



V.O. CHIDAMBARANAR PORT AUTHORITY

Tender No. MEE-PM-EE-7654-2025

e - TENDER

for

***Design, Supply, installation, Testing, and commissioning of
Museum Galleries for Tamil Nadu Maritime Heritage
Museum at VOCPA***

Online submission closing date: 15.00hrs. on 16.10.2025

Online Opening date: 15:30 hrs. on 17.10.2025

<https://etenders.gov.in/eprocure/app>

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SECTION- I

NOTICE INVITING TENDER (NIT)

- 1.1 V.O. Chidambaranar Port Authority invites electronic tenders (Two Cover System under QCBS) from eligible bidders for the work “***Design, Supply, installation, Testing, commissioning of Museum Galleries for Tamil Nadu Maritime Heritage Museum at VOCPA***”
- 1.2 A complete set of Tender documents may be downloaded by any interested Bidders from e-Tender web portal [https://etenders.gov.in/eprocure/ app](https://etenders.gov.in/eprocure/app). The Bidder shall submit his bid in Central Public Procurement Portal (e-Procurement) at [https://etenders.gov.in/eprocure/ app](https://etenders.gov.in/eprocure/app) by following the procedure of Instruction to Bidder (Section - II). Non-submission of Bid along with relevant documents shall lead to rejection of the tender.
- 1.3 Salient features of the Bid:

Tender No.	MEE-PM-EE-7654-2025
Tender Type	Open online e-Tender
Tender Inviting Authority	Chief Mechanical Engineer, VOCPA
Address	V.O. Chidambaranar Port Authority, Harbour Estate, Tuticorin – 628 004, Tamil Nadu
Contact Details & Email	Tel. off: 0461-2372206, 0461-2352226, 0461-2352255 Email: cme@vocport.gov.in
Brief Work Description	Scope of Work includes “ <i>Design, Supply, installation, Testing, commissioning of Museum Galleries for Tamil Nadu Maritime Heritage Museum at VOCPA</i> ”. Work shall be executed as directed by Engineer or his representative.
Location of the work	VOC Port Estate.
Estimated Cost	Rs. 9,42,43,206/- plus GST
Bid Validity	120 days from the date of opening of the Tender
EMD	<p>Rs.18,84,864/-(Rupees Eighteen Lakhs Eighty four thousand eight hundred and sixty four only).</p> <p>All bidders other than an MSEs should pay the EMD through online payment gateway mode in CPP e- Tender web Portal or shall submit the EMD in the form of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt, Banker's Cheque or irrevocable & operative Bank Guarantee from any of the Scheduled Commercial Banks. The validity period of bid security is to remain valid for a period of 45 (forty-five) days beyond the final bid validity period. Otherwise, his/her/their tender will be rejected. EMD in any other form shall not be accepted.</p> <p>The MSEs are required to furnish relevant valid Certificate for claiming exemption. This valid certificate shall be</p>

	uploaded in the Bid, failing which the Technical Bid shall not be evaluated. Similarly, bidders are required to upload scanned copies in the Bid incase payment of EMD in the form of Insurance Surety Bonds, account payee demand draft, fixed deposit receipt, banker's cheque or Bank Guarantee from any of the Commercial Banks, failing which the Technical Bid shall not be evaluated. The originals of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt, Banker's Cheque or Bank Guarantee from any of the Commercial Banks shall be received only after the bid opening date. If the originals not received within 7 days of bid opening date the bid may not be considered.
Delivery period of the Contract	<ol style="list-style-type: none"> 1. Work Completion Period – 90 days from the date of commencement of work. 2. Comprehensive Guarantee - 2 years 3. O&M- Three years after completion of comprehensive Guarantee period.
Downloading of Tender documents start date	25.09.2025
Pre-Bid Meeting	07.10.2025 at 15:00 hours
Downloading of tender document end day	16.10.2025 up to 15:00 hours
Bid Submission end date & time	16.10.2025 at 15:00 hrs.
Bid opening date & time	17.10.2025 at 15:30 hrs.
Currency of Contract	INR
Language of Contract	English

1.4 Bidders fulfilling following eligibility / pre-qualification criteria may participate in the tender:

a) Financial Capability:

Average Annual financial turnover during the last three years, ending 31st March of the previous financial year, should be at least 30% (Thirty per cent) of the estimated cost. The details shall be furnished by the bidder on **Form III of Annexure A.**

b) Similar Work Experience:

The bidder should have successfully completed similar work(s) as detailed below during the last 07 years from the previous month of date of publication of the NIT with either of the following in any in any Central / State Government / Autonomous bodies / PSEs / PSUs / Public Limited or Private Limited Companies / Reputed Organizations/ Major / Minor Ports etc.

i) Three similar completed work each costing not less than the amount equal to 40% (Forty per cent) of the estimated cost.

(OR)

ii) Two similar completed work each costing not less than the amount equal to 50% (Fifty per cent) of the estimated cost.

(OR)

- iii) One similar completed work costing not less than the amount equal to 80% (Eighty per cent) of the estimated cost.

“Similar work” shall mean.

The term similar work shall mean “Similar Projects means Design, Supply and Installation of Visitors Gallery/ Information Centre/ Interpretation Centre works/ Museum/Technology-based Multimedia Works/ Projection Mapping Works”

Copies of work order(s) & respective satisfactory completion(s) / performance certificate(s) must be furnished in support of meeting similar work experience. In case of experience other than Central / State Government / PSUs , the bidder has to submit TDS certificate for the past experience, only then the experience will be considered.

The above-said details shall be furnished by the bidder in Form **IV of Annexure A**.

- 1.5 In addition to the prequalification criteria, the Bidder shall furnish the required details for the evaluation under QCBS as mentioned in the Special conditions of the contract.
- 1.6 The bidder shall have (i) EPF registration certificate; (ii) ESI; (iii) Permanent Account Number [PAN]; (iv) Income Tax Return of preceding three years; and (v) GST Registration Certificate etc.
- 1.7 Other details can be seen in the Tender documents. The Bidders are advised to read the whole document carefully and submit their tender/bid strictly, meeting the requirements spelled out in the bid document.
- 1.8 The bid document is required to be submitted only through e-tender web portal <https://etenders.gov.in/eprocure/app>.
- 1.9 While E-tendering all the supporting documents as stated in Annexure A have to be signed in each and every page serially numbered along with seal and shall be uploaded by the Bidders. No hard copies need to be sent to the Authority.
- 1.10 The Authority will not be held responsible for any technical snag or network failure during online bidding.
- 1.11 The Authority reserves the right to cancel any or all bids without assigning any reason.
- 1.12 The bidder shall upload the site inspection as per Form- XIV “Evidence towards site visit” annexed in the tender document, failing which the bid will be treated as non-responsive.

Format and Signing of Bid:

The Price Bid to be submitted on-line shall be signed digitally by a person or persons duly authorized to sign on behalf the Bidders.

The Bid shall contain no alternations additions, except those to comply with instructions issued by the Employer.

Contacts:

1. The Chief Mechanical Engineer
Mechanical & Electrical Engineering Department,
V.O. Chidambaranar Port Authority,
Tele:0461-2352270
Email: cme@vocport.gov.in

2. The Deputy Chief Mechanical Engineer
Mechanical & Electrical Engineering Department,
V.O. Chidambaranar Port Authority,
Tele: 0461-2352270 Mob:9556050300.
Email: niharrajanbhoi@vocport.gov.in

3. The Executive Engineer,
Mechanical & Electrical Engineering Department,
V.O. Chidambaranar Port Authority,
Tele: 0461-2372203 Mob:8903443444.
Email: senthilganesha@vocport.gov.in

**Chief Mechanical Engineer
V. O. Chidambaranar Port Authority**

SECTION II **INSTRUCTION TO BIDDERS**

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SECTION II

INSTRUCTION TO BIDDERS

2.1 e-TENDER NOTICE:

2.1.1 e-Tenders (Online) are invited in the “**TWO COVER**” system on behalf of **V.O. CHIDAMBARANAR PORT AUTHORITY (VOCPA)** from interested, reputed and experienced eligible bidders for the work as mentioned in the **Notice Inviting Tender (NIT) Section-I**. The bidder must fulfill the eligibility criteria and other requirements stipulated in the bid document.

2.1.2 Bid document having all details are available at the URL of the e-Tender web portal <https://etenders.gov.in/eprocure/app> or at the Port website www.vocport.gov.in for downloading during the period specified in the **NIT(Section-I)**. The completed bid documents are required to be submitted only through online (e-mode) offered on the e-Tender web portal <https://etenders.gov.in/eprocure/app>. Bids in any other manner will be rejected, and no correspondence on such matter will be entertained. No bids shall be accepted off-line.

2.2 PARTICIPATING IN THE TENDER IN THE E-PROCUREMENT PORTAL:

2.2.1 The intending Bidders are required to register on the e-Tender web portal <https://etenders.gov.in/eprocure/app> (If not already registered) by clicking “Online Bidder Enrollment” option in order to obtain user-id and password and then to activate their respective user-id by using Digital Signature Certificate (Class-III). The bidders will have to accept, unconditionally, the online user portal agreement which contains all the terms and conditions of NIT including commercial and general terms and conditions and other conditions, if any, along with an online undertaking in support of the authenticity of the declarations regarding facts, figures, information and documents furnished by the bidder online; The bidder shall visit the homepage of the e-tender portal for getting information to be followed for bidding in the e- tender portal.

2.2.2 Any prospective bidder can view or download the bid documents from the e-Tender web portal <https://etenders.gov.in/eprocure/app> during the period as indicated in NIT / home page of portal.

2.2.3 In the case of any failure, malfunction, or breakdown of the electronic system used during the e- Procurement process, the Tender Inviting Authority shall not accept any responsibility for such failures or breakdowns other than in those systems strictly within their own control.

2.3 ELIGIBLE BIDDERS:

2.3.1 All eligible bidders meeting the eligibility criteria as defined in NIT (Section-I) can participate in the tender.

2.3.2 Bidder means any eligible person or firm or company; Please refer to Special Condition of Contract (SCC) for applicability of Joint Venture / Consortium.

2.3.3 Bidders who have been non-performing / debarred / blacklisted by any Purchaser / Employer / Client at the time of bidding shall not be allowed to participate in this tender.

2.4 COST OF BIDDING:

The Bidder shall bear all costs associated with site visit(s), pre-bid / post bid conference(s), preparation, and submission of his Bid, opening of price bid and VOCPA will in no case be responsible or liable for those costs regardless of the conduct or outcome of the bidding process.

2.5 LOCAL CONDITIONS:

2.5.1 It will be imperative for each Bidder to fully inform himself of all local conditions and factors which may have any effect on the execution of the works covered under the bidding documents and specifications. VOCPA will not entertain any request for clarifications from the Bidders regarding such local conditions.

2.5.2 It must be understood and agreed that such factors have properly been investigated and considered while submitting the bid. Neither any change in the time schedule of the contract nor any financial adjustment arising thereof which are based on the lack of such clear information, its effect on the cost of the works to the Bidder shall be permitted by the VOCPA. No claim for financial adjustment to the contract awarded under these specifications and documents will be entertained by the VOCPA.

2.6 SITE VISIT:

2.6.1 The Bidder, at the bidder's own responsibility and risk are encouraged / advised to carry out the site visit to VOC Port at their own cost for the intended work and to inspect / examine & assess the site condition and its surroundings and satisfy themselves prior to submission of his bid.

2.6.2 In general, they shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their bid. A Bidder shall be deemed to have full knowledge of the site, whether he inspects it or not and no extra charges arising out of any misunderstanding or otherwise shall be allowed. Bidders shall submit a realistic offer for the execution of the work at their own cost without any liability on VOCPA.

2.6.3 It is implied that on submission of the bid/tender, the Bidder is deemed to have read the Tender document, clearly understood & satisfied himself regarding terms & conditions, scope of work and technical specifications of the work & services to be executed, local conditions and other factors likely to be encountered & having a bearing on the execution of work thereof. The price quoted in the **Cover B – Price bid** is adequate and all-inclusive with respect to all factors, circumstances, and conditions likely to be incidental, both direct and indirect, to the work and services mentioned in the subject tender.

2.7 iPRE-BID MEETING

A pre-bid meeting will be conducted on the date & time as specified in NIT (Section – I) through hybrid mode. Interested bidders can participate in the pre-bid meeting physically or through the VC link uploaded in the CPP portal and Port website.

2.8 UNDERSTANDING AND CLARIFICATION ON BIDDING DOCUMENTS:

A prospective bidder requiring clarification regarding discrepancies or omissions in the tender documents or in doubt as to the true meaning of any part, may send queries at once

in writing / email / through e-tender portal, provided the queries are raised during the period as mentioned in the NIT / home page of portal. Any queries received after the due date shall not be considered and no reply to such queries will be given. Reply to queries shall be given by VOCPA only if the queries requested are considered appropriate by VOCPA. Verbal clarifications and information given by the VOCPA or his employee(s) or his representative(s) shall not in any way be binding on the VOCPA.

2.9 AMENDMENT TO BID DOCUMENTS:

- 2.9.1** At any time prior to the due date & time of opening of bids, VOCPA may, for any reason, whether at its own initiative or in response to a clarification sought by any prospective bidder, modify the bidding documents, bidding process, terms & conditions, specifications, etc. by issuing Corrigendum and/or Addendum.
- 2.9.2** Any Corrigendum and/or Addendum thus issued shall be part of bidding documents and shall be notified only on the web portal <https://etenders.gov.in/eprocure/app>. Bidders intending to participate in the tender shall be solely responsible for checking the portal for any amendment issued in the shape of Corrigendum and/or Addendum.
- 2.9.3** In order to afford prospective bidders reasonable time to take the amendment into account in preparing their bids, VOCPA may, at its discretion, extend the deadline for the submission of bids.

2.10 BIDDER'S RESPONSIBILITY:

2.10.1 Contacting VOC Port Authority:

Bidder shall not contact VOC Port Authority on any matter relating to its Bid from the time of the Bid Opening to the time the contract is awarded. Any effort by any Bidder to influence VOC Port Authority in the Bid Evaluation, Bid Comparison, or Contract Award decision shall result in disqualification of the bidder.

2.10.2 Undertaking By the Bidders:

- (i) The Bidder undertakes, if his tender is accepted, has to enter into and execute when called upon to do so, a Contract Agreement as provided in **Annexure B** with such modifications as agreed upon. Until the formal Contract Agreement is prepared and executed, this tender/bid document together with the written acceptance shall form a binding agreement between the Port and the Contractor.
- (ii) The Bidder undertakes, if his tender is accepted, has to give the required performance security as per **Clause No.2.13 of ITB**.
- (iii) The Bidder shall submit a declaration as provided in the **Form VII** of the bid document that the Bidder has not been blacklisted or debarred in the last 3 years by any of the Central / State Government / Autonomous bodies / PSEs / PSUs and any other organizations in India prior to and as on the bid submission date mentioned in the NIT and the same shall be uploaded along with the bid document in the e-tender portal.
- (iv) The bidders shall submit a declaration as provided in the **Form VII** of the bid document that they have not made any payment or illegal gratification to any person / authority connected with the bid process so as to influence the bid process and have not committed any offence

under the Prevention of Corruption Act (PC Act) in connection with the bid.

PREPARATION OF BID

2.11 LANGUAGE OF BID:

The bid prepared by the Bidder and all correspondences and documents relating to the bid exchanged by the Bidder and VOCPA shall be written in the English language, provided that any printed literature furnished by the Bidder may be written in another language so long as it is accompanied by an English translation of its pertinent passages in which case for the purpose of interpretation of the Bid, the English translation shall be considered.

2.12 BID PRICES:

2.12.1 The Bidder shall quote, on the prescribed Price Schedule, the landed prices (F.O.R Destination basis) of all the goods and services at VOCPA.

2.12.2 The quoted price shall be a firm lump-sum price and shall be as on the opening of the bid. The Bidder shall ensure that the prices are rational, reasonable. The above lump-sum price shall include all the taxes (except GST), duties, fees, all types of Cess, insurance, transportation, packing, forwarding and all other incidentals required for execution of the contract in all respects. In case of change in /Custom Duties/other Government taxes & levies during pendency of the contract, only incremental change will be paid, provided goods and services are executed during the original completion date of the Contract. Variation of taxes & duties during extended period of Contract shall only be considered on merit.

2.12.3 No price escalation shall be admissible unless the contract specifically provides for it. In general, no price escalation is applicable on any account till the contract is executed in full and its subsequent amendments accepted by the Contractor even though the completion / execution of the contract may take a longer time than the scheduled period incorporated and accepted in the contract.

2.12.4 Also, by submitting a bid for the work, bidders shall be deemed to have satisfied himself by actual inspection of the site and locality of the work, that rates quoted by him in the Bid will be adequate to complete such work according to the specification and conditions attached here to and he has taken into account all conditions and difficulties that may be encountered during its progress and to have quoted labour and material rates which shall include the cost of the material with taxes, duties and incidental and all other charges necessary for the completion of the work, to the entire satisfaction of VOCPA.

2.13 BID VALIDITY:

2.13.1 The bids shall be valid for a period of 120 days from the date of opening of e-Tender.

2.13.2 During this period, the bidder shall not be permitted to withdraw or vary their offers, once made and if they do so, EMD paid by the bidder will be forfeited.

2.13.3 In exceptional circumstances, prior to the expiry of the original time limit, the “Tender inviting Authority” may request the bidders to extend the period of validity for a specified additional period. The request and the bidders’ responses shall be made in writing or by e-mail. A bidder may refuse the request without any risk of forfeiture of Bid Security (EMD).

2.13.4 A bidder agreeing to the request will not be required or permitted to modify his bid but will be required to extend the validity of his bid for the period of the extension.

2.14 BID CURRENCIES:

The prices shall be quoted in the currency of Indian Rupees only. The price quoted in the currency of Indian rupees in the 'Price Schedule' shall be firm and shall not be varied on account of exchange rate fluctuation during the bid validity / contract period.

2.15 BID SECURITY/ EARNEST MONEY DEPOSIT (EMD):

2.15.1 The Bidder shall furnish, as part of its bid, bid security (EMD) for the amount stipulated in the NIT.

2.15.2 Any bid not accompanied by prescribed bid security shall be rejected by the VOCPA as being non-responsive.

2.15.3 All bidders other than an MSEs should pay the EMD through online payment gateway mode in CPP e- tender web Portal or shall submit the EMD in the form of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt, Banker's Cheque or irrevocable & operative Bank Guarantee from any of the Scheduled Commercial Banks. The validity period of bid security is to remain valid for a period of 45 (forty-five) days beyond the final bid validity period. Otherwise, his/her/their tender will be rejected. EMD in any other form shall not be accepted.

The MSEs are required to furnish relevant valid Certificate for claiming exemption. This valid certificate shall be uploaded in the Bid, failing which the Technical Bid shall not be evaluated. Similarly, bidders are required to upload scanned copies in the Bid incase payment of EMD in the form of Insurance Surety Bonds, account payee demand draft, fixed deposit receipt, banker's cheque or Bank Guarantee from any of the Commercial Banks, failing which the Technical Bid shall not be evaluated. The originals of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt, Banker's Cheque or Bank Guarantee from any of the Commercial Banks shall be received only after the bid opening date. If the originals not received within 7 days of bid opening date the bid may not be considered.

2.15.4 The bid securities of unsuccessful bidders will be returned at the earliest after expiry of the final bid validity period and latest by 30th day after the award of contract.

2.15.5 A bidder's bid security will be forfeited if the bidder:

- a. Withdraws or amends its / his bid.
- b. Impairs or derogates from the tender in any respect within the period of validity of the tender.
- c. If the bidder does not accept the correction of his bid price during evaluation.
- d. If the Bidder submits fraudulent documents and / or wrong information in support of its eligibility / qualification
- e. In case of any bidder found indulged in corrupt, fraudulent, coercive, undesirable

and restrictive practices during the bidding process and

- f. If the successful bidder fails to sign the contract or furnish the required performance security within the specified period.

