeated within reasonable time, upon the same terms and conditions.

If such “**Tests on completion**” cannot be carried out successfully by the Contractor within 1 (one) month after the time fixed by the Contractor and if, in opinion of the Engineer, the tests are being unduly delayed, the Engineer may, in writing, call upon the Contractor, with 7 (seven) days' notice, to make such tests, failing which the Engineer may proceed to make

such tests himself, at the Contractor's risk and expense. In the above eventuality, the Employer shall, nevertheless, have the right of using the installations at the Contractor's risk until the “**Tests on completion**” are successfully carried out.

Clause No. 7.65

**Completion
Period**

Clause No. 7.65.1

All the jobs (including submission of As Built Drawings), as per contract, are to be completed within 08 (**eight**) months from the date of issue of Letter of Acceptance (LOA) [i.e. **award of contract**].

Clause No. 7.67

**Comprehensive
Operation &
Maintenance
Period of 10
Years**

Clause No. 7.67.1

“Comprehensive Operation & Maintenance Period of 10 Years” of the Contract job:

“**Comprehensive Operation & Maintenance Period of 10 Years**” of the Contract job [for the materials, installations & workmanship, with respect to the instant job, as a whole] shall start from the date of taking over the Contract job [as per GCC Clause No. 7.66 (Taking over of the Contract job by KoPT)] and will continue till expiry of **Comprehensive Operation & Maintenance Period of 10 Years**, calculated from the date of taking over the Contract job.

During “**Comprehensive Operation & Maintenance Period of 10 Years**” of the **Contract job**, the Contractor shall nominate 1 (one) competent, experienced and responsible technical person, to co-ordinate and execute all works to be attended by the Contractor, as per contractual obligations, without any extra cost to HDC, KoPT.

Clause No. 7.68

**Defects after
taking over**

Clause No. 7.68.1

The 10 years comprehensive operation & maintenance contract shall be commenced from the date of taking over of the successful installation by HDC, KoPT and the date of issue of the completion certificate.

Clause No 7.71

Clause No. 7.71.2

**Terms of
payment**

Payment to the Successful Bidder will be made stage-wise as indicated below :-

- (i) 10% against approval of layout drawings, schemes, material list for all equipments.
- (ii) 60% against supply of the materials at site in good condition.
- (iii) 20% against erection, testing & commissioning of the complete system.
- (iv) 10% against taking over of the completed work.

During comprehensive operation & maintenance period of 10 years, payment would be made on quarterly basis at the end of every quarter for each year of comprehensive operation & maintenance period of 10 years.

SECTION - IX
BIDDING FORMS

BIDDING FORM – I

MINIMUM ELIGIBILITY CRITERIA

[To be filled up and uploaded, duly signed & stamped]

(I) ANNUAL TURNOVER STATEMENT

The annual turnover of(name of the bidding firm), **for the years 2015-16, 2016-17 and 2017-18** , based on the **Balance Sheets and Profit & Loss Accounts**, are given below:

Financial years	Turnover (as per Auditor's Report / Balance Sheet) [in Rs]
2015-2016	
2016-2017	
2017-2018	
<i>Total</i>	
<i>Average Annual Turnover</i>	

SIGNATURE OF CHARTERED ACCOUNTANT ::

NAME OF CHARTERED ACCOUNTANT ::

(COMPANY SEAL)

NOTE : Copy of Balance Sheets and Profit & Loss Accounts enclosed with sealed & signed.

(II) TECHNICAL EXPERIENCE

Sl. No.	Contract No. / Order No. and date	Name of the Employer and Place of work	Contract value [in Rs.]	Date of completion of work	Page number(s) of reference / supporting document (s), uploaded.

(III) ELECTRICAL CONTRACTOR'S LICENSE ISSUED IN THE NAME OF CONTRACTOR BY STATE / CENTRAL GOVT. AUTHORITY

<u>Date & issue</u>	:	
<u>Validity Upto</u>	:	

TEST OF RESPONSIVENESS

[To be filled up and uploaded, duly signed & stamped]

	Requirement	Submitted/Not submitted [Put √ if submitted & X if not submitted]	Validity/ For the month of
a)			
i)	GST Registration Certificate.	If submitted, Page Number(s):	Not applicable.
ii)	Document in support of non-applicability.	If submitted, Page Number(s):	Not applicable.
b)			
i)	Profession Tax Clearance Certificate (PTCC)	If submitted, Page Number(s):	
	<u>OR</u> Profession Tax Payment Challan (PTPC)	If submitted, Page Number(s):	
ii)	Document in support of non-applicability.	If submitted, Page Number(s):	Not applicable.
c)			
i)	Certificate for allotment of EPF Code No.	If submitted, Code No.: Page Number(s):	Not applicable.
ii)	Latest EPF Payment Challan.	If submitted, Page Number(s):	
iii)	Document in support of non-applicability.	If submitted, Page Number(s):	Not applicable.

d)				
i)	Registration Certificate of ESI Authority.		If submitted, Code No.: Page Number(s):	Not applicable.
ii)	Affidavit, Declaration and Indemnity Certificate.		If submitted, Page Number(s):	Not applicable.
e)	PAN Card		If submitted, PAN No.: Page Number(s):	Not applicable.
f)	MSME / MSE / DIC / SSI / NSIC certificate		If submitted, Page Number(s):	
g)	Power of Attorney		If submitted, Page Number(s):	Not applicable.