2.15.6 No interest shall accrue or is payable on the EMD from the date of its remittance till it is returned to the bidders.

2.15.7 Bid security shall be refunded to the successful bidder on receipt of a performance security and signing of contract. Bid security of the successful bidder may be adjusted against Performance Security Deposit if requested by the successful bidder.

2.15.8 If successful bidder on award of contract fails to sign the contract or to submit a performance security within the specified period, EMD will be forfeited, and the bidder may be suspended for a period of 3(three) years from being eligible to submit Bids for contracts with VOCPA.

2.15.9 The MSEs are exempted from payment of Bid Security subject to furnishing of relevant valid Certificate by uploading the said valid certificate copy at the time of submission of their bid along with the details duly filled in as per **Form-II A**. MSE bidders claiming exemptions from EMD as per MSME guidelines must also register Udyam Registration Certificate indicating URN (Udyam Registration Number) issued from MSME, in order to avail the benefits available to MSEs as contained in Public procurement policy.

2.16 DOCUMENTS COMPRISING THE BID:

2.16.1 The bidder is required to download all the documents for the preparation of his bid. The bidders are strongly advised to examine all the instructions, forms, terms, and specifications in the Tender/Bid documents. Failure to furnish all the information required by the Tender/Bid Document or submission of a Bid not techno-commercially responsive, in every respect, will be at the Bidder's risk and shall result in the rejection of its Bid.

2.16.2 The bidder shall carefully prepare the list of required documents that are asked for submission along with the bid. The bid shall be a Techno-Commercial bid and financial bid. The bid shall be prepared as under and uploaded the same online through e-Procurement Portal in two cover system and digitally signed by the authorized representative of the bidder as follows:

Cover A – Techno-Commercial Bid:

- (i) Duly filled in **Form -I** – “Bid Cover Letter”
- (ii) Scanned copy of system generated proof towards successful payment of EMD in case of payment through online payment gateway mode in CPP e- tender web Portal **OR** scanned copy of proof towards successful payment of EMD in the form of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt, Banker's Cheque or Bank Guarantee from any of the Commercial Banks along with filled in **Form-II A OR** valid Certificates by MSEs for claiming exemption along with filled in **Form-II B**.
- (iii) Eligibility / pre-qualification criteria information on **Financial Capability** as detailed under SI. No. 4. a) of Notice Inviting Tender (Section-I):

Scanned copy of Profit & Loss statements for the last 3(three) years ending 31st March of the previous financial year duly certified by the Chartered Accountant in support of meeting Financial Capability along with duly filled in **Form-III**.

- (iv) Eligibility / pre-qualification criteria information on **Similar Work Experience** as detailed under SI. No. 4. b) of Notice Inviting Tender (Section-I):

Scanned copies of work order(s) along with BOQ & respective satisfactory completion with performance certificate in support of meeting Similar Work Experience along with duly filled in **Form-IV**. In case of experience other than Central / State Government / Autonomous bodies / PSEs / PSUs / Public Limited Companies, the bidder has to submit scanned copies of TDS certificate along with duly filled in **Form-IV A**.

- (v) Scanned copies of (i) EPF registration certificate; (ii) ESI; (iii) Permanent Account Number [PAN]; (iv) Income Tax Return of preceding three years; and (v) GST Registration Certificate
- (vi) Duly filled in Form-V – “Declaration of Authorized Representative”
- (vii) Duly filled in Form-VI – “Schedule of No deviation”
- (viii) Duly filled in Form-VII – “Declaration by the Bidder”
- (ix) Duly filled in Form-VIII – “Bank Mandate Form”
- (x) Duly filled in Form-IX – “Tender Acceptance Letter”
- (xi) Duly filled in Form-X – “Local Content declaration & Self Certification” [**wherever applicable if specifically asked for in bid document**]
- (xii) Duly filled in and signed Form-XI – “Integrity pact” [**wherever applicable as per as per Clause No.2.14.2 of ITB – shall be submitted, else treated as non-responsive**]
- (xiii) Details of Technical Manpower to be deployed for execution of work [**wherever applicable if specifically asked for in bid document**]
- (xiv) Scanned copy of valid license "ESB/" ESA"/"EA" grade issued by the Licensing Board [**wherever applicable if specifically asked for in bid document**]
- (xv) The bidder shall submit the technical details and brochures of the proposed machines /equipment to be deployed along with technical bids with necessary certifications as per the technical requirement.
- (xvi) Any other documents which need to be uploaded, as a support to bidder's qualification/ responsiveness to the bid in compliance to Tender Document.
- (xvii) In Case of JV / Consortium following forms should be filled in and submitted along with bid document

FORM-XII	Declaration Of Power Of Attorney
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	FORM-XIII	Declaration Of Power Of Attorney for Consortium
	FORM-XIV	Joint Bidding Agreement (JBA)

(xviii) In order to file an error-free tender/bid, the bidders may make use of the qualification documents to be uploaded list provided in the **Pre-qualification and Responsiveness Information in Annexure - A** of the bid document to identify the documents to be scanned and uploaded in support of their bid. Scanned copy of duly filled in Annexure - A shall be uploaded by the Bidder.

NB: *Please note that bidders should upload only the documents that are mentioned in the preceding clauses. The bidders need not send any documents (Hard Copy) to the Tender Inviting Authority. The NIT corrigendum/ addendum published by Tender Inviting Authority need not be uploaded and will be deemed to be part of the bid. Bid documents may be scanned with 100dpi with black and white option which helps in reducing size of the scanned document.*

Cover B – “Financial Bid” shall comprise Price Schedule

- (i) Price proposal by the bidder:
 - a. In the e-Procurement Portal, an intelligent Price Schedule / Bill of Quantity in Microsoft Excel format shall be made available to the bidder.
 - b. The bidder shall bid for the whole works as described in the Price Schedule.
 - c. The bidder shall be deemed to have satisfied himself/herself as to the correctness and sufficiency of the Tender and the rates and prices quoted in the Price Schedule, all of which shall cover all his/her obligations under the Contract and all matters & things necessary for the proper execution and completion of the work and the remedying of any defects therein.

2.1.2 Bidders shall submit offers that fully comply with the requirements of the Tender documents. Conditional offers or alternative offers will not be considered in the process of bid evaluation.

2.2 FORMAT AND SIGNING OF BID:

2.2.1 The bidder shall upload the completed bid at his/her convenience within the final date and time of submission. The bidder shall only submit a single copy of the required documents and Price Bid in the portal. The Bidders are advised to upload the completed Bid document well ahead of bid closure time to avoid any last-moment problem of power failures, network failure, etc. VOCPA shall not be responsible in any manner.

2.2.2 The bidder shall ensure the correctness of the bid prior to uploading and also ensure clarity/legibility of the document uploaded by him/her to the portal, especially the scanned documents. Non-submission of legible documents may render the bid non-responsive. However, VOCPA, if so desires, can ask for legible copies or original copies of scanned documents and statements uploaded in the portal within the specified period for verification provided such document in no way alters the Bidder’s price bid. If the Bidder fails to submit

the original documents within the stipulated date, his bid shall be considered nonresponsive.

- 2.2.3** The bidder shall digitally sign on all the statements, documents, certificates uploaded by him/her in support of the **Pre-qualification and Responsiveness of the bid**, owning responsibility for their correctness/ authenticity. The bidder must note that misrepresentation of facts and/or submission of fraudulent documents or submission of bid in an irresponsible manner may disqualify the bidder from participating in any tender of VOCPA and also termination of any other ongoing contracts with forfeiture of the Security Deposit. VOCPA reserves the right to verify the authenticity of the documents/information submitted by the bidder.
- 2.2.4** Signatory of the bid documents shall be Bidder himself or a person duly authorized and holding power of attorney to do so on behalf of the Bidder, as furnished in **Form-V** of the bid document.

2.3 DEADLINE FOR SUBMISSION OF THE BIDS:

- 2.3.1** The online bidding will remain active till the last date and time of the bid submission. Once the date and time (Server date and time) are over, the bidder will not be able to submit the bid. The date & time of bid submission should remain unaltered even if the specified date for the submission of bids declared a holiday for the VOCPA.
- 2.3.2** The Tender Inviting Authority/ VOCPA may extend the deadline for submission of bids by issuing an amendment in accordance with **Clause No.2.9** of this Section, in which case all rights and obligations of the VOCPA and the bidders previously subject to the original deadline will then be subject to the new deadline. The new date after extension shall be available on the Tender portal.

2.4 LATE BIDS:

The system shall reject the submission of any bid through the portal after the closure of the receipt time. For all purposes, the server time displayed in the e-procurement portal shall be the time to be followed by the bidder and concerned officers.

2.5 MODIFICATION AND WITHDRAWAL OF BIDS:

- 2.5.1** In the E-Procurement Portal, it is allowed to modify the bid any number of times before the final date and time of submission. The bidder shall have to log on to the system and resubmit the documents as asked for by the system, including the price bid. In doing so, the bids already submitted by the bidder will be removed automatically from the system, and the latest bid only will be admitted. But the bidder should avoid modification of bid at the last moment to avoid system failure or malfunction of internet or traffic jam or power failure etc. If the bidder fails to submit his/her modified bids within the designated time of receipt, the bid already in the system shall be taken for evaluation.
- 2.5.2** In the e-Procurement Portal, withdrawal of bids is allowed. But in such a case, the bidder has to write a confidential letter with appropriate reasons for his/her withdrawal addressed to the Tender Inviting Authority and upload the scanned document to the portal in the respective bid before the closure of submission. The system shall not allow any equipment withdrawal after the expiry of the closure time of the bid.

OPENING AND EVALUATION

2.6 BID OPENING:

- 2.6.1** Bid opening dates are specified during the publishing of tender or can be extended vide corrigendum. These dates are available in NIT / Corrigendum as well as the home page of the portal.
- 2.6.2** If the specified date of bid opening is declared a holiday for VOCPA, the bids shall be opened at the appointed time on the next working day.
- 2.6.3** If the required EMD has not been provided or exemption from EMD is claimed without acceptable proof of exemption, bid will not be considered for techno-commercial evaluation.
- 2.6.4** The Cover A – Techno-commercial Bid containing the techno-commercial documents listed in the Pre- Qualification and Responsiveness Information in Annexure- A and any other documents uploaded by the Bidders as required for bidding purpose will be opened through online on the scheduled date and time in the presence of such bidders and/or their authorized representatives, who wish to be present at the time of opening, at their own cost.
- 2.6.5** The Price bid of the shortlisted bidders i.e., technically qualified bidders will alone be opened by the Port on a date and time to be notified later.

2.7 CLARIFICATION ON BIDS:

During evaluation and comparison of the bids, the VOCPA may, at his discretion, ask the bidder for clarification on the bid. The request for clarification shall be given in writing by registered/ Speed Post/Registered e-mail/uploaded on the e-procurement Portal, asking the bidder to respond by a specified date, and also mentioning therein that, if the tenderer does not comply or respond by the date, his tender will be liable to be rejected. Depending on the outcome, such tenders are to be ignored or considered further. No change in prices or substance of the bid shall be sought, offered, or permitted. No post-bid clarification at the initiative of the bidder shall be entertained. The shortfall information/documents should be sought only in case of historical documents which pre-existed at the time of the tender opening, and which have not undergone change since then. (Example: if the Permanent Account Number, *registration with GST* has been asked to be submitted and the tenderer has not provided them, these documents may be asked for with a target date as above). So far as the submission of documents is concerned with regard to qualification criteria, after submission of the tender, only related shortfall documents should be asked for and considered. For example, if the bidder has submitted a work /supply order without its completion/ performance certificate, the certificate can be asked for and considered. However, no new work supply/work order should be asked for so as to qualify the bidders.

2.8 EVALUATION & COMPARISON OF BID:

2.8.1 Evaluation of Techno-Commercial Bid:

In evaluation of the techno-commercial bid, conformity of the eligibility/ qualification, technical and commercial conditions to those in the bid document is ascertained. Additional

factors, if any, incorporated in the tender documents may also be considered in the manner indicated therein. A responsive tender is one which inter-alia confirms to all the terms and conditions including General and Special conditions of the entire bid documents without any deviation or reservation and the same shall be determined as described below:

- (a) The documents uploaded by the bidder as specified in **Form- IV** read with **Section - II, Clause 2.11.6.2 (iv)**, will be evaluated basing on the work orders, Performance Certificate / work completion certificate of similar nature of the work and value of the work fulfilling the eligibility criteria.
- (b) The financial capability will be evaluated based on the information provided in **Form III** read with **Section- II, clause 2.11.6.2 (iii)**.
- (c) After scrutiny of the documents uploaded in the **Cover A – Techno-commercial Bid**, the eligible bidders will be pre-qualified based on the details provided by them.
- (d) The Port may verify the original documents of the scanned copies uploaded by the Bidder during evaluation or at any time, if required. In case the documents submitted by the bidders found to be forged/ false, the port will take appropriate penal action including cancellation of the work order issued and blacklisting of the firm/ company for a period of 3 years.
- (e) The shortlisted bidders after the Techno-Commercial evaluation will be informed through emails after short listing and the same will also be published in the Port website. Any bidders who had participated in the tender having any objections or observations shall inform the same to the designated Email id, within a period of seven days from the date of publishing in the website. Objections if any, received after this date will not be entertained.
- (f) Objections so received will be duly examined as per the Terms and Conditions of the tender and the decision will be posted on the website or intimated to the firm. The decision of the competent authority, in this regard, will be final and binding and no further objections will be entertained once the decision is finalized.

2.8.2 Financial Evaluation:

- (a) The due date of opening of **Cover B- Financial Bid** shall be scheduled and intimated to the prequalified bidders through portal.
- (b) The Financial Bid of the pre-qualified & responsive bidders will be opened on the pre-published / notified date & time in the presence of bidders or their authorized representative who wish to be present. The participating bidders can also witness the opening of price bids online by logging on to the portal with his DSC from anywhere.
- (c) The financial evaluation shall be made on the basis of total price as indicated price schedule/ Bill of quantity. VOCPA is not bound to accept the lowest quoted offer. Conditions, if any, with Price Bid shall not be considered for any purpose.

2.8.3 Evaluation of the bid does not exonerate the bidders from checking their original documents. VOCPA reserves the right to verify the authenticity of the documents/information submitted by the bidder.

As per Section-468(Forgery for the purpose of Cheating) and Section-471(using as genuine, a forged document) of IPC-1860, use of fraudulent/forged document for the purpose of

participating in any tender is a punishable offense. Hence, in such cases, VOCPA shall have no other option than to take the following actions against the firm, which has restored to use of forged/fraudulent documents in any tender. It is also applicable if, at a later date, the bidder is found to have misled the evaluation through wrong information.

At the time of the bidding stage

- (a) Termination of any other ongoing contracts with forfeiture of the Security Deposits.
- (b) Blacklisting / debarring / tender holiday of the firm under the Prevention of Corruption Act, 1988 for a period of three years from the date of blacklisting.

At the time of contract execution

- (a) Termination of the contract with forfeiture of the Security Deposits.
- (b) Termination of any other on-going contracts with forfeiture of the Security Deposits.
- (c) Blacklisting of firm under Prevention of Corruption Act, 1988 for a period of three years from the date of blacklisting.

- 2.8.4** Conditional bids may be rejected by VOCPA. Conditions, if any, on any document enclosed with Price Bid shall not be considered for any purpose.

AWARD OF CONTRACT

2.9 AWARD CRITERIA:

The Tender Inviting Authority, on behalf of VOC Port Authority, will award the contract to the bidder whose bid is the lowest evaluated Bid as per tender conditions and their price schedule will be considered.

2.10 PURCHASER'S RIGHT TO ACCEPT OR REJECT ANY OR ALL THE BIDS:

VOC Port reserves the right to accept or reject any bid and the bidding process at any time prior to award of contract without thereby incurring any liability to the affected Bidder or Bidders on the grounds of VOC Port Authority's action.

2.11 NOTIFICATION OF AWARD:

Prior to the expiration of Bid Validity, the Successful bidder will be notified in the form of Letter of Acceptance / Award or Work Order which will be communicated by registered or by mail that his Bid has been accepted. The successful bidder has to furnish Performance Security & additional security (if any), and non-judicial stamp paper for signing of Contract / Agreement within 15 days from date of issuance of Letter of Acceptance/ Award of Work Order. The issue of the letter of acceptance shall be treated as the closure of the Bid process.

2.12 SIGNING OF CONTRACT:

The successful has to furnish the Performance Security Deposit (PSD), as per the Tender Conditions. The Contractor shall be required to execute an agreement in the proforma prescribed by the V.O.Chidambaranar Port Authority (**as per Annexure- B**) on Tamil Nadu Government State stamp paper of the required value within 28 days from the date of issue

of Letter of Acceptance / Work Order. In the event of failure on the part of the successful bidder to execute the agreement within the above stipulated period, or the period agreed by the Port, VOC port being in such circumstances entitled to treat the successful bidder as in breach of contract and proceed accordingly.

2.13 **PERFORMANCE SECURITY DEPOSIT or PERFORMANCE GUARANTEE:**

2.13.1 The successful bidder (Contractor) shall furnish an amount of 5% of the Contract Price as Performance Security in the form of Insurance Surety Bond, account payee demand draft, fixed deposit receipt from Scheduled Commercial bank, irrecoverable and operative Bank Guarantee issued / confirmed from any of the Scheduled Commercial bank in India, as per specimen in **Annexure D** or online payment through RTGS/NEFT to the account whose details are provided as below:

A	Name and address of the bank	Indian Overseas Bank, Harbour Branch, Tuticorin-628004.
B	Name of the branch	Harbour Branch
C	IFSC code	IOBA0000143
D	Account Number	014301000000001
E	Type of Account	Savings Account
F	Beneficiary's Name	FA & CAO, V.O. Chidambaranar Port Authority, Tuticorin

Performance Security is to be furnished within 15 days from the date of issuance of Letter of Acceptance/ Award of Work Order towards successful performance of the Contract and it should remain valid for a period of 60 (sixty) days beyond the date of completion of all contractual obligations of the Contractor, including warranty period. However, the Engineer may relax the time limit of 15 days for submission Performance Security and extend it by further period in extraordinary circumstances for the reasons recorded. If the performance Security is not deposited in time as prescribed above, the LOA shall stand cancelled automatically and the Earnest Money Deposit will be forfeited, and action shall be initiated as per **Clause No. 2.15.8 of ITB**

The Contractor shall furnish the BG towards performance security by the issuing bank directly to the Port through SFMS mode.

This will not bear any interest. Bank Guarantee, obtained from the Nationalized Bank /Scheduled bank in the format prescribed, ***shall be in compliance with for a digital confirmation for the Bank Guarantee and the BG not complying with this shall not be considered.***

The Contractor shall ensure that the Performance Security is valid and enforceable until the Contractor has executed and completed the Works including warranty period and remedied any defects. If required, the Contractor shall extend the validity of the Performance Security

accordingly.

The performance security will be forfeited in the event of breach of contract by the Contractor.

The performance security should be refunded to the Contractor without interest, after the Contractor duly performs and completes all obligations under the contract but not later than 365 days from the date of completion of the Warranty / contract Period.

2.13.2 Security Deposit / Retention Money:

In addition to Performance Security, Security deposit / retention money for an amount of 5% of the contract value shall be recovered by deducting @10% from each running bill subject to a maximum accumulation of 5% of the contract value. The earnest money instead of being released may form part of the security deposit. The contractor may, at his option, replace the retention amount with an unconditional BG at the following stages:

- (a) After the amount reaches half the value of the limit of retention money; and
- (b) After the amount reaches the maximum limit of retention money. One-half of the retention money (or BG, which replaced retention money) shall be released to the contractor without interest on the issue of completion certificate. The other half of the retention money (or BG, which replaced the retention money) shall be released to the contractor without interest, after he duly performs and completes all obligations under the contract but not later than 365 days from the date of completion of the Warranty / contract Period.