BIDDING FORM-III**GENERAL INFORMATION OF THE BIDDER**

[To be filled up and uploaded, duly signed & stamped]

1.	Bidder's Legal Name (IN CAPITAL LETTERS)		
2.	a)	Country of registration.	
	b)	Year of registration.	
	c)	Legal address in country of registration.	
	d)	URL of the bidder.	
3.	Information regarding bidder's authorised representative(s) / contact person(s)		
	a)	Name(s)	
	b)	Address(es)	
	c)	Telephone number(s)	
	d)	Facsimile number(s)	
	e)	Electronic mail address	

4.	a)	Address of the branch office, if any	
	b)	Name of the contact person at branch office	
	c)	Telephone number(s)	
	d)	Facsimile number(s)	
	e)	Electronic mail address	
5.	Whether the bidder is a Proprietorship Firm or Partnership Firm or Limited Company .		
6.	Details of the Banker(s) :		
	a)	Name of the Banker(s) in full.	
	b)	Address(es) of the Banker(s)	
	c)	Telephone number(s)	
	d)	Facsimile number(s)	
	e)	Electronic mail address	
	f)	Name(s) of the contact person(s)	
7.	Bank details for ECS payment :		
	a)	Bank Account number.	
	b)	Name of the bank.	
	c)	Name of the branch.	
	d)	Address of the branch.	
	e)	RTGS code of the branch.	
	f)	MICR code of the branch.	

8.	Income Tax and Goods & Services Tax (GST) details (if applicable):		
	a)	Permanent Account Number (PAN)	
	b)	GST Registration Number (GSTIN)	
9.	Employees' Provident Fund (EPF) Code No.		
10.	Employees' State Insurance (ESI) Code No.		
11.	Mainlines of business		

BIDDING FORM-IV

FORMAT FOR DECLARATION

[To be printed on the bidder's Letter Head and uploaded after signing]

To,
General Manager (Engg.)
Haldia Dock Complex ;
Kolkata Port Trust.

Name of Work: Design, Engineering, Supply, Construction, Erection, Testing and Commissioning including 10 years Comprehensive Operation & Maintenance (O&M) Contract of 1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust.

Tender No. : SDM(P&E)/T/08/2018-2019

E-Tender No.: KoPT/Haldia Dock Complex/P&E Div/8/18-19/ET/146

I, the authorized signatory of the (Name of the Company /Firm) do hereby declare / confirm that :

* I / We have not been **debarred**, **banned** or **delisted** by any Government or Quasi-Government Agencies or Public Sector Undertakings in India.

I / we have not made any **addition** / **modification** / **alteration** in the **Bidding Documents** (including Bidding Forms & Contract Forms) hosted in the websites.

The prices have been quoted in the Price Bid, electronically, through the website of MSTC Ltd. only and no direct or indirect mention of the prices has been made by me / us anywhere else in my / our bid.

No extraneous conditions (like "Not Applicable", conditional rebate, etc.), regarding the Price Bid, have been mentioned anywhere in our bid.

Signature of authorised person of the bidder
(with office seal)

* In case the **firm** has been debarred or banned or delisted by any Government or Quasi-Government Agencies or Public Sector Undertaking in India, then the same should be declared properly, after modifying the sentence, suitably.

1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust.

BIDDING FORM-V

FORM OF TENDER

[To be printed on the bidder's Letter Head and uploaded after signing]

To,
General Manager (Engg.)
Haldia Dock Complex ;
Kolkata Port Trust.

Name of Work : Design, Engineering, Supply, Construction, Erection, Testing and Commissioning including 10 years Comprehensive Operation & Maintenance (O&M) Contract of 1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust.

Tender No. : SDM(P&E)/T/08/2018-2019

E-Tender No.: KoPT/Haldia Dock Complex/P&E Div/8/18-19/ET/146

I/We (Name of the bidder)of(Address of the bidder) having **examined the site of work, inspected the drawings** and read the **bidding documents** [including **all addenda / corrigenda**, issued i.e. {insert Addendum / Corrigendum / Extension No(s)}], hereby bid and undertake to execute & complete all the work related to “Design, Engineering, Supply, Construction, Erection, Testing and Commissioning including 10 years Comprehensive Operation & Maintenance (O&M) Contract of 1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust”, required to be performed in accordance with the **Technical Specification, General Conditions of Contract (GCC), Special Conditions of Contract (SCC)**, etc., at the **rates & prices** quoted in the **Price Bid** [*submitted electronically, through the website of MSTC Ltd.*], withinmonth from the date of order to commence the work , in the event of our bid being accepted.

I/we also undertake to enter into a **Contract Agreement** in the form hereto annexed [**Section XI**] with such alterations or additions thereto, which may be necessary to give effect to the acceptance of the bid and incorporating such **Technical Specification, General Conditions of Contract (GCC), Special Conditions of Contract (SCC)**, etc. and I/we hereby agree that until such **contract agreement** is executed, the said **Technical Specification, General Conditions of Contract (GCC), Special Conditions of Contract (SCC)**, etc. and the bid, together with the acceptance thereof in writing, by or on behalf of the Employer, shall be the contract.

I / We requiredays preliminary time to arrange and procure the materials, tools & tackles, etc. required by the work, from the date of acceptance of bid, before I/we could commence the work.

1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust.

I / We have deposited **Rs. 11,86,415.00 (Indian Rupees: Eleven lakh Eighty Six thousand Four Hundred Fifteen)** only using the **Axis Bank Payment Gateway**, vide **URN No.:**..... of as **Earnest Money Deposit.**

I/We agree that the period for which the bid shall remain open for acceptance, shall not be less than **days**, from the last date of submission of bid.

(Signature of authorised person of the bidder)

WITNESS:

Signature:

Name : _____

Name:
(In Block Letters)

Designation : _____

Address:

Date : _____

Occupation:

(Office Seal)

BIDDING FORM-VI

PRICE SCHEDULE

[To be filled up and uploaded, duly signed & stamped]

Table 1: Total EPC Contract for 1 MW (AC) SPV Plant.

Sl. No.	Item Description	Quantity	Applicable % of GST		
			SGST	CGST	IGST
1	Supply & delivery of PV Modules, Inverters and balance of system including all equipments, materials, spares, accessories, MMS etc. up to site (mention quantity & wattage/ capacity)	1 Set			
2	Installation & commissioning of PV Modules, Inverters and other balance materials etc. at site.	1 Set			
3	Supply & delivery of transformer & switch yard including transmission overhead line connecting to take-off point & interconnection at Haldia Dock Complex (11 kV)	1 Set			
4	Installation & commissioning of transformer & switch yard including transmission overhead line connecting to take-off point & interconnection at Haldia Dock Complex (11 kV)	1 Set			
5	Civil and allied works including construction of buildings, MMS foundations, perimeter etc.	1 Set			

NOTE: The above Bill of Materials (BoM) is indicative only. The purpose is for complete supply, delivery, installation & commissioning of 1 MW (AC) SPV Plant with the provision for evacuation of generated power to nearby 11 kV network (i.e. 11 kV overhead line) of Haldia Dock Complex (HDC), Kolkata Port Trust (KoPT) at Haldia Township, Haldia.

Table 2: Comprehensive Operation & Maintenance (O&M) Contract for 1 MW (AC) SPV Plant.

Sl. No.	Item	Quantity	Applicable % of GST		
			SGST	CGST	IGST
6.	Operation and Maintenance of the 1 MW (AC) PV Grid Interactive Power Plant including transmission & evacuation system for-	----	----	----	----
(i)	First Year	1 Set			
(ii)	Second Year	1 Set			
(iii)	Third Year	1 Set			
(iv)	Fourth Year	1 Set			

1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust.

(v)	Fifth Year	1 Set			
(vi)	Sixth Year	1 Set			
(vii)	Seventh Year	1 Set			
(viii)	Eight Year	1 Set			
(ix)	Ninth Year	1 Set			
(x)	Tenth Year	1 Set			

NOTE: (i) GST as applicable will be paid extra as actual. Applicable rate (in %) of GST may please be indicated.

- (ii) During Comprehensive O&M period of 10 years, the plant will have to be manned by the contractor **round the clock** by one Technician and one Helper.
- (iii) During comprehensive O&M period, as indicated at (i) above, Technician(s) and Helper(s) will have to be manned in the General Duty (i.e. from 08:00 hrs. to 17:00 Hrs. normally) to look after different maintenance activities as well as trouble shooting.
- (iv) One supervisor (Diploma in Electrical) will have to be manned in General duty, responsible for round the clock comprehensive O&M for 365 days.
- (v) If required, to provide more as per requirement.

Integrity Pact

Between

Kolkata Port Trust (KoPT) hereinafter referred to as “The Principal/Employer”

And

..... hereinafter referred to as “The Bidder/Contractor”

Preamble

The Principal intends to award, under laid down organizational procedures, contract/s for “Design, Engineering, Supply, Construction, Erection, Testing and Commissioning including 10 years Comprehensive Operation & Maintenance (O&M) Contract of 1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust” The Principal values full compliances with all relevant laws of the land, rules, regulations, economic use of resources and of fairness / transparency in its relations with its Bidder(s) and/or Contractor(s).