2.14 OTHER INSTRUCTIONS

2.14.1 PROVISION OF PUBLIC PROCUREMENT (PREFERENCE TO MAKE IN INDIA):

The provisions contained in Public Procurement (Preference to Make in India) Order 2017 as Amended by OM No. P-45021/2/2017 – PP(BE-II) dated 16.09.2020 further as amended from time to time if any, shall be applicable to this tender.

- i. The margin of purchase preference applicable is 20% or as decided by the relevant Nodal Ministry for the item from time to time.
- ii. The minimum local content for Class I and Class II local suppliers shall be 50 % and 20 % respectively or as decided by the relevant Nodal Ministry for the item.
- iii. Procurements where the estimate value is less than Rs.5.00 Lakhs shall be exempted from this order.
- iv. Verification of Local Content:
 - a. For procurement value up to 10.00Crores: The class I local supplier /Class II local supplier at the time of tender, bidding or solicitation shall be obliged to indicate percentage of local content and provide Self Certification (as per the format enclosed) that the item offered meets the local content requirement for Class I local supplier / Class II suppliers as the case may be. They shall also give details of the locations at which the local value addition is made.

- b. For procurement value above Rs.10.00 Crores: The Class I local supplier / Class II local supplier at the time of tender, bidding or solicitation shall be required to provide certificate from the statutory auditor or cost auditor of the company (in case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content. The Tenderer shall submit the Declaration as per **Form XI**.

2.14.2 INTEGRITY PACT:

For every work / procurement / contract the value of which is Rs.1crore and above, the Integrity Pact agreement format as given at **Form – X** shall form a part of the bid document and it shall be prepared in Non-judicial stamp paper shall be uploaded along with technical bid by all the participating bidders and the original shall be submitted to Notice Inviting Tender Authority within 7 (Seven) days of opening of tender by all the participating bidders. The Integrity pact signed by the Purchaser and the bidder (successful bidder – Contractor) shall be made part of contract agreement.

Each page of such Integrity pact proforma would be duly "signed" by Purchasers/Procuring Entity's competent signatory. All pages of the Integrity Pact are to be "returned" by the bidder (along with the technical bid) duly signed by the same signatory who signed the bid, i.e., who is duly authorized to sign the bid and to make binding commitments on behalf of his company. Any bid not accompanied by the Integrity Pact duly signed by the bidder shall be considered to be a non-responsive bid and shall be rejected straightway."

The details of Independent External Monitors (IEM) are:

- 1) Shri Hermanprit Singh, IPS (Retd.),
12, Bevedre Road,
Alipore,
Kolkata – 700027.
Phone No: 9830197103
Email id: hermanprit@gmail.com.
- 2) Shri Trivikram Nath Tiwari, ILS (Retd.),
Flat no.G-4/1602,
16th Floor,
Ganga Yamuna Hindon Apartments,
Siddharth Vihar, Sector 7, Ghaziabad -201009, UP.
Email id trivikramnt@yahoo.co.in

SECTION III

GENERAL CONDITIONS OF CONTRACT

3.1 GENERAL PROVISIONS:

3.1.1 Definitions:

In the Conditions of Contract ("these Conditions"), which include Particular Conditions and these General Conditions, the following words and expressions shall have the meanings hereby assigned to them, except where the context requires otherwise.

3.1.1.1 The Contract:

3.1.1.1.1 "Contract" means the Notice Inviting Tender, the Bid / Tender and acceptance thereof and the formal legal Agreement, if any, executed between the Employer and the Contractor together with the documents referred to therein including General Conditions with appendices and any Special Conditions of Contract, the Specifications, Designs & Drawings, Scope of Work, Priced Schedule / Bill of Quantities and further any documents. All these documents taken together shall be deemed to form one Contract and shall be complementary to one another.

3.1.1.1.2 "Contract Agreement" means the Employer and the Contractor shall enter into a Contract Agreement within stipulated days after the Contractor receives the Letter of Acceptance / Work Order, unless they agree otherwise. The Contract Agreement shall be in the format annexed to the bid document. The costs of non-judicial stamp paper of applicable value and other statutory charges (if any) in connection with entry into the Contract Agreement shall be borne by the Contractor.

3.1.1.1.3 "Letter of Acceptance (LOA)/ Letter of Award / Notification of Award / Work Order (WO)" means the letter of formal acceptance, signed by the Employer.

3.1.1.1.4 "Specification" means the document entitled specification, as included in the Contract, and any additions and modifications to the specification in accordance with the Contract. Such document specifies the works.

3.1.1.1.5 "Drawings" means the drawings of the Works, as included in the Contract, and any additional and modified drawings issued by (or on behalf of) the Employer in accordance with the Contract.

3.1.1.1.6 "Schedules" means the document(s) entitled schedules, completed by the Contractor and submitted, as included in the Contract. Such document may include the Bill of Quantities, data, lists, billing package and schedules of rates and/or prices.

3.1.1.1.7 "Price Schedule / Bill of Quantities" means the documents so named (if any) which are comprised in the Schedules.

3.1.1.1.8 "Tender/Bid" (including terms offers, quotations or proposals in certain contexts) means an offer to supply of goods, services, or execution of works made in accordance with the terms and conditions set out in the bid document inviting such offers.

3.1.1.1.9 “Tender/Bid documents” means a document issued by Employer, including any amendment / corrigendum thereto, that sets out the terms and conditions of the given procurement process including ‘Notice Inviting Tender’.

3.1.1.1.10 “e-Tender” means conducting of procurement processes by the Employer with bidders for execution of works and services through use of information and communication technology (specially the internet) with the aim of open, nondiscriminatory and efficient procurement through transparent procedures.

3.1.1.2 Parties and Persons:

3.1.1.2.1 “Party” means the Employer or the Contractor, as the context requires.

3.1.1.2.2 “Employer/ Purchaser” (“Board”) means the Board of V.O. Chidambaranar Port Authority and assigns, acting through its Chairperson or any other Officer so nominated by the Board.

3.1.1.2.3 “Contractor / Service Provider” means the person(s), firm or company whose Tender has been accepted by the Employer and includes the Contractor’s Representative(s), the successors and/or permitted assigns for the subject Contract.

3.1.1.2.4 “Engineer” means the Chief Mechanical Engineer / V.O. Chidambaranar Port Authority or any other Officer nominated by Chairman.

3.1.1.2.5 “Employer's Personnel” means the Engineer, his representative and all other staff, labour and other employees of the Employer; and any other personnel notified to the Contractor, by the Employer or the Engineer, as Employer's Personnel.

3.1.1.2.6 “Contractor's Personnel” means the Contractor's Representative and all personnel whom the Contractor utilizes on Site, who may include the staff, labour and other employees of the Contractor and of each Subcontractor; and any other personnel assisting the Contractor in the execution of the works.

3.1.1.2.7 “Contractor's Representative” means the person named by the Contractor in the Contract or appointed from time to time by the Contractor under **Sub-Clause 3.4.2** [Contractor's Representative], who acts on behalf of the Contractor.

3.1.1.2.8 “Engineer’s Representative” means any Representative(s) of the Engineer, the assistants referred to in **Sub-Clause 3.3.2** [Delegation by the Engineer] whose authority shall be notified in writing to the Contractor by the Engineer.

3.1.1.2.9 “Sub-contractor” means any person named in the Contract as a subcontractor, or any person appointed as a subcontractor, for a part of the Works; and the legal successors in title to each of these persons.

3.1.1.3 Money & Payments:

3.1.1.3.1 “Contract Price” means accepted contract amount mentioned in the Letter of Acceptance towards execution and completion of the Works and the remedying of any defects.

3.1.1.3.2 “Executed value” means the price defined in **Sub-Clause 3.13.3** and includes adjustments in accordance with the Contract.

- 3.1.1.3.3 "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.
- 3.1.1.3.4 "**Currency**" means Rupees in which part (or all) of the Contract Price is payable.
- 3.1.1.3.5 "Performance Security" means the security (or securities, if any) under Clause 2.28.1 of ITB [Performance Security].
- 3.1.1.4 Dates, Periods and Completion:**
- 3.1.1.4.1 "**Commencement Date**" means the date notified under **Sub-Clause 3.7.1** [*Commencement of Work*].
- 3.1.1.4.2 "**Time for Completion**" means the time for completing the Works or a Section (as the case may be) under **Sub-Clause 3.7.2** [Time for Completion], as stated in NIT/ Special Condition of Contract / Scope of Work / LOA (with any extension under **Sub-Clause 3.7.4** [*Extension of Time for Completion*]), calculated from the Commencement Date.
- 3.1.1.4.3 "**Acceptance**" means as defined under **Clause 3.9** [Acceptance].
- 3.1.1.4.4 "**Completion Certificate**" means the certificate issued under **Clause 3.9** [Acceptance].
- 3.1.1.4.5 "**Warranty Period**" means the period as mentioned under **Sub-Clause 3.10.2**.
- 3.1.1.4.6 "**Day**" means a calendar day of 24 hours from midnight to the next midnight irrespective of the number of hours worked in that day.
- 3.1.1.4.7 "**Week**" means, seven days without regard to the number of hours worked in any day in the week.
- 3.1.1.4.8 "**Month**" means, month according to Gregorian calendar.
- 3.1.1.4.9 "**Year**" means 365 days.
- 3.1.1.5 Works & Goods:**
- 3.1.1.5.1 "**Contractor's Equipment**" means all apparatus, machinery, vehicles and other things required for the execution and completion of the works and the remedying of any defects. However, Contractor's Equipment excludes Temporary Works, Employer's Equipment (if any), Plant, Materials and any other things intended to form or forming part of the Permanent Works.
- 3.1.1.5.2 "**Permanent Works**" means the permanent works to be executed / maintained by the Contractor under the Contract.
- 3.1.1.5.3 "**Plant & equipment**" means the apparatus, machinery and vehicles intended to form or forming part of the Permanent Works.
- 3.1.1.5.4 "**Materials**" means things of all kinds (other than Plant & equipment) intended to form or forming part of the Permanent Works, including the supply-only materials (if any) to be supplied by the Contractor under the Contract.

- 3.1.1.5.5 **"Temporary Works"** means all temporary works of every kind (other than contractor's Equipment) required on Site for the execution and completion of the Permanent Works and the remedying of any defects.
- 3.1.1.5.6 **"Works"** mean the Permanent Works and the Temporary Works, or either of them as appropriate including services under the Contract.
- 3.1.1.5.7 **"Section"** means a part of the Works
- 3.1.1.5.8 **"Goods"** means Contractor's Equipment, Materials, Plant and Temporary Works, or any of them as appropriate. The term 'goods' also includes works & services which are incidental or consequence to supply of such goods, such as transportation, insurance, installation, commissioning, training and maintenance.
- 3.1.1.6 **Other Definitions:**
- 3.1.1.6.1 **"Contractor's Documents"** means the calculations, computer programs and other software, drawings, manuals, models and other documents of a technical nature (if any) supplied by the Contractor under the Contract.
- 3.1.1.6.2 **"Employer's Equipment"** means the apparatus, machinery and vehicles (if any) made available by the Employer for the use of the Contractor in the execution of the Works, as stated in the specification; but does not include Plant which has not been taken over by the Employer.
- 3.1.1.6.3 **"Force Majeure"** is defined as in **Clause 3.17** [*Force Majeure*].
- 3.1.1.6.4 **"Laws"** means all national (or state) legislation, statutes, ordinances and other laws, and regulations and by-laws of any legally constituted public authority.
- 3.1.1.6.5 **"Site"** means the locations /places/lands where the Permanent Works are to be executed and to which Plant and materials are to be delivered or services to be provided or works to be executed and any other places as may be specified in the Contract as forming part of the Site.
- 3.1.1.6.6 **"Variation"** means any change to the Works, which is instructed or approved as a variation under **Clause 3.12** [*Variations*].

3.1.2 Interpretations:

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, and
- (d) "written" or "in writing" means hand-written, printed, or electronically made, and resulting in a permanent record.
- (e) the marginal words and other headings shall not be taken into consideration in the interpretation of these Conditions.

3.1.3 Communications:

Wherever these Conditions provide for giving or issuing of approvals, certificates, consents, determinations, notices and requests, these communications shall be:

- (a) in writing and delivered by hand (against receipt), sent by mail or courier, or speed post.
- (b) delivered, sent or transmitted to the address for the recipient's communications.

3.1.4 Law, Language and Jurisdiction:

The language for communications shall be in English. The contract shall be governed by and constructed according to the laws in force in India. All disputes shall be subjected to exclusive jurisdiction of the courts at Tuticorin only for the purpose of actions and proceedings arising out of this contract.

3.1.5 Priority of Documents:

In case of any variation in Instructions to Bidders (ITB), General Conditions of Contract (GCC) and Special Conditions of Contract (SCC), the Special Conditions of Contract – if any, shall prevail. But in case of any requirement / condition specified in the Scope of Work, it shall prevail over all other conditions. It may please be noted that at any time prior to the deadline for submission of Bids, Employer may, for any reason, whether at its own initiative or in response to a clarification requested by any prospective bidder, modify the tender document by amendment / issue of addendum. In such cases, clarifications shall be treated as the appropriate meaning of the respective conditions of bid document.

3.1.6 Assignment:

The Contractor shall not assign the whole or any part of the work to any other Party/Firm/Individual without prior written consent of the Employer.

3.1.7 Care and Supply of Documents:

The Contractor shall keep on the Site, a copy of the Contract, the Contractor's Documents (if any), the Drawings and Variations and other communications given under the Contract. The Employer's Personnel shall have the right of access to all these documents at all reasonable times.

3.1.8 Contractor's use of Employer's Documents:

As between the Parties, the Employer shall retain the copyright and other intellectual property rights in the Specification, the Drawings and other documents made by (or on behalf of) the Employer. The Contractor may, at his cost, copy, use, and obtain communication of these documents for the purposes of the Contract. They shall not, without the Employer's consent, be copied, used or communicated to a third party by the Contractor, except as necessary for the purposes of the Contract.

3.1.9 Confidential Details:

The Contractor shall disclose all such confidential and other information as the Engineer may reasonably require in order to verify the Contractor's compliance with the Contract.

3.1.10 Compliance with Laws, Statutes & Regulations:

The Contractor shall, in performing the Contract, comply in all respect with applicable Laws, Statutes and Regulations including clearance from State / Central Govt. Authorities, Pollution Control Boards, labour enforcement and local authorities. The Contractor shall indemnify and hold the Employer harmless against and from the consequences of any failure to do so.

3.1.11 Details to be Confidential:

The Contractor shall treat the details of the contract as private and confidential, except to the extent necessary to carry out obligations under it or to comply with applicable laws. The Contractor shall not publish, permit to be published or disclose any particulars of the works in any trade or technical paper of elsewhere without the previous agreement of the Employer.

3.2 THE EMPLOYER:

3.2.1 Right of Access to the Site:

The Employer shall give the Contractor right of access to, and possession of, all parts of the Site within the time (or times) stated in the Contract. If no such time is stated in the Contract, the Employer shall give the Contractor right of access to, and possession of, the Site within such times as may be required to enable the Contractor to proceed in accordance with the time schedule (bar chart) submitted under **Sub-Clause 3.7.3** [Time Schedule / Bar Chart].

If the Contractor suffers delay as a result of a failure by the Employer to give any such right or possession within such time, the Contractor shall give notice to the Engineer within 7 (seven) days from end of such time or period and shall be entitled to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under **Sub-Clause 3.7.4** [*Extension of Time for Completion*],

However, if and to the extent that the Employer's failure was caused by any error or delay by the Contractor, including an error in, or delay in the submission of, any of the Contractor's Documents, the Contractor shall not be entitled to such extension of time.

3.2.2 Permits, Licenses or Approvals:

The Employer shall (where he is in a position to do so) provide administrative support to the Contractor at the request of the Contractor:

- (a) by obtaining copies of the Laws of the Country which are relevant to the Contract but are not readily available, and
- (b) for the Contractor's applications for any permits, Licenses or approvals required by the Laws of the Country for execution of work under the Contract:
 - (i) which the Contractor is required to obtain.
 - (ii) for the delivery of Goods, including clearance through customs, and for the export of Contractors Equipment when it is removed from the Site.
 - (iii) which the Contractor is required to obtain under the Contract

3.2.3 Employer's Claims:

If the Employer considers himself to be entitled for any payment (claim) under any Clause of these Conditions or otherwise in connection with the Contract, and/or to any extension of the Defects Liability Period, the Employer or the Engineer shall give notice and particulars to the Contractor.

The notice shall be given as soon as practicable after the Employer became aware of the event or circumstances giving rise to the claim. A notice relating to any extension of the Defects Liability Period shall be given before the expiry of such period.

The particulars shall specify the Clause or other basis of the claim and shall include substantiation of the amount and/or extension to which the Employer considers himself to be entitled in connection with the Contract. The claim amount shall be considered as a deduction in the Contract Price.

3.3 ENGINEER AND ENGINEER'S REPRESENTATIVE:

3.3.1 The Engineer shall carry out such duties in issuing decision, certificates and orders as are specified in the contract. The Engineer's Representative shall be responsible to the Engineer and be the Engineer-in-Charge of the work.

3.3.2 Delegation by Engineer:

The duties of the Engineer's Representative is to watch and supervise the work and to test and examine any materials to be used or workmanship employed in connection with the works. He shall have no authority to relieve the Contractor or any of his duties or obligations under the contract nor except as expressly provided hereunder or elsewhere in the contract to order any work involving delay or any extra payment by the Employer nor to make any variation of or in the works.

Any written instructions or approval given by the Engineer's Representative to the Contractor within the terms of such delegation (but not otherwise) shall bind the Contractor and the Employer as though it had been given by the Engineer provided, however, that.

a) Failure of the 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 or breaking up thereof.

b) If the Contractor shall be dissatisfied by reason of any decision of the Engineer's Representative, he shall be entitled to refer the matter to the Engineer who shall thereupon confirm, reverse or vary such decision.

3.4 THE CONTRACTOR'S OBLIGATIONS:

3.4.1 Contractor's General Obligations:

The Contractor shall design (to the extent specified in the contract) if stipulated in the Contract, execute and complete the Works in accordance with the Contract and with the Engineer's instructions, and shall remedy any defects in the Works.

The Contractor shall provide the Plant& equipment, materials and Contractor's Documents specified in the contract, and all Contractor's Personnel, Goods, consumables and other

things and services, whether of a temporary or permanent nature, required in and for this design, execution, completion and remedying of defects.

All the material, equipment offered and used in the execution of the work shall be suitable for sustained service in a marine atmosphere and local environment condition.

The Contractor shall be responsible for the adequacy, stability, and safety of all Site operations and of all methods of construction. The Contractor shall, in consideration of payments to be made to him as hereinafter provided, execute and do the Works set forth as described in the Scope of Work and specifications, including any amendments to tender clauses.

The Contractor shall exercise all reasonable care and diligence in the discharge of all technical, professional and Contractual duties to be performed by them under this Contract as specified in the Scope of Work within the Time for Completion and provide all labour, including the supervision and security thereof, Contractor's Equipment necessary thereof and for carrying out his obligation, so far as the necessity for providing the same is specified in or is reasonable to be inferred from the Contract. The Contractor shall be fully responsible to Employer for proper, efficient, and effective discharge of their duties.

The Contractor shall, whenever required by the Engineer, submit details of the arrangements and methods, which the Contractor proposes to adopt for the execution of the Works. No significant alteration to these arrangements and methods shall be made without this having previously been notified to the Engineer.

If the Contract specifies that the Contractor shall design any part of the Permanent Works, then.

- (a) the Contractor shall submit to the Engineer the Contractor's Documents for this part in accordance with the procedures specified in the Contract.
- (b) these Contractor's Documents shall be in accordance with the Specification and Drawings and shall include additional information if required by the Engineer to add to the Drawings.
- (c) the Contractor shall be responsible for this part, and it shall, when the Works are completed, be fit for such purposes for which the part is intended as are specified in the Contract;

3.4.2 Contractor's Representative:

The Contractor shall appoint the Contractor's Representative and shall give him all authority necessary to act on the Contractor's behalf under the Contract. The Contractor shall submit the name and particulars of the representative prior to commencement of work.