In order to achieve these goals, an Independent External Monitor (IEM) appointed by the principal, will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

NOW, THEREFORE,

To avoid all forms of corruption by following a system that is fair, transparent and free from any influence/prejudiced dealings prior to, during and subsequent to the currency of the contract to be entered into with a view to:-

Enabling the PRINCIPAL/EMPLOYER to get the contractual work executed and/or to obtain/dispose the desired said stores/equipment at a competitive price in conformity with the defined specifications/scope of work by avoiding the high cost and the distortionary impact of corruption on such work/procurement/disposal and Enabling BIDDERS/CONTRACTORS to abstain from bribing or indulging in any corrupt practice in order to secure the contract by providing assurance to them that their competitors will also abstain from bribing and other corrupt practices and the PRINCIPAL/EMPLOYER will commit to prevent corruption, in any form, by its officials by following transparent procedures.

Section-1 - Commitments of the Principal/Employer:

- (1) The Principal commits itself to take measures necessary to prevent corruption and to observe the following principles:
 - a. No employee of the Principal, personally or through family members, will, in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.

- b. The Principal will, during the tender process, treat all Bidder(s) with equity and reason. The Principal will, in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
 - c. The Principal will exclude from the process all known prejudiced persons.
- (2) If the Principal obtains information on the conduct of any of its employees which is a criminal offence under the Indian Penal Code (IPC)/Prevention of Corruption (PC) Act, or if there be a substantive suspicion in this regard, the Principal will inform the Chief Vigilance Officer and in addition can initiate disciplinary actions.

Section-2 - Commitments of the Bidder(s)/Contractor(s):

- (1) The Bidder(s)/Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.
- a. The Bidder(s)/Contractor(s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.
 - b. The Bidder(s)/Contractor(s) will not enter with other Bidders into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bid or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
 - c. The Bidder(s)/Contractor(s) will not commit any offence under the relevant IPC/PC Act; further the Bidder(s)/Contractor(s) will not use improperly, for purpose of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details including information contained or transmitted electronically.
 - d. The Bidder(s)/Contractor(s) of foreign origin shall disclose the name and address of the Agents/representative in India, if any. Similarly the Bidder(s)/Contractor(s) of Indian Nationality shall furnish the name and address of the foreign principals, if any. Further details as mentioned in the "Guidelines on Indian Agents of Foreign Suppliers" shall be disclosed by the Bidder(s)/Contractor(s). Further, as mentioned in the Guidelines, all the payments made to the Indian Agent/representative have to be in Indian Rupees only. Copy of the "Guidelines on Indian Agents of Foreign Suppliers" is annexed and marked as Annex-"A".
 - e. The Bidder(s)/Contractor(s) will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

- (2) The Bidder(s)/Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

Section-3 - Disqualification from tender process and exclusion from future contracts:

If the Bidder(s)/Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or in any other form such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/Contractor(s) from the tender process or take action as considered appropriate.

Section-4 - Compensation for damages:

- (1) If the Principal has disqualified the Bidder(s) from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/Bid Security.
- (2) If the Principal has terminated the contract according to Section 3 or if the Principal is entitled to terminate the contract according to Section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages of the contract value or the amount equivalent to Performance Bank Guarantee.

Section-5 - Previous transgression:

- (1) The Bidder declares that no previous transgressions occurred in the last 3 years from the date of signing the Integrity pact with any other Company in any country conforming to the anti corruption approach or with any other Public Sector Undertakings/Enterprise in India, Major Ports/Govt. Departments of India that could justify his exclusion from the tender process.
- (2) If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or action can be taken as considered appropriate.

Section-6 - Equal treatment of all Bidders/Contractors/Sub-contractors:

- (1) The Bidder(s)/Contractor(s) undertake(s) to demand from all subcontractors a commitment in conformity with this Integrity Pact, and to submit it to the Principal before contract signing.
- (2) The Principal will enter into agreements with identical conditions as this one with all Bidders, Contractors and Sub-contractors.
- (3) The Principal will disqualify from the tender process all Bidders who do not sign this Pact or violate its provisions.

Section-7- Other Legal actions against violating Bidder(s)/Contractor(s)/Sub-contractor(s):

The actions stipulated in this Integrity Pact are without prejudice to any other legal action that may follow in accordance with provisions of the extant law in force relating to any civil or criminal proceedings.

Section-8 -Role of Independent External Monitor (IEM):

- (a) The task of the Monitors shall be to review independently and objectively, whether and to what extent the parties comply with the obligations under this pact.
- (b) The Monitors shall not be subject to instructions by the representatives of the parties and shall perform their functions neutrally and independently.

- (c) Both the parties accept that the Monitors have the right to access all the documents relating to the contract.
- (d) As soon as the Monitor notices, or has reason to believe, a violation of this pact, he will so inform the authority designated by the Principal and the Chief Vigilance Officer of Kolkata Port Trust.
- (e) THE BIDDER(s)/CONTRACTOR(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the PRINCIPAL including that provided by the BIDDER/CONTRACTOR. The BIDDER/CONTRACTOR will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation, if any. The same is applicable to subcontractors. The Monitor shall be under contractual obligation to treat the information and documents of the Bidder/Contractor/Sub-contractor(s) with confidentiality.
- (f) The Principal/Employer will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor, the option to participate in such meetings.
- (g) The Monitor will submit a written report to the designated Authority of Principal/Employer/Chief Vigilance Officer of Kolkata Port Trust within 8 to 10 weeks from the date of reference or intimation to him by the Principal/Employer/Bidder/Contractor and should the occasion arise, submit proposals for correcting problematic situation. BIDDER/CONTRACTOR can approach the Independent External Monitor(s) appointed for the purposes of this Pact.
- (h) As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or to take corrective action, or to take other relevant action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.
- (i) If the Monitor has reported to the Principal substantiated suspicion of an offence under the relevant IPC/PCA, and the Principal/Employer has not, within reasonable time, taken visible action to proceed against such offence or reported to the Chief Vigilance Officer, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
- (j) The word 'Monitor' would include both singular and plural.

Section-9 - Facilitation of Investigation:

In case of any allegation of violation of any provisions of this Pact or payment of commission, the PRINCIPAL/EMPLOYER or its agencies shall be entitled to examine all the documents including the Books of Accounts of the BIDDER/CONTRACTORS and the BIDDER/CONTRACTOR shall provide necessary information and documents in English and shall extend all possible help for the purpose of such examination.

Section-10 - Pact Duration:

The Pact begins with when both parties have legally signed it and will extend up to 2 years or the complete execution of the contract including warranty period whichever is later. In

case bidder/contractor is unsuccessful this Integrity Pact shall expire after 6 months from the date of signing of the contract.

If any claim is made/lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged/determined by Chairman of KoPT.

Section-11 - Other Provisions:

- (1) This agreement is subject to Indian Law. Place of performance and jurisdiction is the Registered Office of the Principal in Kolkata.
- (2) Changes and supplements as well as termination notices need to be made in writing in English.
- (3) If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.
- (4) Should one or several provisions of this agreement turn out to be invalid, the reminder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

(For & on behalf of the Principal)

(For & on behalf of Bidder/Contractor)

(Office Seal)

(Office Seal)

Place:

Date :

Witness 1:
(Name & address)

.....
.....

Witness 1:
(Name & address)

.....
.....

Witness 2:
(Name & address)

.....
.....

Witness 2:
(Name & address)

.....
.....

SECTION - X

CHECKLIST

Before scanning and upload the following required documents, all pages are to be signed by a person duly authorised to sign on behalf of the bidder, and are to be embossed with their official seal, owing responsibility for their correctness / authenticity. All pages of the aforesaid documents should be serially marked.

*The offered prices would be given in the “**Price Bid (Part-II)**” electronically, through the website of **MSTC Ltd.** only.*

Sl. No.	Particulars	Submitted/ Not submitted [Put ✓ if submitted and put X if <u>not</u> <u>submitted</u>]	If submitted, <u>page numbers</u>
1.	Filled up checklist.	☐	☐
2.	Proof of Bid Document Fee.	☐	☐
3.	Proof of Earnest Money Deposit (EMD).	☐	☐
4.	Certificate of getting benefit by MSME / SSI / NSIC for exemption of Bid Document Fee and Earnest Money,	☐	☐
		☐	☐
5.	Bidding Forms		
	i) Bidding Form – I	☐	☐
	ii) Bidding Form - II	☐	☐

Sl. No.	Particulars	Submitted/ Not submitted [Put ✓ if submitted and <u>put X if not submitted</u>]	If submitted, <u>page numbers</u>
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	iii) Bidding Form – III	☐	☐
	iv) Bidding Form - IV	☐	☐
	v) Bidding Form – V	☐	☐
	vi) Bidding Form - VI	☐	☐
vii)	Bidding Form - VII	☐	☐

SECTION – XI
CONTRACT FORMS

FORM OF AGREEMENT

(To be submitted on Non- Stamp Paper of worth not less than INR 50.00)

CONTRACT NO. : GM(E)/...../ /AGMT/...../.....

TENDER REFERENCE:

Tender No. : **SDM(P&E)/T/08/2018-2019**

E- Tender No. : KoPT/Haldia Dock Complex/P&E Div/8/18-19/ET/146

for

Design, Engineering, Supply, Construction, Erection, Testing and Commissioning including 10 years Comprehensive Operation & Maintenance (O&M) Contract of 1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust.