3.4.3 Assignment and Subcontracting:

The Contractor shall not, assign the contract or any part thereof or any benefit or interest therein or there under without the prior written consent of the Engineer.

The Contractor shall not sub-contract the whole of the works. Except otherwise provided by the Contract, the Contractor shall not sub-contract any part of the Works without the prior

written consent of the Engineer and such consent if given shall not relieve the Contractor from any liability or obligation under the Contract and he shall be responsible for the facts, defaults and neglects of any sub-Contractor, his agents, servants or workmen fully as if they were the acts, defaults or neglects of the Contractor.

In the event of the Contractor contravening this condition, Employer shall be entitled to terminate the Contract forthwith and award a fresh Contract to some other party at risk and cost of the Contractor who shall be liable for any loss or damage which Employer may sustain in consequence arising out of such replacement of the Contractor. In such a case, the performance security deposit shall be forfeited.

3.4.4 Cooperation:

The Contractor shall, as specified in the Contract or as instructed by the Engineer, allow appropriate opportunities for carrying out work to:

- (a) the Employer's Personnel,
- (b) any other contractors /PMC/ 3rd party Inspecting Agency employed by the Employer, and
- (c) the personnel of any legally constituted public authorities,

who may be employed in the execution on or near the Site of any work not included in the Contract.

3.4.5 Setting Out:

The Contractor shall set out the Works in relation to original points, lines and levels of reference specified in the Contract or notified by the Engineer. The Contractor shall be responsible for the correct positioning of all parts of the Works, and shall rectify any error in the positions, levels, dimensions or alignment of the Works.

3.4.6 Safety Procedures:

The Contractor shall:

- (a) comply with all applicable safety regulations,
- (b) take care for the safety of all persons entitled to be on the Site,
- (c) use reasonable efforts to keep the Site and Works clear of unnecessary obstruction so as to avoid danger to these persons,
- (d) provide fencing, lighting, guarding, and watching & warding of the Works until completion and taking over under **Clause 3.9** [Acceptance], and
- (e) provide any Temporary Works (including roadways, footways, guards and fences), which may be necessary, because of the execution of the Works, for the use and protection of the public and of owners and occupiers of adjacent land.
- (f) provide all lights be placed or screened so as not to interfere with any signal lights on the Employer's railways or with any traffic lights of any local or other authority.

3.4.7 Site Data:

The Employer shall have made available to the Contractor for his information, all relevant data if available in the Employer's possession on conditions at the Site, including environmental aspects. The Contractor shall be responsible for interpreting all such data.

The Contractor shall be deemed to have obtained all necessary information as to risks, contingencies and other circumstances which may influence or the Tender or Works. To the same extent, the Contractor shall be deemed to have inspected and examined the Site, its surroundings, the above data and other available information, and to have been satisfied before submitting the Tender as to all relevant matters, including (without limitation):

- (a) the form and nature of the Site, including sub-surface conditions,
- (b) the hydrological and climatic conditions,
- (c) the extent and nature of the work/service and Goods necessary for the execution and completion of the Works and the remedying of any defects,
- (d) the Laws, procedures, and labour practices of the State / Country, and
- (e) the Contractor's requirements for access, accommodation, facilities, personnel, power, transport, water and other services.

3.4.8 Sufficiency of the Accepted Contract Amount:

Unless otherwise stated in the Contract, the Accepted Contract Amount covers all the Contractor's obligations under the Contract (including those under Provisional Sums; If any) and all things necessary for the proper execution and completion of the Works.

3.4.9 Rights of Way and Facilities:

The Contractor shall bear all costs and charges for special and/or temporary rights of-way which he may require, including those for access to the Site. The Contractor shall also obtain, at his risk and cost, any additional facilities outside the Site, which he may require for the purposes of the Works.

3.4.10 Transport of Goods:

Unless otherwise stated in the Particular Conditions:

- (a) the contractor shall give the Engineer not less than 07 days' notice of the date on which any Plant or a major item of other Goods will be delivered to the Site;
- (b) the Contractor shall be responsible for packing, loading, transporting, receiving, unloading, storing and protecting all Goods and other things required for the Works; and
- (c) the Contractor shall indemnify and hold the Employer harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from the transport of goods and shall negotiate and pay all claims arising from their transport.

3.4.11 Contractor's equipment:

The Contractor shall be responsible for all Contractor's equipment. When brought on to the Site, Contractor's equipment shall be deemed to be exclusively intended for the execution of the Works and shall be retained at the site till the completion of the work. The Contractor

shall not remove from the Site any major items of Contractor's equipment without the consent of the Engineer. However, consent shall not be required for vehicles transporting Goods or Contractor's Personnel off Site.

3.4.12 Protection of the Environment:

The Contractor shall take all reasonable steps to protect the environment (both on and off the Site) and to limit damage and nuisance to people and property resulting from pollution, noise and other results of his operations.

The Contractor shall ensure that emissions, surface discharges and effluent from the Contractor's activities shall not exceed the values indicated in the Specification and shall not exceed the values prescribed by applicable Laws.

3.4.13 Site Facilities:

Facilities Supplied by the Contractor:

The Contractor shall supply all services, amenities, temporary structures including security fencing if required and storage compounds if required, machinery, temporary sheds and construction equipment necessary for the proper execution of the Works at Site at his cost except for the items specified below, which will be provided by the Employer.

Facilities Supplied by the Employer:

The Employer will make available to the Contractor the following services which will be charged at the prevailing rates.

(a) Supply of land for Contractor's site establishment and lay down areas:

The above shall be made available at rates as given in the Scale of Rates as relevant and applicable subject to revision from time to time.

(b) Construction Water / Drinking Water:

The Employer will provide a source for reasonable quantity of construction water at one point adjacent to the Contractor's work area on chargeable basis. Any further reticulation to the Contractor's individual facilities shall be the Contractor's responsibility and cost. Similarly drinking water may be supplied on chargeable basis. However, all necessary arrangement like plumbing / installation of water meter etc. to be made by the contractor. Water charges will have to be paid (adjusted from the contractor's bill) by the contractor against actual consumption recorded through water meter as per the prevailing rates subject to revision from time to time.

(c) Construction Electric Power:

The Employer will provide source of electric power at one point adjacent to the Contractor's work area. Any further reticulation to the Contractors' individual facilities shall be the Contractor's responsibility and cost.

The **Electricity consumption charges** [as per Port tariff] shall have to be paid by the Contractor immediately, on receipt of the bill from the office of MEE Department, V.O.Chidambaranar Port. 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).

The Employer does not guarantee the continuity of power supply in the event of power failure the contractor shall be required to make its own arrangements for the provision of uninterrupted electric power.

3.4.14 Records to be maintained:

The Contractor shall maintain site account of materials, including the departmental supply, clearly indicating relevant information such as description of the material, source, date of delivery at site, date of consumption at site. The Contractor shall forward a copy of monthly site account of materials to the Engineer in Charge at the end of every month. On completion of the work under the contract, the Contractor shall submit to the Engineer in Charge a copy of the site account of the materials from the date of commencement to date of acceptance. The Contractor shall also maintain hindrance register, site instructions register, complaint register and daily progress register and the EIC shall verify the registers as and when required and sign the same, duly recording his remarks.

3.4.15 Security of the Site:

Unless otherwise stated; authorized persons shall be limited to the Contractor's Personnel and the Employer's Personnel; and to any other personnel notified to the Contractor, by the Employer or the Engineer, as authorized personnel of the Employer's other contractors on the Site.

3.4.16 Contractor's Operations on Site:

The Contractor shall confine his operations to the Site, and to any additional areas, which may be obtained by the Contractor and agreed by the Engineer as working areas. The Contractor shall take all necessary precautions to keep Contractor's Equipment and Contractor's Personnel within the Site and these additional areas, and to keep them off adjacent land.

During the execution of the Works, the Contractor shall keep the Site free from all unnecessary obstruction and shall store or dispose of any Contractor's Equipment or surplus materials. The Contractor shall clear away and remove from the Site any wreckage, rubbish and Temporary Works, which are no longer, required. The Contractor shall clear away and remove, all Contractor's Equipment, surplus material if not handed over to the Employer as per the Contract. Contractor shall leave that part of the Site and the Works in a clean and safe condition. The Contractor shall at all reasonable times allow persons duly authorized by the Employer.

3.5 STAFF AND LABOUR:

3.5.1 Engagement of Staff and Labour:

The Contractor shall make arrangements for the engagement of all staff and labour, local or otherwise, and for their payment, accommodation, feeding and transportation. Since time is the essence of this Contract, the requisite number of labour force has to be kept so as to complete work within the completion period as stipulated in the Contract.

3.5.2 Compliances of Regulations etc.:

The Contractor shall, at all times during the continuance of the Contract, so far it may be necessary, comply with all existing enactments including central and state Legislation as well as an applicable Bye-Laws of any local authority regarding labour (Contractor's Personnel), particularly the Minimum Wages Act, Factories Act, Workmen's Compensation Act, Provident Fund and Miscellaneous Provisions Act, Family Pension Fund Act and Employees State Insurance Act, Contract Labour (Regulation and Abolition) Act, Payment of Wages Act, Maternity Benefit Act, National Festival Holiday Act, Shop and Establishment Act, The Apprentice Act and shall keep the Employer indemnified against any action that may be taken against him for the contravention of provisions of the above said enactments by the Contractor. The prices quoted by the Contractor in Bill of Quantities shall be deemed to include all expenses whatsoever the Contractor may be required to incur for the compliance with the provisions of the above said legislation. The Contractor shall make necessary arrangements for the Employer to witness the payments made by the Contractor to his staff and labour and get the certificate from the Employer as required in terms of the regulations.

The Contractor shall cover all its workmen under EPF & ESI irrespective of the no. of workmen engaged in the work. The Contractor shall produce documentary evidence in support of the EPF & ESI coverage to its workers within 30 days of induction of contractual worker(s). This will also be applicable to the sub-contractor(s) appointed by the Contractor for the subject work.

The Contractor shall also comply apart from all the relevant labour Laws applicable to the Contractor's Personnel, Laws relating to their employment, health, safety, welfare, and emigration and shall allow them all their legal rights.

The Contractor shall require his employees to obey all applicable Laws, including those concerning safety at work.

3.5.3 Rates of Wages and Conditions of Labour:

The Contractor shall pay rates of wages and observe conditions of labour as per the provision of regulations, etc which are not lower than the minimum wages & conditions notified under any Central or State law as applicable to the Employer.

3.5.4 Persons in the Service of Employer:

The Contractor shall not recruit, or attempt to recruit, staff and labour from amongst the Employer's Personnel.

The Employer shall be at liberty to terminate the Contract if the Contractor himself or any of his partners / employees / staffs or any of his Directors who having held Class-I post with the Employer prior to his retirement has failed to obtain the Employer's specific permission to undertake any outside employment before the expiry of two years from the date of his retirement, in accordance with the regulations.

3.5.5 Facilities for Staff and Labour:

The Contractor shall provide and maintain all necessary facilities as applicable at site for smooth execution of contract. . Port entry permit for the contractor and their staff, materials, vehicles etc. for movement inside the Port area, will be on chargeable basis.

3.5.6 Health and Safety:

The Contractor shall at all times take all reasonable precautions to maintain the health and safety of the Contractor's Personnel. The Contractor shall maintain records and make Reports concerning health, safety and welfare of persons, and damage to property, as, the Engineer may reasonably require.

Safety Gears, PPEs, Etc.

The Contractor shall be solely responsible, at his own cost to provide all safety gears including PPEs for all labours engaged and he shall also ensure the use of such safety items by his staff & labour at site.

In the event of failure on the part of the Contractor, 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.

3.5.7 Contractor's Superintendence:

(a) The Contractor shall give or provide all necessary superintendence during the execution of the Works and as long thereafter as the Engineer may consider necessary for the proper fulfilling of the Contractor's obligations under the Contract. The Contractor, or his competent and authorized agent or Representative is to be constantly on the works and shall give his whole time to the superintendence of the same. Such authorized agent or Representative shall receive on behalf of the Contractor directions and instruction from the Engineer or the Engineer's Representative.

(b) *Epidemics:*

In the event of any outbreak of illness or an epidemic nature, the Contractor shall comply with and carry out such regulations, orders and 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.

3.5.8 Contractor's Personnel:

The Contractor's Personnel shall be appropriately qualified, skilled, and experienced in their respective trades or occupations wherever require. The Contractor shall employ such skilled, semi-skilled and unskilled labour as is necessary for proper, timely execution of work.

The Engineer may require the Contractor to remove (or cause to be removed) any person employed on the Site or Works, including the Contractor's Representative if applicable, who:

- (a) persists in any misconduct or lack of care,
- (b) carries out duties incompetently or negligently,

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- (c) fails to conform with any provisions of the Contract, or
 - (d) persists in any conduct, which is prejudicial to safety, health, or the protection of the environment.

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

3.5.9 Wage Records:

The Contractor shall maintain records of wages and other remuneration paid to his employees in such forms as may be convenient and to the requirements of the Engineer and conciliation officer, Central Ministry of Labour, Government of India or such other authorised persons appointed by the State Government. The Contractor shall also exhibit the different notices as required under the Minimum Wages Act, 1949, Payment of Wages Act, 1936 and other Acts, Rules and Regulations made there under from time to time.

3.5.10 Accidents:

The Contractor shall within 24 hours of the occurrence of any accident at or about the site or in connection with the execution of the work report such accidents to the Engineer / Engineer's Representative. The Contractor shall also report such accidents to the competent authorities to whom such report is required to be sent as per prevailing law.

3.5.11 Records of Contractor's Personnel and Equipment:

The Contractor shall submit if required, to the Engineer, details showing the number of each class of Contractor's Personnel and of each type of Contractor's Equipment on the Site. Details shall be submitted each calendar month, in a form approved by the Engineer, until the Contractor has completed all work.

3.5.12 Disorderly Conduct:

The Contractor shall at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst the Contractor's Personnel, and to preserve peace and protection of persons and property on and near the Site.

3.5.13 Observance By Sub-Contractors:

The Contractor shall be responsible for observance by his Sub-Contractors of the foregoing provisions.

3.5.14 Remedial Action by the Employer:

If as a result of 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 sums of money due or that they 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 respect of his work pursuant to the Contract shall be paid by the Contractor.

3.6 PLANT, MATERIALS AND WORKMANSHIP:

3.6.1 Manner of Execution:

The Contractor shall, at his own costs and expenses, provide all labour, plant & equipment, materials, stores, etc. required for efficiently carrying out and completing the work to the satisfaction of the Employer within the stipulated time period as per Scope of Work and Specifications.

All plant & equipment and materials and workmanship shall be of the respective kinds described in the Contract and in accordance with Engineer's instructions and shall be subjected to such tests specified in the Contract.

3.6.2 Quality Assurance:

The Quality Assurance Plan defines the methodology to be used to ensure quality of goods / services involved in the work. The Contractor shall submit a quality assurance plan (QAP) for acceptance by the Engineer if specified in the Contract. The QAP shall, contain list of the tests and inspections proposed along with standards (IS or other equivalent standards / performance standards where applicable) to be done to ensure quality for goods and services

3.6.3 Inspection:

The Engineer or his designated Representative(s) shall at all reasonable times:

- (a) have full access to Contractor or its sub-contractor(s) / its manufacturer(s) premises / work site where the Plant and Equipment are being manufactured or the facilities are being installed / executed, and
- (b) during production, manufacture, and construction (at the Site and elsewhere), be entitled to examine, inspect, measure and test the materials and workmanship, and to check the progress of manufacture of materials.

The Contractor shall give the Employer's Personnel full opportunity to carry out these activities, including providing access, facilities, permissions and safety equipment.

3.6.4 Test

The Contractor shall at its own expense carry out at the place of manufacture and / or on the Site all such tests of the Plant and Equipment and any part of the Work / Facilities as are specified in the Contract or as per approved QAP.

Unless otherwise specified,

- (a) Works where supply of plant & equipment are not included in scope of Contractor, test & inspection shall be done by Engineer or his Representative on quality of workmanship of work.
- (b) The contractor shall submit, if necessary, test guarantee certificates / internal inspection report / manufacturer certificates towards acceptance of plant equipment. Inspection of works at site shall be carried out on the basis of workmanship and performance tests.

(c) Works where supply of plant & equipment are included in scope of Contractor and if such tests are clearly intended by or provided for or inferred from the Contract or Specifications or Bill of Quantities, the test & inspection of all such specified plant & equipment / items shall be carried out at Contractor / sub- contractor(s) / manufacturers' premises as per approved QAP. For rest of the equipment / items, the Contractor shall submit test guarantee certificates/internal inspection report / manufacturer certificates. Tests & Inspection of works at site shall be carried out on the basis of workmanship and performance standards and as per approved QAP.

The Engineer or his designated representative(s) shall be entitled to attend the aforesaid test and / or inspection, provided that the Employer shall bear costs and expenses incurred in connection with such attendance including, but not limited to, all travelling and board and lodging expenses.

Whenever the Contractor is ready to carry out any such test and / or inspection, the Contractor shall give a 7-day advance notice of such test and / or inspection. The Engineer shall then either carry out the examination, inspection, measurement or testing without unreasonable delay, or promptly give notice to the Contractor that the Engineer does not require to do so. If the Contractor fails to give the notice, he shall, if and when required by the Engineer, shall carry out any such test and / or inspection and thereafter reinstate and make good, all at the Contractor's cost. The Contractor shall provide the Engineer with a certified report of the results of any such test and / or inspection.

If any Plant and Equipment or any part of the Facilities fails to pass any test and/ or inspection, the Contractor shall either rectify or replace such Plant and Equipment or part of the Facilities and shall repeat the test and / or inspection upon giving a notice.

The execution of a test and / or inspection of Plant and Equipment or any part of the Facilities, or the attendance by the Employer or the Engineer, or the issue of any test certificate or waiver certificate shall not relieve the Contractor from any of its responsibilities under the Contract.

Employer's right to inspect, test and, where necessary, reject the Goods after the Goods arrival in Employer premises shall in no way be limited or waived by reason of the Goods having previously been inspected, tested and passed by Employer or its representative prior to the Goods' shipment from the place of origin.

3.6.5 Rejection:

If, as a result of an examination, inspection, measurement or testing, any Plant, Materials or workmanship is found to be defective or otherwise not in accordance with the Contract (all such matters being hereinafter, called 'Defects'), the Engineer may reject the Plant, Materials or workmanship by giving notice to the Contractor in writing of the said decision specifying particulars of the defects alleged to exist or to have occurred. The Contractor shall at his own expense and with all efforts would make good the defects so specified.

Further, Employer reserves the right to subject any part / component / equipment for re-test and on written instruction from Employer, the Contractor shall arrange for the re-test and the cost shall be reimbursed by Employer as per actual, only if the test results are

satisfactory. In case of unsatisfactory test results, the part / component / equipment shall be rejected and the Contractor shall be responsible for replacement of the item at his own cost and also bear the cost of the re-test.

3.6.6 Remedial Work:

Notwithstanding

- (a) remove from the Site and replace any Plant or Materials which is not in accordance with the Contract,
- (b) remove and re-execute any previous test or certification, the Engineer may instruct the Contractor to: any other work which is not in accordance with the Contract, and
- (c) execute any work which is urgently required for the safety of the Works, whether because of an accident, unforeseeable event or otherwise.

The Contractor shall comply with the instruction within a reasonable time, which shall be the time (if any) specified in the instruction, or immediately if urgency is specified under sub-paragraph (c). If the Contractor fails to comply with the instruction, the Employer may take, at the cost and risk of the Contractor, such steps as may in all circumstances be reasonable to make good such defects. The expenditure so incurred by the Employer will be recovered from the amount due to the Contractor. The decision of the Engineer with regard to the amount to be recovered from the Contractor will be final and binding on the Contractor.