ORDER REFERENCE: /1036/ /O-... dated

This agreement made this day of , Two thousand ,
BETWEEN

The Board of Trustees for the Port of Kolkata, a body corporate -- constituted by the Major Port Trust Act, 1963 (hereinafter called the ‘**Trustees**’, which expression shall unless excluded by or repugnant to the context be deemed to include their successors in office) of the one part

AND

..... (hereinafter called the ‘**Contractor**’, which expression shall unless excluded by or repugnant to the context be deemed to include its heirs, executors, administrators, representatives and assignees or successors in office) of the other part

[Together hereinafter the ‘**Parties**’]

WHEREAS

The Trustees are desirous that certain works should be executed by the Contractor, viz. ‘**Design, Engineering, Supply, Construction, Erection, Testing and Commissioning including 10 years Comprehensive Operation & Maintenance (O&M) Contract of 1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust**’ and have accepted a Bid / offer by the Contractor for execution, completion and maintenance of such works, including remedying any defects therein, during the Defect Liability Period.

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this agreement words expressions shall

1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust.

NOW THIS AGREEMENT WITNESSETH as follows :

1. In this agreement words and expression shall have the same meanings as are respectively assigned to them in **Conditions of Contract** hereinafter referred to.
2. The following documents shall be deemed to form and be read and construed as part of this agreement :
 - a) The said bid / offer.
 - b) The Letter of Acceptance of the bid /offer [vide Order No./1036/...../O-... dated]
 - c) The Conditions of Contract and **Technical Specification** [all terms and conditions of Tender No. SDM(P&E)/T/08/2018-2019].
 - d) Addenda [Please insert Addenda Nos.]
 - e) “ Price Comparative Statement”, showing the prices quoted (electronically , through the website of MSTC Ltd.) by the Successful Bidder, in the Price Bid.
 - f) All correspondence, by which the contract is added, amended, varied or modified, in any way, by mutual consent.
3. In Consideration of the payments to be made by the Trustees to the Contractor as hereinafter mentioned, the Contractor hereby covenant with the Trustees to execute, complete & maintain the work, including remedy any defects therein (during the Defect Liability Period”), in conformity with the provisions of the Contract, in all respects.

IN WITNESS whereof the parties hereto have caused this Agreement to be executed the day and year first before written.

The parties hereunto affixed their respective Common Seals (or have hereunto set their respective hands and seals).

For and on behalf of

For and on behalf of

HALDIA DOCK COMPLEX
KOLKATA PORT TRUST
(TRUSTEES)

(CONTRACTOR)

SEAL

SEAL

In presence of

In presence of

INDEMNITY BOND

[To be submitted on Non-judicial Stamp Paper of worth not less than INR .50.00, **duly notarised**]

Reference:

Order No.:/...../...../O-... dated for Design, Engineering, Supply, Construction, Erection, Testing and Commissioning including 10 years Comprehensive Operation & Maintenance (O&M) Contract of 1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust.

1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust.

Senior Deputy Manager (P&E),
Haldia Dock Complex ;
Operational Administrative Building (1st Floor) ;
Chiranjibpur, P.O.: Haldia ;
Dist. : Purba Medinipur ,
West Bengal, India
PIN : –721 604

This deed of **Indemnity Bond** made on by
..... having their office at
(hereinafter called “the **Contractor**”).

Whereas the General Manager (Engineering), **Haldia Dock Complex, Kolkata Port Trust**, Dist.: Purba Medinipur, West Bengal (hereinafter call “the **Engineer**”) has placed an order, bearing no. SDM(P&E) / 1036/...../O-... dated and some materials, spare parts, components, sub-assemblies, etc. are required to be taken **outside of Haldia Dock Complex** premises for some specialized servicing, repairing, overhauling, etc. or **fault diagnosis & remedial measures** by the Contractor, as per the terms & conditions mentioned in the said order, and which have been mutually agreed upon by the parties hereto,

AND

Whereas in consideration of the said contract, the Contractor has agreed to execute an **Indemnity Bond** for the safe custody on receipt of the said materials, spare parts, components, sub-assemblies, etc., from the **Engineer** until the **completion of servicing / overhauling / repairing / remedial work** and returning back to the Engineer as hereinafter appearing.

Now this deed witnessed that in pursuance of the said agreement and in the premises, the Contractor agrees to indemnify Engineer and at all the terms, to hold themselves liable for all the **damages, loss** due to **pilferage / fire** or negligence on the part of the Contractor or their employees, agents and representatives or from whatever cause, with all losses, interest charges and expenses incurred by the said Engineer on account of the material(s) issued to the Contractor,

AND

It is in terms of the said contract and this **Deed of Indemnity**, the material(s) issued free to the Contractor for servicing / overhauling / repairing / **fault diagnosis & remedial work**, thereon shall be deemed to be the **property of the Engineer**.