3.7 COMMENCEMENT AND DELAYS:

3.7.1 Commencement of Work:

The work shall be commenced within 15 days of issuance of Letter of Acceptance / Work Order. If no notification received from the Contractor regarding commencement date, then 16th date from issuance of Letter of Acceptance / Work Order shall be treated as date of commencement. The Contractor shall proceed with the Works with due expedition and without delay. Commencement of work is subject to compliance all the conditions precedent as mentioned at **Clause No. 2.11 and 2.13 of ITB (Section-I)**. The stipulated deadlines mentioned at **Clause No. 2.11 and 2.13 of ITB (Section-I)** would have to be strictly adhered to unless otherwise extended by Employer.

3.7.2 Time of Completion / Period of Contract:

The Contractor shall complete the whole of the Works, and each Section (if any), within the Time for Completion as indicated in Work Order / Letter of Acceptance for the Works or Section (as the case may be), including:

- (a) achieving the passing of the Tests on Completion, and
- (b) Completing all work, which is stated in the Contract as being required for the Works or Section to be considered to be completed for the purposes of taking over under **Clause 9** [Acceptance]

3.7.3 Time Schedule/ Bar Chart:

If specified in the Contract, The Contractor shall submit a Time Schedule / Bar Chart form within 15 days of issuance of Letter of Acceptance / Work Order.

The Contractor shall submit a bar chart, before signing the agreement, clearly indicating the plan for timely execution of the work. The bar chart must indicate the individual activities and commencement and completion dates of each activity. The bar chart shall be used for monitoring the progress of the work.

Unless the Engineer, within 15 days after receiving bar chart, gives notice to the Contractor stating the extent to which it does not comply with the Contract, the Contractor shall proceed in accordance with the bar chart.

If, at any time, the Engineer gives notice to the Contractor that time schedule fails (to the extent stated) to comply with the Contract or to be inconsistent with actual progress and the Contractor's stated intentions, the Contractor shall submit a revised time schedule / bar to the Engineer.

3.7.4 Extension of Time for Completion:

The Contractor shall commence the works after being notified for award of work and shall proceed with the same with due expedition and without delay except as may, be expressly sanctioned or ordered by the Engineer or be wholly beyond the Contractor's control. The Contractor shall maintain the rate of progress required as per schedule.

The Contractor shall be entitled subject Contractor's Claims to an extension of the Time for Completion if and to the extent that completion of work *is* or will be delayed by any of the following causes:

- (a) changes ordered by the Employer,
- (b) delay in performance of work caused by orders issued by the Employer.
- (c) delay in providing work fronts or supply of any materials or services which are to be provided by the Employer,
- (d) exceptionally adverse climatic conditions,
- (e) force Majeure
- (f) other reasonable causes

If the Contractor considers himself to be entitled to an extension of the Time for Completion, the Contractor shall give notice to the Engineer for extension of time before expiry of the period of contract with details of the hindrance(s) on account of which he desires such extension as aforesaid with documentary evidence.

If the progress of work is held up owing to circumstances which, in the opinion of Engineer are beyond the control of the Contractor the Engineer may, at his discretion, grant to the Contractor such extension of time as he considers reasonable for the completion of the work.

The execution of the work during the extended period also shall be only under the conditions and at the rate specified in the contract.

No claim shall be made by the Contractor on the grounds of executing the work beyond the completion period stipulated in the contract.

3.7.5 Liquidated Damage:

Unless otherwise specified, in case of delay in completion of the contract, liquidated damages (for works costing up to Rs. 10 lakh - one (1) percent of the contract value per week and for all other works half percent (0.5%) of the contract value per week of delay subject to a maximum of ten percent (10%) of contract value should be levied. Such liquidated damages will be deducted from

any money due or become due to the contractor. The payment of such damages shall not relieve the contractor of his obligations to complete the work or from any other of his obligations or liabilities under this contract.

3.8 TESTS, IF ANY ON COMPLETION OF ERECTION & INSTALLATION AT EMPLOYER'S SITE:

- (a) On completion of erection / installation of the items under the work / facilities by the Contractor and also when trial runs & final adjustments at the site are completed in accordance with the Contract, the Contractor shall give the Engineer-in-charge notice in writing thereof and before making the tests on completion of 7 days' notice in writing of the date on which he will be ready to make the said tests in accordance with and in the manner prescribed in the specifications.
- (b) If any portion of work falls under the tests to fulfil the Contract conditions, tests of the faulty portion shall, if required by the Engineer-in-charge or by the Contractor, be repeated within a reasonable time upon the same terms and conditions.
- (c) If the Contractor neglects to make the 'Performance test' within the time stipulated, Employer shall nevertheless have the right of using the Installations at the Contractor's risk until the 'Performance test' is successfully carried out.

3.9 ACCEPTANCE:

Upon successful tests under **Clause No.3.8** / upon completion of work under this contract, the Engineer may accept the works and/or services, if defects or shortcomings are not considered essential and, the Contractor agrees to make good the deficiencies in confirmation with this contract. Further, no work shall be treated as accepted before the Contractor clears the site of scraps, unused materials, work shed, equipment and all such materials which were used for execution of the work and not required any more at the work site.

The Engineer may, at the sole discretion of the Employer, may accept part or section work if it is substantially completed.

The Contractor shall submit to the Engineer the "as-built" documents and operation and maintenance manuals in accordance with the Specification and in sufficient detail for the Employer to operate, maintain, dismantle, reassemble, adjust and repair this part of the Works. Such part shall not be considered to be completed for the purposes of acceptance until these documents and manuals have been submitted to the Engineer.

As soon as the works have been completed in accordance with the contract and have passed the tests on completion, the Employer shall issue a certificate in which he shall certify the date on which the works have been so completed and have passed the said tests, and the Employer shall be deemed to have taken over the works on the date so certified.

3.10 DEFECT LIABILITY / WARRANTY:

- 3.10.1** The Contractor shall warrant that the work or any part thereof under this contract will comply strictly with the contract or superior to what is defined, shall be first class in every particular case and shall be free from defects. The Contractor shall further warrant that all

materials, equipment, and the supplies furnished by him will be new and fit for their intended purposes.

3.10.2 The warranty period shall be for a period of minimum 12 months from date of completion of work, unless otherwise specified in the Scope of Work / Special Condition of Contract.

3.10.3 If during the Defect Liability Period any defect be found in materials and workmanship or of the work executed by the Contractor, the Contractor upon being notified, shall promptly, in consultation and agreement with the Employer and at its cost, repair, replace or otherwise make good such defect as well as any damage to the goods & services and materials caused by such defect within a specified time or a mutually agreed time between the Contractor & Employer.

3.10.4 If the work or any part thereof cannot be used by reason of such defect and / or making good of such defect, the Defect Liability Period of the work or such part, as the case may be, shall be extended by a period equal to the period during which the work or such part cannot be used by the Employer because of any of the aforesaid reasons. In addition, the Contractor shall also provide an extended warranty for any such replaced or repaired component of the work for the period of minimum 12 months or as it may be stipulated in Contract Technical Specifications. Such obligation shall be in addition to the defect liability specified under **Clause 3.10.2** hereof.

3.10.5 If the Contractor, having been notified, fails to remedy the defects in accordance with the contract, the Employer may proceed to take such remedial action as may be necessary, at the Contractor's risk and cost.

3.10.6 In the event of repeated failure of any component or material or fitting, within the warranty period, it shall be treated as failure on the part of the Contractor and the Contractor shall have to promptly rectify the same at his own cost failing which Employer shall have the right to recover the cost from any other outstanding amount of the Contractor lying with Employer and / or any amount that may become due to the Contractor and the Contractor shall be debarred to participate in any of the tender of Employer in future.

3.11 MEASUREMENT:

Unless otherwise specified:

- (a) measurement shall be made of the net actual quantity of each item of the Permanent Works, and
- (b) the method of measurement shall be in accordance with the Bill of Quantities or other applicable Schedules.

3.12 VARIATIONS:

The variation or additional work must be a necessary part within the scope of the original works and should not completely change the scope/ character and purpose of the original contract. The variation may result in additional or reduced payments to the contractor or there may be no price change at all.

3.12.1 Variation means:

- (a) increase or decrease in the quantity of any work included in the BOQ of the contract.
- (b) omission of any such work (but not if the omitted work is to be carried out by the Employer by another contractor);
- (c) change in the character or quality or kind of any such work.
- (d) change in the levels, lines, position and dimensions of any part of the works.
- (e) additional work of any kind necessary for the completion of the works; and
- (f) change of the specified sequence or timing of construction of any part of the works.

At any time during the execution of the contract, by a written notice to the Contractor (Change Order), variations as specified above may be made in the scope of contract by Representative of Engineer, with due approval of competent authority.

3.12.2 Valuation of Variations:

Variations as specified in **clause 3.12.1** shall not in any way vitiate or invalidate the contract but the cost, if any, arising out of all such changes shall be taken into account in ascertaining the total amount of the contract price. Where the rate is available in the contract and the same is applicable to the additional work, in the opinion of the Engineer, the cost of the additional work shall be determined as per this available rate. But, if the rate for additional work is not available in the contract, the same shall be determined by the Engineer taking into account the market rate and labour cost at the site for similar works and shall be final.

3.12.3 Deviations from the specifications as contained in the contract agreement including the make / model, shall not be accepted. In case of any such deviation, payment shall not be made for that part of the work / item, even if it is meeting the functional requirements and has been accepted by the Employer. The payment for such portion of the work / item can only be released if the contractor makes good the deviations before the expiry of the warranty period so as to meet the specifications of the tender agreement in all respects.

3.12.4 Adjustments for Changes in Legislation:

If during the period of the contract, any statutory regulations or bye-laws, new tax / duty / cess or any other charge is imposed / levied / come into force by the Government / any statutory authority having impact on the payable amount to the Contractor only to the extent of the services to be rendered after commencement of work, then the same would be paid by VOCPA to the contractor at actual on production of relevant proof.

3.13 CONTRACT PRICE AND PAYMENT:

3.13.1 The Contract Price:

The Contract Price as specified in Letter of Acceptance / Work Order shall be for the entire Scope of the work towards execution and completion of the Works and the remedying of any defects. Price Schedule or Bill of Quantity of Contract Price is attached with Letter of Acceptance.

The Contract Price accepted in Indian Rupees shall include all duties, taxes and levies, transportations, incidentals, etc. as may be applicable and prevailing on base date of the Contract i.e. bid opening date but excluding Goods & Service Tax (GST).

3.13.2 Firm Contract Price:

The contract shall be firm, not subject to any escalation except in the event of a change in the scope of work or specification or as otherwise provided in the Contract.

3.13.3 Executed Contract Value:

The Employer hereby agrees to pay to the Contractor the Contract Price in consideration of the performance by the Contractor of its obligations and includes adjustments in accordance with the Contract or such other sums as may be determined in accordance with the terms and conditions of the Contract.

3.13.4 Payment Terms:

Contractor shall submit Tax invoice as per the provision of GST Act and rules. 100% of payment to the Contractor will be made on satisfactory completion of works and will be released within 15 working days from the date of receipt of the complete and correct invoices & relevant documents and unless any objection to such bill is raised by the Employer. Deductions & Recoveries will be made as per conditions of the contract. The quantity given in the Price Schedule / BOQ is only approximate and payment will be made as per actuals.

3.13.5 Taxes & Duties:

The Contractor shall pay all taxes, duties, cess, levies if any, fees and all other dues required to be borne & paid by him under the Contract, and the Contract Price shall not be adjusted for any of these costs except as stated in **Sub-Clause 3.12.4** [Adjustments for Changes in Legislation] on production of documentary evidence by the Contractor;

The Contractor shall bear and pay all the liabilities in respect of non- observance of all legal formalities as per various statutory provisions.

3.13.6 Goods and Service Tax:

3.13.6.1 The GST shall be paid by the Employer at the rates applicable from time to time on submission of bills / invoices as prescribed under GST rules mentioning the full details regarding the Name, Address, GST Registration Number of the bidder along with the description, classification and value of taxable services and GST payable thereon. The GST shall be reimbursed to the Contractor on his making available the GST claimed by him in GSTR against the Port GST number.

3.13.6.2 The GST TDS shall be applicable as per the section 51 of the CGST Act, 2017. [As per CGST Act, 2017] and shall be deducted at such rate as may be specified from the invoice of the Contractor.

3.13.7 Income Tax:

Income tax will be deducted at the rates as applicable from time to time. It is open to the contractor to make an application to the concerned Income Tax Authorities to obtain a certificate from them authorizing the department to deduct income tax at such lower rate or

deduct no tax as may be appropriate to his case. Such certificate will be valid for the period specified therein unless it is cancelled by the Income Tax authorities earlier.

3.13.8 E-payment:

The Bidder should submit the consent in a mandate form for receipt of payment through EFT and provide the details of bank A/c in line with RBI guidelines for the same. These details will include bank name, branch name & address, A/c type, bank A/c no., bank and branch code as appearing on MICR cheque issued by the bank. Further, the Contractor should also submit a certificate from their bank certifying the correctness of all the above-mentioned information in the mandate form. In case of non-payment through EFT or where EFT facility is not available, payment will be released through cheque.

3.13.9 Deduction / Recoveries:

3.13.9.1 Deduction of taxes at source shall be made from the bill of the Contractor in accordance with the prevailing rules & regulations of Employer.

3.13.9.2 While performing under the contract, the damages caused by the Contractor or his/her workmen to any of the Employer's shall be promptly made good by the Contractor at his/her own cost. In case the Contractor fails to repair/replace the damage, the Employer shall have the right to take steps to make good the damages and all the cost on this account shall be recovered from the bills of the Contractor or any money due to the Contractor from this contract or any other contract or any other transaction. In determination of the damage, the opinion of the Engineer shall be conclusive.

3.13.9.3 Any dues arising out of failure on the part of the Contractor to carry out any obligation under the contract shall be deducted from the bills of the Contractor or from any money due to the Contractor from this contract or any other contract including Security Deposit and Performance Security

3.13.10 No Interest on Account of Delayed Payments:

Any claim for interest will not be entertained by the Employer with respect to any payment or balance which may be in their hands owing to any disputes between themselves and the Contractor or with respect to any delay on part of the Employer in making payment.

3.14 BREACH OF CONTRACT, REMEDIES AND TERMINATION:

3.14.1 Breach of Contract:

In the event of unsatisfactory performance or non-compliance with regard to the provisions of the Contract or omission or negligence or default or failure to comply with any of the conditions of contract, a breach of contract is said to have occurred by the Contractor of the terms and conditions of the Contract. In such cases, the Employer will issue notice to the contractor indicating such unsatisfactory performance or non-compliance by the Contractor, for compliance and if the Contractor fails to comply within a period of 15 days or within the time specified in the notice from the date of issue of notice, the Employer reserves the right to terminate the contract following the procedure as stated below:

- (a) Consequent to the failure of the contractor to comply with the notice issued for non-performance / breach of contract, the Employer will issue a notice giving the

contractor 7 days' time asking him to show cause as to why the contract should not be terminated.

- (b) If no reply is received or if the reply received from the contractor within given time is found to be not satisfactory, Port will terminate the contract with immediate effect.

3.14.2 Termination of Contract for Default:

Without prejudice to any other remedy for breach of contract, by written notice of default sent to the Contractor, the Employer may terminate the contract in whole or in part, if:

- (a) the Contractor has seriously or repeatedly breached the contract including:
1. failure to complete the work within the time period(s) specified in the contract, or any extension thereof granted.
 2. substantial suspension of work for more than the specified days without authority from the engineer and failure to proceed with the work within the specified days of receipt of notice from the engineer without any lawful excuse.
 3. failure to obey instructions in relation to his progress or defective work, material or plant.
 4. failure to proceed diligently with the work.
 5. breach of the prohibition against sub-contracting.
 6. abandons the Contractor without reasonable cause.
- (b) the contractor has committed fraud.
- (c) the contractor fails to perform any other obligation under the contract within the period specified in the contract or any extension thereof granted.

In such event,

- (a) the Performance Security and Security Deposit will be forfeited, for the loss or damages suffered by the Port due to the breach of the Contract committed by the Contractor. In addition, the Employer may also black list or suspend or debar the Contractor from participating in future tenders, as the Employer thinks deem fit.
- (b) the Employer will take over the site and to complete the works himself or with another contractor (risk Purchase) and using the contractor's materials, equipment, temporary works. The Contractor shall remain liable to the Employer for any excess cost for such works and risk, if any
- (c) No payment shall be released in favour of the Contractor till all the balance works are completed in all respects. After the balance works are completed, the Employer may consider payment for the items / goods that have been completed / supplied by the Contractor and accepted by the Employer after adjustment of any additional cost that have been incurred for completing the balance works and outstanding dues that due to the Contractor.

However, the contractor shall continue to fulfil the contract to the extent not terminated.

3.14.3 Termination of Contract for Insolvency / Bankruptcy / Winding up, etc.:

The Employer shall be entitled to cancel / terminate the Contract before expiry of contract period, if the Contractor is declared as insolvent or bankrupt or is unable to pay its debts or makes a composition with its creditors or if a trustee, liquidator, receiver or administrator is appointed to take over the assets or the business or the undertaking of the Contractor or if a substantial portion of the assets, property, revenues or business of the Contractor is confiscated or expropriated by the Central / State Government or any governmental agency or third party or if the law relating to the sick companies applies to the Contractor or the Contractor is dissolved or wound up or if an order shall be made or an effective resolution is passed for the winding up of the Contractor or the Contractor is reconstituted or the business or operations of the Contractor is closed either due to disputes inter-se amongst its stakeholders or otherwise. Termination shall be affected by giving a written notice to the contractor, without compensation to the contractor, provided that such termination will not prejudice or affect any right of action or remedy which has accrued or will accrue thereafter to Employer.

3.14.4 Termination of Contract for Employer's Failure or Convenience / Foreclosure of the Contract by Port:

After placement of the contract, there may be an unforeseen situation compelling Employer to cancel the contract. In such a case, the Contract may be foreclosed by the Employer by giving 30 (thirty) days advance notice to the Contractor during the subsistence of the contract period without assigning any reasons. In such event, the Performance Security Deposit and Security deposit will be refunded to the Contractor. Also, the Contractor may be suitably compensated on mutually agreed terms for terminating the contract based on value of works executed, value of any materials lying at site, etc., and deducting from it: (i) pending advances; (ii) other recoveries; and (iii) taxes as due.

3.14.5 Discontinuance by the Contractor:

If the contractor is not in a position to continue the contract, the Contractor should give 90 (ninety) days in writing, prior to the proposed date of discontinuance of the contract to the Port. In such case, the Performance Security and the Security Deposit shall be forfeited.

3.15 RISK AND RESPONSIBILITY:

3.15.1 Indemnification:

The Contractor shall defend, indemnify, and keep indemnified and hold the Employer, its officers and employees harmless from any and all claims, demands, injuries, damages, costs, charges, compensation, losses, expenses, proceedings or suits including attorney fees, arising from

- a) Any breach or default in the performance of any obligation on the Contractor's part to be performed under the terms and conditions of this Contract or
- b) any negligence of the Contractor, or any of its agents, or its employees or the person provided for the purpose of this Contractor.
- c) non-fulfilment/ non-adherence/ non-compliance of any statutory provisions which is

as per law the contractor is required to comply with.

The provisions of this section shall survive even after the expiration or termination of this Agreement.

3.15.2 Contractor's Care of the Works:

Care of Works From the commencement to the completion of works the Contractor shall take full responsibility for the care thereof and of all Temporary works and in case any damage, loss or injury shall happen to the works or to any part thereof or to any Temporary works from any cause whatsoever (save and except the Excepted Risks as defined in **clauses 15.3.**) shall at his own cost repair and make good the same so that at completion, the works shall be in good order and condition and in conformity in every respect with the requirements of the Contract and the Engineer's instructions. In the event of any such damage, loss, injury happening from any of the Expected Risks the Contractor shall if and to the extent required by the Engineer repair and make good the same as aforesaid at the cost of the Employer.