It is hereby agreed that the Contractor shall be liable for all injury, losses and damages that may be caused to the, from whatever cause and further that the Contractor shall not part with or delivery possession of the said material(s) to any other party or person, save in compliance with and in performance & provision of contract in respect of which this **Indemnity Bond** is executed, the Contractor having undertaken to delivery the said material (s) in all respect in compliance with the terms of the contract.

This bond and the trust hereby created shall remain valid and binding on the Contractor till such time as the above said order has been fully and finally executed and Contractor has delivered the complete thereon to the Engineer under the terms of the contract.

For and on behalf of (name of the Contractor), under the common seal of the company.

WITNESS (Signature of the authorised person on behalf of the Contractor)

(Signature)
Name :
Designation
Name :
Designation

Signed in my presence and identified by me

:

BANK GUARANTEE FOR PERFORMANCE GUARANTEE

[To be submitted on Non-judicial Stamp Paper of worth not less than INR 50.00]

**To
The Board of Trustees,
for the Port of Kolkata.**

BANK GUARANTEE NO..... DATE.....

Name of Issuing Bank.....

Name of Branch.....

Address.....

In consideration of the **Board of Trustees for the Port of Kolkata**, a body corporate – duly constituted under the Major Port Trusts Act, 1963 (Act 38 of 1963), (hereinafter referred to as “**The Trustees**”) having awarded to Shri / Messrs a Proprietary/ Partnership/Limited / Registered Company, having its Registered Office at (hereinafter referred to as “**The Contractor**”, which expression shall unless repugnant to the context or meaning thereof include its successors, administrators, executors and assigns), a **CONTRACT** by issue of Trustees’ Work Order No. //...../O-..... dated for “Design, Engineering, Supply, Construction, Erection, Testing and Commissioning including 10 years Comprehensive Operation & Maintenance (O&M) Contract of 1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust” and the same having been unequivocally accepted by the Contractor resulting in a **CONTRACT** bearing No. **GM(E)/1036/ /AGMT/...../.....** and the Contractor having agreed to provide a **BANK GUARANTEE** from a Nationalized / Scheduled Bank of India, in prescribed format for Rs. (**Indian Rupees**) only, for the faithful and satisfactory performance of the entire contract .

We, ... Branch, Kolkata/Haldia, do, on the advice of the Contractor, hereby undertake to indemnify and keep indemnified the Trustees to the extent of the said sum of **Rs** (**Indian Rupees**) only. We, Branch, Kolkata/Haldia, further agree that if a written demand is made by the Trustees through any of its officials for honouring the Bank Guarantee constituted by these presents, we, Branch, Kolkata/Haldia, shall have no right to decline to cash the same for any reason whatsoever and shall cash the same and pay the sum so demanded to the Trustees within a week from the date of such demand by an A/c Payee Banker's Cheque drawn in favour of "Kolkata Port Trust", without any demur. Even if there be any dispute between the Contractor and the Trustees, this would be no ground for us, (Name of Bank), Branch, Kolkata/Haldia, to decline to

1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust.

honour the Bank Guarantee in the manner aforesaid. The very fact that we,Branch, Kolkata..... /Haldia, decline or fail or neglect to honour the Bank Guarantee in the manner aforesaid, shall constitute sufficient reason for the Trustees to enforce the Bank Guarantee unconditionally without any reference, whatsoever, to the Contractor.

2. We, ' Branch, Kolkata /Haldia, further agree that a mere demand by the Trustees at anytime and in the manner aforesaid, is sufficient for us,Branch, Kolkata /Haldia, to pay the amount covered by this Bank Guarantee in full and in the manner aforesaid and within the time aforesaid without reference to the Contractor and no protest by the Contractor, made either directly or indirectly or through court, can be valid ground for us, Branch, Kolkata/Haldia, to decline or fail or neglect to make payment to the Trustees in the manner and within the time aforesaid.

3. We, Branch, Kolkata/Haldia, further agree that the Bank Guarantee herein contained shall remain in full force and effect, during the period that is taken for the due performance of the said contract by the Contractor and that it shall continue to be enforceable till all the dues of the Trustees under and/or by virtue of the terms and conditions of the said contract, have been fully paid and its claim satisfied and/or discharged in full and/or till the Trustees certify that the terms and conditions of the said contract have been fully and properly observed/fulfilled by the Contractor and accordingly, the Trustees have discharged the Bank Guarantee, subject however, that this guarantee shall remain valid upto and inclusive ofday of..... ..200.....and subject all so that the provision that the Trustees shall have no right to demand payment against this guarantee after the expiry of 6 (six) calendar months from the expiry of the aforesaid validity period upto.....or any extension thereof made by us,Branch, Kolkata..... /Haldia, in further extending the said validity period of this Bank Guarantee on Non-judicial Stamp Paper of appropriate value, as required / determined by the Trustees, only on a written request by the Trustees to the Contractor for such extension of validity of this Bank Guarantee.