3.15.3 Excepted Risks:

The "Excepted Risks" are war hostilities (whether war be declared or not) invasion act of foreign enemies, rebellion, revolution, insurrection or military or usurped power civil war or (otherwise than among the Contractor's own employee's) riot, commotion or disorder or use or occupation by the Employer of any portion of the works in respect of which a certificate of completion has been issued or a cause solely due to the Engineer's design of the Works or any such operation of the forces of nature as reasonable foresight and ability on the part of the Contractor could not foresee or responsibility provide against or any such eventuality which are beyond the control of the contractor and the Employer (all of which are herein collectively referred to as "The Excepted Risks").

3.15.4 Patent Rights:

The Contractor shall fully indemnify Employer 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.

All payments, or otherwise, shall be deemed to be included by the Contractor in the Prices named in the tender and shall be paid by him to whom they may be payable.

In the event of any claim being made or action brought against Employer in respect of any such matter as aforesaid, the Contractor shall be immediately notified thereof and he shall, with the assistance if he so requires of Employer, 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 Employer such security as shall from time to time, reasonably required by Employer to recover the ascertained or agreed amount as the case may be of any compensation, damages, expenses and cost which might be payable by Trustees in respect of or as result of any negotiation or litigation.

3.15.5 Damage to Property:

The Contractor shall be responsible for making good to the satisfaction of the Port, any loss or damage to any structures and properties within the Port premises if such loss or damage is due to fault and/or the negligence or willful acts or omission of the Contractor, his employees, agents, representatives and/or manpower deployed by the contractor. The contractor shall make good the loss as assessed by the Port.

3.15.6 Accident or Injury to Workmen:

The Employer shall not be liable for any damages or compensation payable at law in respect or in consequence of an accident or injury to any workmen or any other person in the employment of the Contractor and the Contractor shall indemnify and keep indemnified the Port against all such damages and compensation and against such claims, demands, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

3.16 INSURANCE:

- (a) Before commencing of execution of works the contractor shall insure against any damage, loss or injury which may occur to any property including that of the Employer or to any person including any employee of the Employer or arising out of the execution of the works in carrying out of the contract.
- (b) Minimum Amount of Insurance: Such Insurance shall be effected with an insurer for at least the awarded value of the contract and the contractor shall produce to the Engineers representative the policy or policies of insurance and receipts for payment of the current premiums, which is mandatory before admitting any bills for payment by Employer.

3.17 FORCE MAJEURE:

- (a) The term “force majeure” as employed herein shall mean including but not limited to, acts of God, war, revolt, riot, fire, flood and acts and regulations of the Government of India or any of its authorized agencies. In the event of either party being rendered unable by force majeure to perform any obligation required to be performed by them under this agreement, the relative obligation of the affected party by such force majeure shall be suspended for the period during which such cause lasts.
- (b) Upon the occurrence of such cause and upon its termination the party alleging that it has been rendered unable as aforesaid thereby shall notify the other party immediately in writing of the alleged beginning and ending thereof giving full particulars and satisfactory proof and it cannot be claimed ex-post facto. The clause does not excuse a party’s non-performance entirely, but only suspends it for the duration of the Force Majeure.
- (c) The time for performance or relative obligations suspended by the force majeure shall be extended by the period for which the cause lasts or condoned by the Employer without any penalty. If the work is suspended by force majeure conditions lasting for more than 1(one) month, the Port shall have the option of cancelling the

Contract in whole or in part thereof at its own discretion. Any situation of force majeure shall not be payable by the Port under any circumstances. For the period of force majeure, no amount shall be payable to the Contractor.

3.18 DISPUTE RESOLUTION MECHANISM:

3.18.1 Normally, there should not be any scope for dispute between the Employer and Contractor after entering into a mutually agreed valid contract. When dispute/ difference / disagreement / claims of any kind arise, both the Employer and contractor should first try to resolve it amicably by mutual consultation failing which it shall be referred to conciliation & settlement Committee established by the Employer.

3.18.2 Amicable Settlement:

If a dispute of any kind, whatsoever, arises between the Employer and 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 the repudiation or termination of the contract, including any difference, question or disagreement by either party with any action, in action, opinion, instruction, determination, certificate or valuation of the Engineer; the matter in dispute shall,

- (a) refer to the Chief Mechanical Engineer, V.O. Chidambaranar Port Authority, Tuticorin.
- (b) In case the dispute is not resolved, the same shall be referred to the committee headed by Deputy Chairman and other members to be nominated by Chairman, VOCPT.
- (c) If the dispute remains unresolved, the same shall be referred to the Chairman, VOCPT, whose decision, in this regard, is final and binding on both the parties to the contract.

3.18.3 Conciliation:

In case any dispute is not resolved amicably as provided in **Clause 3.18.1**, the Contractor may agree to refer the matter to conciliation & settlement Committee established by the Employer. The procedure for reconciliation and settlement shall be followed as per the guidelines issued by the Ministry of Ports, Shipping and Waterways (Conciliation and Settlement Guidelines).

3.18.4 Arbitration:

If an amicable settlement is not forthcoming, the Dispute shall be referred to the Society for Affordable Redressal of Disputes - Ports (hereinafter called as SAROD - Ports). The dispute shall be dealt with in terms of Rules of SAROD - Ports. The detailed procedure for conducting Arbitration shall be governed by the Rules of SAROD - Ports and provisions of Arbitration & Conciliation Act, 1996, as amended from time to time. The Dispute shall be governed by Substantive Law of India.

3.19 OTHER CONDITIONS:

3.19.1 Extras:

Any extra expenses incurred in connection to the Works by the Employer in the performance of the Works 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 Contract or from any amount lying with them or under their control or he 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 him in such manner as the Employer may determine.

3.19.2 Use of Ground:

On completion of Works or termination of his contract, he shall clear away all his tools, plant, rubbish, and other materials within a fortnight and handover and peaceful possession of the same to the Employer in a tidy and clean condition.

3.19.3 Use of Completed Portions:

3.19.3.1 Whenever in the opinion of the Employer the work or any part thereof is in a condition suitable for use and in the best interest of the Employer requires the use, the Employer may take possession of the same. The Contractor shall, however, be not relieved of his pending obligations.

3.19.3.2 Prior to the date of final acceptance of the work by the Employer, all necessary repairs or renewals in work or part thereof so used on account of defective materials or workmanship or due to the operation's failure except normal wear & tear shall be at the expenses of the Contractor.

3.19.3.3 Such use shall neither relieve the Contractor or any of his responsibilities under the contract nor act as a waiver by the Employer of the conditions thereof. However, if, in the opinion of the Employer, the use of the work or the part thereof delays the completion of the remainder of the work, the Employer may grant such extensions of time, as it may consider reasonable.

3.19.3.4 The decision of the Employer in the matter shall be final. The Contractor shall not be entitled to claim any compensation on account of such use by the Employer.

3.19.4 Employer's Lien:

Employer shall have a lien on 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.

3.19.5 Bribes and Commission:

Any bribe, commission, gift or advantage given, promised or offered by or on behalf of the Contractor or his or their behalf to any officer, servant, representative or agent of the Engineer or to any person on his behalf in relation to the obtaining or to be execution of this or any other contract with the Employer shall in addition to any criminal liability which he

may incur subject the contractor to the cancellation of this and all other contracts with the Employer and also to the payment of any loss or damage resulting from any such cancellation, and the Employer shall be entitled to deduct the amounts so payable from any money otherwise due to the contractor under this or any other contract. Any question or disputes as to the commission of any offence under the present clause shall be settled by the Engineer in such a manner and on such evidence or information as he shall think fit and consider sufficient and his decision shall be final and conclusive.

SECTION IV

SPECIAL CONDITIONS OF CONTRACT

4.1 Commencement of Work: (Superseding Clause No.3.7.1 of GCC)

The work shall commence within 15 days of the issuance of the Letter of Acceptance / Work Order. If no notification received from the Contractor regarding commencement date, then 16th date from issuance of Letter of Acceptance / Work Order shall be treated as date of commencement. Initially LOA shall be issued for the BOQ Sl. No. 1 to 11 and after completion of work, work order shall be issued for the Comprehensive O&M for a period of three years. The Contractor shall proceed with the Works with due expedition and without delay. Commencement of work is subject to compliance with all the conditions precedent as mentioned at **Clause No. 2.26 and 2.28.1 of ITB (Section-II)**. The stipulated deadlines mentioned at **Clause No. 2.26 and 2.28.1 of ITB (Section-II)** would have to be strictly adhered to unless otherwise extended by Employer.

4.2 Time of completion/period of contract (May be read in conjunction with Clause No.3.7.2 of GCC)

The period of the execution of work “Design, Supply, installation, Testing, and commissioning of Museum Galleries for Tamil Nadu Maritime Heritage Museum at VOCPA” is 3 (Three) months from the date of commencement of Contract.

Comprehensive Guarantee - 2 years from successful commissioning and acceptance of the facilities.

Comprehensive O&M- Three years after completion of comprehensive Guarantee period.

4.3 Time Schedule/ Bar Chart:

The Contractor shall submit the bar chart in accordance with **Clause No.3.7.3 of GCC**.

4.4 Liquidated Damage: (May be read in conjunction with Clause No.3.7.5 of GCC)

In case of delay in completion of the contract excluding Comprehensive O&M period, liquidated damages @ one percent (1%) of the contract value excluding Comprehensive O&M period (as per BOQ) per week of delay subject to a maximum of ten percent (10%) of contract value excluding CAMC should be levied. Such liquidated damages will be deducted from any money due or become due to the contractor. The payment of such damages shall not relieve the contractor of his obligations to complete the work or from any other of his obligations or liabilities under this contract.

Penalty during Warranty period and CO&M period: During warranty period from date of acceptance the following clause will be applicable. The contractors shall ensure the Museum (all zones) is ready for visitors at the scheduled visitors time stipulated by the Port, at 100%. In case of any shortfall due to their (contractor) account (except preventive maintenance duration), the cost of CAMC charges for the shortfall period will not be paid by the Port and for 1% shortfall period, a penalty of 1% CAMC charges for the particular Quarter CAMC period shall be deducted in the bill or any money due to the contractor, subject to the maximum 10% of particular Quarter CAMC period charges. If the Shift technicians are not deployed, the equi-proportionate rate per man day will be worked out as per following formula. Equi-proportionate rate (per day per man power) = $\frac{\text{Annual maintenance cost} \times 70\%}{12 \text{ Months} \times 30 \text{ days} \times \text{Number of man power deployed}}$. The equi proportionate rate arrived as above and 10% of equi proportionate rate will be deducted as penalty from the

contractor's bill. The cost of first year CO &M period is considered for calculating the LD during the warranty period.

4.5 Inspection, Test & Acceptance: (in conjunction with Clause No. 3.6.3, 3.8 and 3.9)

Third party agency (TPA): The TPA shall be appointed by the contractor at his cost, who has atleast carried out 2 Nos of museum work. The TPA shall provide the following services, but not limited to

1. Reviewing and approval of design, drawings, data sheets and documents submitted by the contractor as per the relevant standards, statutory and bid requirements, in co-ordination with VOCPA.
2. Compile all relevant data, reports, and documentation throughout the project.
3. Assistance and review of works, safety, data authentication, and approvals(if any).
4. Preparation of a checklist and comprehensive review plan and Monitoring, Reviewing, inspecting, Validating, Co-ordinating with stakeholders, QC, Ensuring timely completion
5. Co-ordination with stakeholders, executing agency, VOCPA, statutory/regulatory agencies, (if any) etc
6. Any other activities as envisaged by the VOCPA
7. The TPA while inspecting, shall adhere to the requirements of the relevant standards meant for the execution. While offering its views/recommendations, the standards referred to must be mentioned by the TPA. In case there is no specific standard available, the same may be clearly mentioned and proper justification in support of recommendation should be recorded in the report. The contractor has to submit one set of the standard documents of relevant standards referred/ mentioned in the contractual document for reference.
8. The TPA shall depute concerned Engineer(s)/Expert (s) continuously/intermittently for smooth execution and quality checking as per project requirements
9. The responsibility of the TPA shall, inter alia, to ensure and certify that the work is being executed as per the relevant standards as given in the approved QAP.
10. On completion, permit the contractor to commission the project. Consultant shall check, validate, the material, works, equipment, procedures and clearances & required approvals and recommend with a detailed report for the acceptance of the Project by VOCPA. TPA shall provide the SOP including preventive, breakdown maintenance and operation during the warranty and Comprehensive Operation and Maintenance (CO & M) period.

Each part of the work includes the following and same will be appraised to Third Party Agency (TPA) and VOCPA with relevant documents, drawings, presentation, etc. Based on the relevant standards and inputs from VOCPA, the TPA shall approve each items with reference to the tender terms, standards applicable, data authentication, objective of museum, etc.

- i. Layout plan
- ii. Design and drawing
- iii. Data sheets
- iv. Civil structure, civil and mechanical work details, Electrical, Electronic equipment & Instrumentation and integration with each part.
- v. Interconnection of each part connected with main control room with suitable and required accessories.

After the installation/trials are completed satisfactorily at VOCPA premises which alone shall be the proof of acceptance of the materials / equipment, models , etc. If the appearance / performance of the Models/ materials / equipments are not satisfactory, the same are to be readjusted, replaced or changed as per the directions of Engineer and his decision alone shall be final and binding. The representative of successful bidder and TPA representative shall be present during the test, commissioning and acceptance. On successful completion of all the works, VOCPA will issue an acceptance certificate based on the recommendation of the TPA.

4.6 Defect Liability /Warranty: (Superseding Clause No.3.10)

The contractor guarantee for trouble free working of the equipment in Museum for Two year from the date of acceptance shall be furnished. For this purpose, two year shall mean twenty four calendar months during which the Museum shall remain in commission and will not include period or periods during which the equipment shall be out of commission due to defective materials, bad workmanship etc., covered by the manufacturer's guarantee.

- 4.7** Hot work during maintenance period is subject to adhering to safety measures prescribed by Fire Section/ Safety office Department.
- 4.8** Contractor's Office: The buildings should not be used for residential purposes. The contractors shall at their own cost and expense shall arrange for watch and ward security at the above location.
- 4.9** No cooking shall be permitted inside the work spot. No alcoholic drinks will be permitted inside the work spot and no personnel with alcoholic influence will be permitted to enter into the work spot. The contractor shall ensure that the personnel employed for this work do not smoke inside the Port area.
- 4.10** Statutory requirement as per Labour Department and Dock Safety Inspectorate as per regulation should be adhered by the Contractor.
- 4.11** All safety precautions shall be strictly adhered to.
- 4.12** The contractor and their employees should be complied with Quality Management (ISO 9001:2015, EMS ISO 14001:2015 and OHASAS 18001:2007) Electricity Act, Dock Safety regulations.
- 4.13** The contractor shall allow his labourers for the government notified national and local festival holiday and such closed holidays for the Port declared by the employer and also have due regard to local religious and social customs in respect of labourers employed by him. However based on the essential requirement, the contractor may deploy the manpower as per applicable rules and norms.
- 4.14** The Contractor shall be responsible for any accident, damage or injury caused to any of his employees during the execution of this work and shall hold the VOCPA blameless in respect thereof and also in respect of any reason whatsoever.
- 4.15** The Contractor shall be solely responsible for reporting to the Port Authority and Police Department immediately of any serious or fatal accidents inside the Harbour premises to any of his employees/workmen engaged by him.
- 4.16** The contractor shall deploy disciplined work force. If any the person (s) noticed for malpractice/ disobedience / noncompliance of work, the contractor is responsible for the

misbehavior and the concerned will not be entertained inside VOCPA further. The damage / loss caused shall be rectified by the contractor.

- 4.17 The staff provided by the contractor are in case found to be indulging in any undesirable or unfair activities in the premises of the office, the contractor will solely be responsible for all the consequences apart from the liberty of office to lodge complaints before appropriate authorities.
- 4.18 The contractor shall furnish contact telephone number, Mobile number & contact address of representative of contractor.
- 4.19 Unauthorized person belonging to the contractor are not allowed to enter port premises.
- 4.20 Accidents: Any accidents including death caused to the contractor or workers during course of execution of work or elsewhere will be taken care by the contractor(s) themselves and Port is no way responsible for the same. The port is not responsible for any loss of life or damage or theft of materials. All the materials should be kept in the safe custody of the Contractor.
- 4.21 The contractor shall supply the PPEs (safety helmet, Gloves, shoes, reflecting jackets, diversion boards, etc) to the workers for carrying out maintenance works in safe manner.
- 4.22 The contractor shall pay the monthly salary to the technicians before 7th day of every month.
- 4.23 Any manpower shall apply leave, the contractor is requested to deploy a fresh manpower as required.
- 4.24 The contractor is required to pay bonus as per the Bonus act to the manpower deployed and the same shall be reimbursed at actual by the Port upon submission of proof of payment to the provided manpower.
- 4.25 The contractor shall furnish the valid labour license under contract labour (Regulation and abolition) Act 1970 within 30 days from the date of work order and comply with all necessary required provisions of the above act as amended and rules /orders framed there under from time to time and shall hold valid license throughout the contract period.
- 4.26 The contractor shall be responsible for disputes that may arise between the contractor and the manpower contractor and its amicable solutions.
- 4.27 STAFF: The staff engaged for by the contractor shall be given periodical safety training and periodical medical check-up by the contractor (once in a year) to comply with IDLR requirement. Electrician/Supervisor working in electrical accessories shall be qualified as per the requirement of electricity act.
- 4.28 If any damages happened to the port properties during the contract period, the contractor shall rectify the damage at his cost, failing which the actual charges towards rectification will be re-covered from the contractor along with departmental supervision cost.
- 4.29 **PAYMENT:- (May be read in conjunction with clause no.3.13 of GCC)**

Delivery & Commissioning

1. 10% payment excluding Comprehensive O&M charges for three years i.e BOQ Sl. No. 1 to 11, on signing of the agreement and submission of the performance security deposit including

approval of Museum design with drawings if any.

2. 50 % payment on Delivery of materials. The contractor shall submit the billing breakup unit (BBU) after signing of the agreement. The BBU will be vetted by TPA and approved by VOCPA.
3. The balance 40% payment excluding Comprehensive O&M charges i.e BOQ Sl. No. 1 to 11, for three years will be made on supply, installation, testing and commissioning of all system, completion of all works and acceptance by Port. The bill / invoice shall be submitted by the contractor on acceptance of Port.

Delivery & Commissioning

On issue of work order for the Comprehensive O&M charges BOQ Sl. No. 12 to 14. The payment shall be released quarterly on successful completion of works carried out in the O&M period.

4.30 QCBS evaluation criteria : (May be read in conjunction with clause no.2.8 of ITB)

Sl. No.	Evaluation parameters	Marks for each Criteria	Maximum Marks
Experience in Eligible Assignment			
1	The bidder shall have No. of years of experience in the field of executing similar work. The bidder shall submit the old, intermittent and recent as a proof of indicating the no. of years of experience in the field. The order date will be considered for the count of year of experience	3 Years – 5 Marks 5 years - 7 Marks 7 Years – 10 Marks	10
2	The Bidder shall have successfully completed during the last seven years having at-least One similar work costing not less than the amount equal to 80 (eighty) percent of the estimated cost OR Two similar works costing not less than the amount equal to 50 (fifty) percent of the estimated cost OR Three similar works costing not less than the amount equal to 40 (forty) percent of the estimated cost in Government Organization/State govt./ Autonomous body/ Public sector unit in India in last 07 years. For establishing their experience, the bidders shall produce authentic and valid proof i.e., WO/LOI, agreement and CC and other relevant documents. V.O.	As per similar work, Additional eligible project of 80% of total project cost – 10 Marks each (Subject to a maximum score up to 20 Marks) OR Additional eligible projects of 50% of total project cost – 5 Marks each (Subject to a maximum score up to 20 Marks) OR Additional eligible project of 40% of total project cost – 3.33 Marks each (Subject to a maximum score up to 20 Marks)	20

Sl. No.	Evaluation parameters	Marks for each Criteria	Maximum Marks
	CHIDAMBARANAR PORT AUTHORITY may, at its own discretion, verify the veracity and validity of the work orders and certificates produced by the Bidder. Similar work as indicated in 1.4 of NIT		
3	The bidder shall have experience in the relevant sector : relevant sector means Cultural and heritage sector. The bidder shall submit the work order and completion certificate or relevant documents as a proof of indicating the experience in the sector.	2 works – 6 Marks 3 works - 8 Marks 4 works – 10 Marks	10
4	The bidder shall have experience in the region: Region means Southern region. The bidder shall submit the work order and completion certificate or relevant documents as a proof of indicating the experience in any category.	2 works – 6 Marks 3 works - 8 Marks 4 works – 10 Marks	10
Financial Capacity			
2	Overall financial strength of the consultant in terms of turnover, profitability and cash flow (liquid assets) situation	Turnover figure for Last three Years more than 3 Crores – 7.5 Marks Net Profit Figure for Last three years more than 1 Crore – 7.5 Marks	15
4	Team composition for this project. Team members shall be available during the entire course of the project. The team member shall visit the site as per site requirement and during the critical works. The bidder shall provide the self-attested biodata/resume of the team member, countersigned by the bidder's representative.	One Architect with at least 5 years of experience in relevant field: 3 mark One Mechanical/ Electrical/ Electronics Engineer with at least 5 years of experience in relevant field: 3 mark One Civil Engineer with at least 5 Years of experience in relevant field: 3 mark One Script Writer with at least 5 Years experience in relevant field: 3 mark One VO Artist with at least 5 Years experience in relevant field: 3 mark	15
5	The Bidder is required to prepare a concept report and submit it along with the technical Bid with designs and make a presentation before the Technical Evaluation Committee	Understanding the project and Execution methodology: Layout Drawings: Concept Design:	20

Sl. No.	Evaluation parameters	Marks for each Criteria	Maximum Marks
	on the drawing, design, visual & sound effects including technical specification, brand of materials etc. to be used. (Presentation)	Proposed Walkthrough package /animation.	
TOTAL			100
Note: The bids satisfying the prequalification criteria as Mentioned in NIT and scoring Min. Technical score of 50 Marks out of 100marks will be considered for prequalification and technical responsiveness.			

NB:-

- The bidder shall furnish all the works experience as mentioned above shall be submitted in the work experience format indicating each category with clause No. and certify that these are the only works submitted for prequalification and QCBS.
- The Authority shall select the Bidder through QCBS process.
- Eligibility and pre-qualification of the Bidder will be first examined based on the details submitted under Technical Bid with respect to eligibility and qualifications criteria prescribed in this NIT.
- After prequalification, Technical score shall be evaluated based on parameters specified in the tender document. Only those Bidders whose Technical Bids are responsive, fulfils the Minimum scores a minimum 50 marks out of 100 in Technical Bid as mentioned above, hereof (the “Qualified Bidders) shall be entitled to opening of their Financial Bid subject to and in accordance with provisions set out under this TD. Financial Bid will include the total cost required for execution of the Project, and the Bidder quoting the lowest cost will get the maximum financial score of 100. The Bidder should quote a lumpsum price for each item for the implementation of the Project and it shall not be as a percentage of the overall project cost. Financial scores of other Bidders shall be given in proportionately. 70% weightage shall be assigned to technical score and 30% weightage shall be assigned to the financial score.
- Total score shall be calculated as:

$$\text{Total Score} = 70\% \times \text{Technical Score} + 30\% \times \text{Financial Score}$$
Whereas,

$$\text{financial Score} = 100 \times (\text{Lowest Financial Bid} / \text{Financial Bid})$$
- The Project will be awarded to the Bidder with highest Total Score (H1) (hereinafter referred to as “**Selected Bidder**”). However, Port reserves the right to award the contract.
- Bidders are advised that Selection shall be entirely at the discretion of the Authority. Bidders shall be deemed to have understood and agreed that the Authority shall not be required to provide any explanation or justification in respect of any aspect of the Selection Process or Selection.
- Any information contained in the Proposal shall not in any way be construed as binding on the Authority, its agents, successors or assigns, but shall be binding against the Bidder if the Work is subsequently awarded to it.
- Intending Bidders are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their bids as to the nature of the building/monuments (so far as is

practicable), the form and nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their bid. A Bidder shall be deemed to have full knowledge of the site, whether he inspects it or not and no extra charge consequent on any misunderstanding or otherwise shall be allowed. The bidders shall be responsible for arranging and maintaining at their own cost all materials, tools & plants, water, electricity access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a bid by a bidder implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and rates at which stores, tools and plant, etc. will be issued to him by the Government and local conditions and other factors having a bearing on the execution of the work.

- The Authority does not bind itself to accept the highest score bid or any other bid and reserves to itself the authority to reject any or all the bids received without assigning any reason. All bids in which any of the prescribed condition is not fulfilled or any condition including that of conditional rebate is put forth by the bidder shall be summarily rejected.
- **The presentation and commitments provided by the bidder shall be a part of bid document and the bidder shall fulfill the commitments during the execution with the approval.**

SECTION-V & SECTION -VI

TECHNICAL SPECIFICATIONS & SCOPE OF WORK

1. **PART-1: SANGAM AGE DURING AND POST**

1.1 **Model/ Replica Boat**

Boat Replica Models (Sangam Age – During & Post) with Ramp

1. General Description

The work involves the **supply, fabrication, installation, testing, and commissioning of Boat Replica Models (Sangam Age – During & Post) including ramp**, within a designated space of approx. **7000 mm × 3000 mm**. The replica shall be constructed using **FRP (Fiberglass Reinforced Plastic)** with **MS structural frame reinforcement**, and finished in **PU-based wooden finish paint** to ensure durability, authenticity, and aesthetic appeal.

2. Scope of Work

The scope shall cover but not be limited to the following:

- Preparation of **design validation drawings** for the replica.
- **Fabrication in FRP** with MS reinforcement, ensuring structural stability.
- **Seamless, groove-less construction** to achieve a monolithic look.
- **Ramp structure** fabrication with appropriate load-bearing capacity.
- Integration of **wood/engineered wood detailing** for authenticity.
- **Surface finishing** with UV-resistant, weather-protected PU wooden finish.
- **Electrical works** including LED lighting, concealed wiring, drivers, and earthing.
- Supply of all **fixtures, fittings, anchors, adhesives, hardware** required for installation.
- **Installation, alignment, testing, and commissioning** at site.

3. Technical Specification

- **FRP Material:** High-strength FRP (minimum 3 mm thickness, multi-layered layup), UV and weather resistant.
- **MS Structural Frame:** Conforming to IS 2062 / ASTM A36, treated with epoxy primer & anti-corrosive paint.
- **Paint Finish:** PU wooden finish (minimum 3-coat system) conforming to IS 14209/IS 13213
- **Ramp:** Designed for minimum 2 kN/m² live load as per IS 875.
- **Electrical Works:**
 - LED luminaires (low-heat, energy-efficient, min. 50,000 hrs life).
 - FRLS (Fire Retardant Low Smoke) cables conforming to IS 694 / IEC 60227.
 - Proper earthing as per IS 3043.

- **Fixing & Hardware:** SS-304/316 anchors, bolts, adhesives of structural grade.
- **Durability:** Resistance against weather, termites, corrosion, and wear.

4. Execution Methodology

1. **Design & Approval:** Preparation of shop drawings, mock-ups, and approval by Engineer-in-Charge.
2. **Fabrication:** Controlled workshop fabrication of FRP & MS frame.
3. **Surface Treatment:** Epoxy primer on MS, PU coating on FRP for durability.
4. **Installation:** Site delivery, anchoring, alignment, and secure fitting.
5. **Electrical Integration:** Concealed wiring, fixing of drivers & luminaires.
6. **Finishing:** Seamless surface finishing, groove-less joints.
7. **Testing & Commissioning:** Full load tests, lighting checks, stability & safety verification.

5. Testing & Quality Assurance

- FRP tensile, flexural, and impact strength tests as per ASTM D638 / IS 10192.
- Weld inspection of MS frame as per IS 9595.
- Paint adhesion, thickness & gloss tests as per IS 101.
- Electrical continuity, insulation resistance, and earthing tests as per IS 732.
- Dimensional checks, alignment, and finish inspection jointly with client.

6. Codes and Standard Compliance

All works shall comply with the latest editions of relevant codes/standards, including but not limited to:

- **FRP Materials:** ASTM D790 / IS 10192
- **Structural Steel:** IS 2062 / ASTM A36
- **Welding:** IS 9595
- **Paint & Coatings:** IS 14209/IS13213: IS 15489/IS9197
- **Electrical Installations:** IS 732, IS 3043, IEC 60364
- **Fire Safety** IS 1644/ IS 1648
- **General Workmanship:** CPWD / International best practices

7. Scope of Deliverables

- Complete **boat replica model** with ramp, fabricated, installed, and commissioned.
- **All drawings, documentation, and test certificates.**
- **Operation & Maintenance Manual (O&M)** including cleaning, upkeep, and repair guidelines.
- As-built drawings and warranty certificates.

8. Comprehensive Guarantee-Two years

- Comprehensive warranty for **2 years** from the date of commissioning covering materials, workmanship, finishing, and electrical components.
- Free rectification/replacement of any defects during warranty period.

9. Post-Warranty Services

- Availability of **spare parts, repair kits, and service engineers** for long-term upkeep.
- Response time for service calls not exceeding **72 hours**

1.2 Display / Showcase

Free-Standing Floor-Mounted Museum Showcase

1. General Description

The work includes **supply, fabrication, installation, testing, and commissioning** of a **free-standing, floor-mounted museum showcase** of size **1200 mm (L) × 600 mm (W) × 1500 mm (H)**, designed for the secure display and long-term conservation of archaeological artifacts. The showcase shall be designed with robust structure, precision glazing, controlled lighting, and integrated safety/security mechanisms to meet museum-grade standards.

2. Scope of Work

The scope shall include but not be limited to:

- Design validation and preparation of shop drawings.
- Fabrication of **metal pedestal/base with anti-corrosion finish** in approved color.
- Supply and installation of **6 mm toughened clear glass panels** on all visible sides with seamless joints.
- Integration of **museum-grade concealed LED lighting system** ($\text{CRI} \geq 90$, CCT 3000–3500 K, anti-UV, low-heat, dimmable).
- Concealed wiring and drivers integrated into the pedestal.
- Provision of **fixtures, fittings, locks, and security hardware** for artifact protection.
- Electrical & mechanical works, earthing, and safety mechanisms.
- Testing, commissioning, and handing over of the complete functional unit.

3. Technical Specifications

a) Base / Pedestal

- Material: Powder-coated metal with corrosion-resistant treatment (minimum 80 microns coating).
- Finish: Smooth, approved shade, scratch-resistant.

b) Glazing

- 6 mm thick toughened safety glass, optically clear, distortion-free.
- High transparency ($\geq 90\%$ light transmission).
- Precision edge polishing with silicone/UV-bonded joints.
- Secure mechanical fixing, tamper-proof.

c) Lighting

- Integrated, concealed **LED system** with:
 - $\text{CRI} \geq 90$, CCT 3000–3500 K (warm white).
 - Anti-UV filters, $< 75 \mu\text{W}/\text{lm}$ UV output.
 - Low-heat dissipation to protect artifacts.
 - Dimmable electronic drivers.

d) Hardware & Security

- Concealed hinges, locks (cam-lock or equivalent museum-grade system).
- Seamless fixing with vibration-free stability.
- Provision for bolting to floor, if required.

e) Electrical & Mechanical

- Fire retardant low smoke (FRLS) wiring conforming to IS 694 / IEC 60227.
- Proper earthing as per IS 3043.
- Concealed drivers with adequate ventilation.

4. Execution Methodology

1. **Design Approval:** Shop drawings, material samples, finish samples for approval.
2. **Fabrication:** Controlled workshop fabrication of pedestal and glazing components.
3. **Assembly:** Glass panels joined with precision bonding and secure fixing.
4. **Lighting Integration:** Concealed wiring and LED installation.
5. **On-site Installation:** Anchoring, alignment, final finishing.
6. **Testing & Commissioning:** Electrical safety, illumination checks, and security lock tests.

5. Testing & Quality Assurance

- Glass testing as per IS 2553 (toughened safety glass).
- Paint coating test for thickness & adhesion (IS 101).
- Illumination uniformity and CRI verification (lux meter test).
- Electrical insulation resistance & continuity tests (IS 732).
- Security hardware function testing (lock & stability check).

6. Codes & Standard Compliance

- **Glass:** IS 2553 / EN 12150 (Safety glass).
- **Metal Finishing:** ISO 9227 (corrosion resistance).
- **Electrical Works:** IS 732, IS 3043, IEC 60598.
- **Lighting:** CIE standards for museum lighting, IESNA RP-30.
- **General Workmanship:** CPWD specifications / international museum standards.

7. Scope of Deliverables

- Complete museum showcase with pedestal, glazing, lighting, wiring, locks, and accessories.
- Operation & Maintenance (O&M) manuals with cleaning and artifact safety guidelines.
- As-built drawings, warranty certificates, and test reports.

8. Comprehensive Guarantee-Two years

- Comprehensive warranty for **2 years** covering structure, glazing, lighting, locks, wiring, and workmanship.
- Free rectification/replacement of defects during warranty period.

9. Post-Warranty Services

- Availability of spares (drivers, LEDs, locks, glass panels) for minimum 10 years.
- Service response within **72 hours** of complaint.

1.3 Display

13" Full HD Interactive Professional-Grade Display

1. General Description

The work includes the **supply, installation, integration, testing, and commissioning** of a **13" Full HD (1920 × 1080) professional-grade interactive display** with **10-point multi-touch functionality**. The unit shall be compact, slim in design, space-efficient, and user-friendly, with high reliability for continuous professional/museum/exhibition usage.

2. Scope of Work

The scope shall include but not be limited to:

- Supply of the display unit with inbuilt processor.
- Installation with mounting (wall, stand, or embedded as per site requirement).
- Integration with existing AV/IT systems.
- Provision of all **cables, adaptors, drivers, and accessories**.
- Testing, commissioning, and demonstration for client approval.
- Handover with user manuals and training.

3. Technical Specifications

a) Display

- Screen Size: **13" Full HD (1920 × 1080)**.
- Brightness: **≥ 250 nits**, with anti-glare panel.
- Viewing Angle: Wide angle (≥ 170° horizontal/vertical).
- Aspect Ratio: 16:9.

b) Touch Technology

- Capacitive type, **10-point multi-touch**.
- High responsiveness with < 10 ms response time.
- Scratch-resistant, durable surface (≥ 7H hardness).

c) Processor & Performance

- Inbuilt **Cortex A72 Quad-Core CPU, 1.7 GHz** or higher.
- Minimum 4 GB RAM and 32 GB internal storage (expandable).
- GPU optimized for interactive multimedia performance.

d) Connectivity

- **Wireless:** Wi-Fi (802.11ac), Bluetooth 5.0 or higher.
- **Wired:** LAN (RJ-45), HDMI (in/out), USB 3.0, Audio out.
- Plug-and-play integration with standard OS (Windows, Android, Linux).

e) Design & Build

- Compact, slim profile with concealed cabling option.
- Provision for **wall/stand/embedded mounting**.
- Professional-grade durability for 24/7 operation.

f) Accessories

- All necessary **power adaptors, HDMI/USB cables, mounting hardware, fixtures, and fittings.**

4. Execution Methodology

1. **Pre-installation:** Site survey, mounting provision, and cable routing.
2. **Installation:** Secure mounting, cable management, and integration.
3. **Configuration:** Setup of connectivity (LAN/Wi-Fi/Bluetooth) and calibration of touch.
4. **Testing & Commissioning:** Verification of display resolution, brightness, touch accuracy, connectivity, and performance.
5. **Handover:** User training, O&M manual, and documentation.

5. Testing & Quality Assurance

- Display resolution and brightness verification (FHD, ≥ 250 nits).
- Touch calibration and responsiveness test.
- Connectivity test (Wi-Fi, LAN, USB, HDMI, Bluetooth).
- Continuous run test (minimum 24 hours non-stop).
- Electrical safety and insulation checks (as per IS 732).

6. Codes & Standards Compliance

- **Safety & EMC:** CE / FCC / BIS certification.
- **Touch Performance:** ISO 9241-9 (ergonomic requirements for touch).
- **Electrical Safety:** IS 13252 (Part 1) / IEC. 62368
- **EMI/EMC:** IEC 61000.
- **RoHS:** Restriction of Hazardous Substances compliance.

7. Scope of Deliverables

- Fully installed **13” interactive display** with mounting.
- All accessories (cables, adaptors, fittings).
- User manuals, as-built documentation, and test certificates.
- Training for client/operator staff.

8. Comprehensive Guarantee-Two years

- Comprehensive onsite warranty for **2 years** covering display panel, touch system, processor, and accessories.
- Free replacement/repair of defective components during warranty period.

9. Post-Warranty Services

- Guaranteed availability of spares for **minimum 5 years.**
- Technical support response time ≤ 72 hours.

1.4 Mini PC

Mini PC (Intel i7 or Equivalent) – Supply, Installation, Testing & Commissioning

1. General Description

The work includes the **supply, installation, testing, and commissioning** of a **compact mini PC system** suitable for professional, continuous operation in museum/exhibition/AV environments. The unit shall be of a compact **Mini PC form factor (Intel NUC or equivalent)** with high performance, licensed operating system, and required accessories for ready-to-use functionality.

2. Scope of Work

- Supply of **Mini PC** meeting the specified configuration.
- Installation, integration with display/AV systems.
- Supply of all **cables, connectors, and adaptors** for functional setup.
- Provision of **wireless keyboard & mouse**.
- Testing, commissioning, and demonstration of performance.
- Delivery of **O&M manual, drivers, and licenses**.

3. Technical Specifications

a) Processor

- Intel **Core i7 (latest generation)** or higher equivalent.
- Base frequency ≥ 2.8 GHz, Turbo ≥ 4.5 GHz.
- Minimum 8 cores, 12 threads.

b) Memory (RAM)

- 16 GB **DDR4**, expandable to 32 GB or higher.

c) Storage

- 1 TB **SSD (NVMe preferred)**.
- Minimum 3000 MB/s read speed.

d) Operating System

- **Windows 11 Pro 64-bit**, genuine and licensed.

e) Connectivity

- HDMI, DisplayPort (if available), USB 3.1/3.2, USB-C/Thunderbolt.
- Wi-Fi 6 and Bluetooth 5.0 or higher.
- LAN (RJ-45, Gigabit).

f) Accessories

- Wireless **keyboard & mouse set**.
- HDMI cable (2 m or as required).
- Power adaptors and all necessary connectors.

g) Form Factor

- Compact **Mini PC design**, Intel NUC or equivalent, with VESA mounting option.
- Low-noise, energy-efficient operation.

h) Approved Makes

- **Intel / Dell / HP / ASUS** (or equivalent internationally reputed brand).

4. Execution Methodology

1. **Pre-installation:** Verification of site requirements and power supply.
2. **Installation:** Placement, secure cabling, and system setup.
3. **Configuration:** OS installation (if required), driver updates, connectivity check.
4. **Testing:** Benchmarking for processor, storage, and RAM performance.
5. **Commissioning:** Integration with displays/AV systems and client demonstration.

5. Testing & Quality Assurance

- OS activation with license verification.
- Storage speed test using standard benchmark tools.
- RAM and CPU stress testing for minimum 2 hours.
- Connectivity test (HDMI, USB, LAN, Wi-Fi, Bluetooth).
- Electrical safety and grounding compliance (IS 732).

6. Codes & Standards Compliance

- **Safety & EMC:** CE, FCC, BIS certification.
- **RoHS** compliance.
- **Energy Efficiency:** ENERGY STAR 8.0 or equivalent.
- **Electrical Safety:** IS 13252 (Part 1) / IEC 62368

7. Scope of Deliverables

- Fully installed and configured **Mini PC with accessories**.
- Original licensed software and recovery media (if applicable).
- User manual, warranty documents, and test certificates.
- As-built documentation.

8. Comprehensive Guarantee-Two years

- Comprehensive onsite warranty for **2 years** covering processor, RAM, SSD, OS license, and accessories.
- Free replacement/repair of defective components during warranty.