4. We,Branch, Kolakta /Haldia, further agree that, without our consent and without affecting in any manner our obligations hereunder, the Trustees shall have the fullest liberty to vary from time to time any of the terms and conditions of the said contract or to extend the time for full performance of the said contract including fulfilling all obligations under the said contract by the Contractor or to postpone for any time or from time to time any of the powers exercisable by the Trustees against the Contractor and to forebear or enforce any of terms and conditions relating to the said contract and We,
Branch, Kolkata... .. /Haldia, shall not be relieved from our liability by reason of any such variation or extension being granted to the Contractor or for any forbearance, act or commission on the part of the Trustees or any indulgence by the Trustees to the Contractor or by any such matter or thing of whatsoever nature, which under the law relating to sureties would, but for this provision, have effect of so

relieving us,Branch, Kolkata /Haldia.

5. We, Branch, Kolkata /Haldia do also agree that the Trustees at their option shall be entitled to enforce this Guarantee against us
... ..Branch, Kolkata /Haldia as principal debtor in the first instance without producing against the Contractor and notwithstanding any security or other guarantee that the Trustees may have in relation to the Contractor's liabilities.
6. We,..... -.Branch, Kolkata... .. /Haldia, lastly undertake not to revoke this Bank Guarantee during its currency except with the previous consent of the Trustees in writing.

SIGNATURE... ..

NAME.....

DESIGNATION.....

(Duly constituted attorney for and on behalf of)

BANK. , . . .

BRANCH... ..

KOLKATA... .. /HALDIA

(OFFICIAL SEAL OF THE BANK)

Kolkata Port Trust
Haldia Dock Complex
CERTIFICATE OF COMPLETION OF WORK

Contractor : _____

Address : _____

Date of completion : _____

Dear Sir,

Subject : Design, Engineering, Supply, Construction, Erection, Testing and Commissioning including 10 years Comprehensive Operation & Maintenance (O&M) Contract of 1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust.

Reference : i) **Work Order No.:**/...../...../O-... dated
.....
ii) **Contract No./ Agreement No. :**/...../...../ AGMT /
...../

This is to certify that the above work which was carried out by you is, in the opinion of the undersigned, complete in every respect on the _____ day of _____ 20____, in accordance with terms of the contract and you are required to maintain the work in accordance with **GCC Clause No. 7.67** of the General Conditions of Contract and under provisions of the contract.

(Signature of the Engineer/Engineer's Representative)

Name:

Designation:

Date:

(OFFICIAL SEAL)

1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust.

Kolkata Port Trust
Haldia Dock Complex
CERTIFICATE OF FINAL COMPLETION

**General Manager (Finance),
Haldia Dock Complex (HDC),
Jawahar Tower Complex,
P.O: Haldia Township,
Dist.: Purba Medinipur,
PIN – 721 607,
West Bengal, India.**

Subject : Design, Engineering, Supply, Construction, Erection, Testing and Commissioning including 10 years Comprehensive Operation & Maintenance (O&M) Contract of 1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust.

Reference : i) **Work Order No.:**/...../...../O-... dated
.....
ii) **Contract No./ Agreement No. :**/...../...../ AGMT /
...../

This is to certify that the above work, which was carried out by is now complete in every respect, in accordance with the terms of the contract and that all obligations under the contract have been fulfilled by the Contractor.

(Signature of the Engineer/Engineer's Representative)

Name:

Designation:

Date:

(OFFICIAL SEAL)

1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust.

(“NO CLAIM CERTIFICATE” FROM CONTRACTOR)

[To be submitted on Bidder’s Letter Head]

General Manager(Engineering)

Haldia Dock Complex ;
Kolkata Port Trust.
Engineering Department
Jawahar Tower Complex ;
P.O.: Haldia Township;
Dist.: Purba Medinipur ;
PIN: –721607
West Bengal, India.

Dear Sir,

Subject : Design, Engineering, Supply, Construction, Erection, Testing and Commissioning including 10 years Comprehensive Operation & Maintenance (O&M) Contract of 1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust.

Reference : i) **Work Order No.:**/...../...../O-... dated
.....
ii) **Contract No./ Agreement No. :**/...../...../
AGMT //

I/We do hereby declare that I/we have received full and final payment from Haldia Dock Complex, Kolkata Port Trust, for the execution of the subject work, and I/we have no further claim against Haldia Dock Complex, Kolkata Port Trust in respect of the above mentioned job.

Yours faithfully,

(Signature of Contractor)

Date :
Name of Contractor :
Address :

(OFFICIAL SEAL OF THE CONTRACTOR)

1 MW (AC) Solar PV Power Plant at Haldia Dock Complex, Kolkata Port Trust.