9. Post-Warranty Services

- Guaranteed spare part availability for **minimum 5 years**.
- Technical support response within **72 hours**.

1.5 Interactive Kit for Interaction

Gesture-Based Interactive Installation

1. General Description

The work includes the **supply, installation, testing, and commissioning** of a **gesture-based interactive installation**, where digital content is triggered and controlled by visitor hand movement/gestures. The system shall deliver an intuitive, immersive, and user-friendly experience with seamless integration of hardware, software, and content.

2. Scope of Work

- Supply and installation of **motion/gesture sensors** (IR/Camera-based).
- Provision of **processing unit** (Mini PC with media player as required).
- Integration with **display interface** (existing/provided separately).
- Supply of **mounting hardware, cabling, adaptors, and power supplies**.
- Licensed **gesture-recognition software** enabling real-time interaction.
- **Calibration, content integration, and commissioning** for functional readiness.
- Demonstration, O&M documentation, and training.

3. Technical Specifications

a) Hardware

- **Gesture Sensors:** IR depth camera or equivalent, minimum 30 fps, tracking distance 0.5–4 m.
- **Processing Unit:** Mini PC with Intel i7 / 16 GB RAM / 1 TB SSD / Windows 11 Pro.
- **Media Player:** Integrated or external (supporting FHD/4K playback).
- **Connectivity:** HDMI, USB 3.0/3.1, LAN, Wi-Fi, Bluetooth.
- **Mounting:** Wall/ceiling/floor mount depending on site layout.
- **Power:** Stabilized power adaptors, cabling, surge protection.

b) Software

- Licensed **gesture-interactive software** with:
 - Reliable multi-gesture recognition.
 - Content triggering, scaling, and mapping.
 - Customizable UI/UX.
 - Low-latency real-time performance (< 50 ms).
 - Compatibility with Windows OS.

c) Functionality

- **Real-time gesture tracking** with smooth rendering.
- **Low-latency interaction** for seamless user experience.
- **Stable, continuous operation** for long hours (museum/exhibition environments).
- **Calibration tools** for quick setup and content alignment.

4. Execution Methodology

1. **Design Approval:** Submission of sensor placement drawings & integration plan.
2. **Hardware Setup:** Installation of sensors, processing unit, and mounting.
3. **Software Installation:** Setup of licensed gesture-interactive software.
4. **Integration:** Linking to display/media system, content execution.
5. **Calibration:** Fine-tuning of sensors for accurate gesture response.
6. **Testing & Commissioning:** Verification of gesture responsiveness, latency, and reliability.

5. Testing & Quality Assurance

- Gesture accuracy test with multiple users and conditions.
- Latency check (< 50 ms).
- 24-hour stability/run test.

- Electrical safety test as per IS 732.
- Content trigger and playback verification.

6. Codes & Standard Compliance

- **Safety & EMC:** CE / FCC / BIS.
- **Electrical Safety:** IS 13252 (Part 1) / IEC. 62368.
- **EMC/EMI:** IEC 61000.
- **RoHS** compliance.
- **Software License Compliance:** OEM-issued genuine license.

7. Scope of Deliverables

- Gesture sensors, processing unit, media player.
- Licensed interactive software.
- Mounting hardware, power adaptors, cabling.
- Content preloaded/executed as per requirement.
- User manuals, O&M documentation, and calibration guide.
- As-built drawings and test reports.

8. Comprehensive Guarantee-Two years

- Comprehensive warranty for **2 years** covering hardware, software license, and integration.
- Free rectification/replacement of defective components during warranty.

9. Post-Warranty Services

- Availability of spares (sensors, adaptors, cables) for **minimum 5 years**.
- Software updates and technical support.
- Service response time within **72 hours**.

1.6 Cable / Accessories

Projection and Control System

1. General Description

The work includes the **supply, installation, testing, and commissioning** of a **complete projection and centralized control system** comprising digital projectors, custom controller, networking infrastructure, cabling, and accessories. The system shall be professionally integrated to ensure **seamless, reliable, and user-friendly operation** in AV/IT environments such as museums, exhibitions, auditoriums, and interactive spaces.

2. Scope of Work

- Supply, installation, and integration of a **custom centralized controller** with AV/IT interfaces.
- Supply, installation, and commissioning of **professional-grade digital projectors** (FHD/4K), with suitable brightness (ANSI lumens as per site requirement).

- Supply and setup of **mounting hardware, projection lenses, and alignment accessories.**
- Networking infrastructure including **rack, patch panel, switches (managed/unmanaged as per design), and PDU.**
- Provision of **HDMI, LAN, power, and control cables with connectors, adaptors, and terminations.**
- Integration of controller, projectors, and network components for **synchronized and stable operation.**
- System calibration, testing, and handover with user manuals and training.

3. Technical Specifications

a) Custom Controller

- Centralized AV/IT control unit.
- Interfaces: HDMI, LAN, RS-232/RS-485, USB, audio in/out, IR control.
- Web-based GUI and/or touchscreen interface for user-friendly operation.
- Scheduling, automation, and remote monitoring capability.

b) Projection System

- Resolution: **Full HD (1920×1080) or 4K UHD (3840×2160).**
- Brightness: As per site requirement (minimum **6000 ANSI lumens** recommended for large-format projection).
- Contrast Ratio: $\geq 10,000:1$.
- Lens: Standard/short-throw/long-throw lenses as per design.
- Mounting: Ceiling/floor/stand mounts with alignment adjustments.
- Connectivity: HDMI, HDBaseT, LAN, RS-232.
- Operation: 24/7 professional-grade reliability.

c) Networking Infrastructure

- Rack: 19" network rack with power management.
- Patch Panel: CAT6 or higher.
- Switch: Managed/Unmanaged (Gigabit) as per design requirement.
- PDU: Rack-mounted power distribution unit.

d) Cables & Accessories

- **HDMI (high-speed, 4K compliant), CAT6 LAN cables, shielded power cables, control cables.**
- High-quality connectors, adaptors, and terminations.
- Cable management accessories (trays, conduits, raceways).

4. Execution Methodology

1. **Pre-installation:** Site survey, design validation, and cable routing plan.
2. **Installation:** Secure mounting of projectors, racks, and controllers.
3. **Integration:** Cabling, networking, and controller–projector interconnection.
4. **Calibration:** Alignment, brightness/contrast adjustments, and network configuration.
5. **Testing & Commissioning:** Functional test of projection, control, and automation.
6. **Handover:** Documentation, O&M manuals, and client training.

5. Testing & Quality Assurance

- Projection resolution and brightness verification.
- Control system responsiveness and automation testing.
- Network connectivity and stability tests.
- Electrical insulation, earthing, and safety checks as per IS 732.
- 24-hour continuous run stability test.

6. Codes & Standard Compliance

- **Projection System:** ISO 21118 (Projector brightness).
- **Electrical Safety:** IS 13252 (Part 1) / IEC 62368
- **Networking:** ANSI/TIA-568-C.2, ISO/IEC 11801.
- **EMC/EMI:** IEC 61000.
- **RoHS** compliance.

7. Scope of Deliverables

- Custom AV/IT controller with all interfaces.
- Digital projectors with required lenses & mounting.
- Networking rack, switches, patch panels, and PDU.
- All required cables, adaptors, connectors, and management accessories.
- As-built drawings, test certificates, and O&M manuals.
- Training for end-user personnel.

8. Comprehensive Guarantee-Two years

- Comprehensive onsite warranty for **2 years** covering projectors, controller, networking equipment, and accessories.
- Free replacement/repair of defective components within warranty period.

9. Post-Warranty Services

- Guaranteed spare part and firmware/software support for **minimum 7 years**.
- Service response time within **72 hours**.

1.7 Integration all Accessories (Mini Server to Main Server)

Power & Data Cabling Works for Projection & Technology Systems

1. General Description

The work includes the **supply, laying, testing, and commissioning** of all required electrical and data cabling for connecting power and signals from the Distribution Board (DB) to all digital projection and technology equipment. The scope covers **cables, conduits, junctions, termination, accessories, and system integration** to ensure a **fully functional and seamless setup**.

2. Scope of Work

- Supply and installation of **electrical power cabling** (FRLS/FRLSH copper) with conduits, trunking, and protective accessories.
- Supply and installation of **signal/data cabling** (HDMI, LAN, fibre optics if required, AV/IT cables with proper connectors).
- Termination, patching, and integration at **DB, junction boxes, equipment panels, and technology devices**.
- Supply of all **junction boxes, termination panels, patch cords, adaptors, connectors, and mounting hardware**.
- Cable routing through trays, conduits, or trunking for **neat, concealed, and protected installation**.
- Complete **integration, signal mapping, testing, and commissioning** to ensure smooth operation of connected systems.

3. Technical Specifications

a) Electrical Cabling

- Type: **FRLS/FRLSH copper conductor cables**.
- Size: As per load requirement (minimum 2.5 sq.mm for equipment power; higher sizes as per design load).
- Standards: IS 694 / IS 7098 / IEC 60228.
- Installation: In **PVC/HDPE conduits, GI trunking, or cable trays** with proper support.
- Protective Accessories: Circuit breakers, glands, lugs, ferrules, and identification tags.

b) Data/Signal Cabling

- HDMI: High-speed, 4K compliant, gold-plated connectors.
- LAN: CAT6 or higher, shielded/unshielded as per design.
- Fibre (if required): Single Mode/Multimode, terminated with LC/SC connectors.
- AV/IT Cables: As per OEM requirement for projection and interactive systems.
- Patch Panels: 19" rack-mountable with labeling.

c) Accessories & Termination

- Junction Boxes: Fire-retardant, dust-proof.
- Patch Cords: Factory-tested, certified.
- Termination Panels: For both electrical and data cables.
- Mounting Hardware: Brackets, clamps, saddles, supports.
- Cable Management: Conduits, trays, raceways, labels, ferrules.

4. Execution Methodology

1. **Pre-installation survey** for cable routing.
2. **Laying of conduits/trunking** with proper alignment and support.
3. **Pulling and dressing of cables** with tagging/labeling for identification.
4. **Termination at DB, junction boxes, patch panels, and equipment**.
5. **Integration and signal mapping** for correct connectivity.
6. **Testing & Commissioning** for continuity, insulation resistance, and data transfer performance.

5. Testing & Quality Assurance

- Electrical cables: Insulation Resistance Test, Polarity Test, Earth Continuity Test (as per IS 732).
- LAN: Fluke test for CAT6 performance.
- HDMI/Fibre: End-to-end connectivity and resolution test (Full HD/4K).
- Proper labeling and documentation of all cables and terminations.

6. Standards & Compliance

- **Electrical:** IS 732, IS 694, IEC 60228.
- **LAN Cabling:** ANSI/TIA-568-C.2, ISO/IEC 11801.
- **HDMI:** HDMI 2.0/2.1 compliance.
- **Fibre:** ISO/IEC 14763-3.
- **Safety:** IS 16406 (FRLS/FRLSH requirements), IEC 60332 (fire propagation).

7. Deliverables

- All electrical and data cabling with accessories.
- Junction boxes, patch panels, terminations, and patch cords.
- As-built cable routing diagrams and test certificates.
- Labeling of all circuits and data points.

8. Comprehensive Guarantee-Two years

- Comprehensive warranty on all supplied cabling, connectors, patch panels, and accessories.
- Free rectification of cable faults within the warranty period.

1.8 Content for Display

Content Research, Development & Production Services for Galleries

1. General Description

The work involves the **end-to-end development of interpretive content** for the galleries, including **research, scripting, translations, design, and media production**, to deliver a cohesive, authentic, and visitor-friendly narrative experience. The agency shall coordinate closely with **VOCPA (or their nominated representatives)** throughout the process to ensure historical accuracy, cultural sensitivity, and thematic alignment.

2. Scope of Work

a) Research & Framework

- Conduct in-depth **historical and thematic research** relevant to the gallery content.
- Develop **narrative frameworks, storylines, and timelines**, aligned with curatorial objectives.
- Curatorial discussions and validation with VOCPA representatives.

b) Content Creation

- Prepare **interpretive texts** for panels, captions, labels, and narratives.

- Write **scripts for audio-visuals, films, and interactives**.
- Ensure content is **visitor-centric, accessible, and engaging**.

c) Language Services

- **Translation** of all approved content into **Hindi, English, and Tamil**.
- **Proofreading and editing** by professional linguists to ensure accuracy and consistency.

d) Design & Visualization

- Create **infographics, maps, diagrams, and illustrations** to enhance interpretation.
- Develop **digital visualizations and interactive mock-ups** for content presentation.

e) Media Production

- Produce **short films, audio-visuals, animations, voiceovers, and digital interactive content**.
- All media to be **museum-grade quality** with licensed professional narration, music, and effects.

f) Integration & Formatting

- Deliver **final content packages** in both **print-ready and digital formats**.
- Content prepared for **integration with display panels, AV systems, and interactive technology**.

g) Approvals & Deliverables

- Submit **draft content** for review and approvals at each stage.
- Incorporate feedback and finalize all content.
- Deliver **master files (editable + final formats)** for all textual, graphic, and media content.

h) Rights & Licenses

- All content, media, and visuals to be **original and copyright-cleared**.
- Agency to provide **full transfer of rights, licenses, and clearances** to the client.

3. Execution Methodology

1. **Inception Meeting** with VOCPA for project orientation.
2. **Research & Draft Narrative** preparation with references and citations.
3. **Content Development** for text, graphics, and media in iterative stages.
4. **Stakeholder Review Workshops** for validation and approvals.
5. **Media Production & Formatting** in compliance with gallery specifications.
6. **Final Submission & Handover** of content package with documentation.

4. Testing & Quality Assurance

- Proofreading and language checks by certified linguists.
- Validation of **historical accuracy** through references and expert review.
- Compliance with **museum communication standards** (clarity, readability, accessibility).
- Trial integration of media content with target hardware/software.

5. Codes & Standard Compliance

- **UNESCO/ICOM museum communication guidelines** for interpretive content.

-
- **ISO 17100** for translation quality management.
 - **ISO/IEC 27001** for digital content handling & licensing.
 - **Broadcast/Media Standards** for AV production quality.

6. Deliverables

- Narrative framework, scripts, and content documentation.
- Text panels, captions, labels, and storylines in approved languages.
- Infographics, maps, diagrams, and illustrations in digital + print-ready formats.
- Audio-visual films, animations, and interactives with voiceovers.
- Final approved content in both **editable (source) and finalized formats**.
- Licensing documents, copyright clearance certificates, and transfer of rights.

7. Warranty & Post-Warranty Support

- **Warranty: 2 Years** – Free rectification of errors in content, translations, or formatting.
- **Post-Warranty Services:** Paid support for content updates, reformatting, and additional translations as required.

1.9 Software/ Application

Supplementary Technical Requirement – Functional Completeness

The contractor shall provide **all necessary technological equipment, software, applications, accessories, special effects, or any other mechanisms** required to ensure the **complete functionality and intended operation** of the system, installation, or exhibit.

This includes, but is not limited to:

- **Hardware components:** Sensors, controllers, displays, processing units, AV/IT devices, and interactive peripherals.
- **Software & Applications:** Licensed software, content management systems, interactive applications, drivers, and control interfaces.
- **Accessories & Cabling:** Power and data cables, adapters, connectors, mounting hardware, and protective components.
- **Special Effects / Mechanisms:** Lighting effects, projection mapping, actuators, haptic or motion feedback devices, and any additional mechanisms required to achieve the intended experience.
- **Integration & Commissioning:** Full integration of all components with seamless operation, testing, calibration, and handover.

All supplied items shall comply with relevant IS/IEC standards, safety regulations, and manufacturer guidelines, ensuring the system is fully operational, reliable, and visitor-ready. All necessary technology equipment, licensed software, applications, accessories, special effects, and any other mechanisms required to ensure full functionality, seamless operation, and integration of the system shall be included in the scope of supply.

2. PART-2 : PEARL FISHING

2.1 Model/ Replica OYSTER AND PEARL

Replica Model – Oyster & Pearl Art Installation (Inlit Type)

1. General Description

Supply, fabrication, installation, testing, and commissioning of a **replica model of Oyster & Pearl art installation (inlit type)** within a floor space of **2000 mm × 2000 mm**, constructed using **FRP (Fiberglass Reinforced Plastic)** and **wood**, reinforced with an **MS structural frame**, and finished with **high-quality epoxy paint**.

The installation shall be designed and executed to achieve **authentic aesthetic appeal, structural stability, and seamless finish** with long-term durability.

2. Scope of Work

- Preparation of **design drawings, prototypes, and mock-up** for approval prior to final execution.
- **Fabrication** of Oyster & Pearl structure in FRP + wood with MS reinforcement.
- **Surface finishing** with UV-resistant, high-quality epoxy paint.
- **Seamless, groove-less fixing** with concealed joints for an authentic appearance.
- Supply and installation of all **fixtures, fittings, anchors, and hardware**, including concealed hanging/bolting systems.
- Integration of **electrical & mechanical works**, including inlit LED lighting system, drivers, and concealed wiring.
- Provision of all **cabling, connectors, and accessories** for complete operation.
- Any additional mechanisms required to make the installation **fully functional, durable, and visually authentic**.

3. Technical Specifications

- **FRP**: High-strength, fire-retardant grade FRP (IS 6746 / ISO 178).
- **MS Frame**: IS 2062 structural steel, epoxy primer-coated for corrosion resistance.
- **Wood**: Seasoned hardwood/engineered wood (IS 4020 compliant).
- **Paint Finish**: High-quality epoxy-based, UV and abrasion resistant (IS 2932 / ISO 12944). IS 15489/IS 9197
- **Lighting**: LED system, CRI ≥ 90, CCT 3000–3500 K, low-heat, anti-UV, dimmable drivers.
- **Electrical Work**: IS/IEC 60364 compliant wiring, proper earthing, and safe termination.

4. Execution Methodology

1. **Prototyping and Mock-up**: Develop prototype for review and approval.
2. **Fabrication**: FRP molding, wood detailing, and MS reinforcement.
3. **Finishing**: Seamless integration with epoxy coating and groove-less fixing.
4. **Lighting Integration**: Concealed inlit LED system, wiring, drivers.
5. **Installation**: On-site fixing with concealed bolting and anchoring.

6. **Testing & Commissioning:** Check electrical, lighting, stability, and finish quality.

5. Testing & Quality Assurance

- FRP & structural strength tests (as per IS/ASTM standards).
- Paint adhesion and finish inspection.
- Electrical continuity, insulation resistance, and earthing tests.
- LED lighting quality verification (lux levels, CRI, CCT).
- Mock-up approval before final execution.

6. Codes & Standard Compliance

- **FRP Materials:** IS 6746, ASTM D790.
- **Steel Frame:** IS 2062, IS 800.
- **Paints/Coatings:** IS 14209/IS13213: IS 15489/IS9197.
- **Electrical Safety:** IS/IEC 60364, IS 732.
- **LED Lighting:** LM-79/LM-80 compliance.

7. Deliverables

- Approved **design mock-up** and prototype.
- Final **installed Oyster & Pearl art installation** complete in all respects.
- Electrical and lighting integration drawings.
- Test certificates and as-built documentation.

8. Warranty & Post-Warranty Services

- **Warranty: 2 Years** – Coverage for structural integrity, finishing, lighting system, and electrical works.
- **Post-Warranty Services:** Paid maintenance support for repainting, LED replacement, or structural repairs as required.

2.2 55” Display

55” Professional-Grade 4K UHD Display

1. General Description

Supply, installation, testing, and commissioning of a **55” diagonal professional-grade display** suitable for continuous **24/7 operation**, with **4K UHD resolution**, robust build quality, and advanced features for reliable usage in gallery/museum/AV integration environments.

2. Technical Specifications

Display Panel

- Type: Edge LED BLU
- Resolution: 3840 × 2160 (4K UHD)
- Pixel Pitch: 0.315 × 0.315 mm
- Active Display Area: 1209.6 mm (H) × 680.4 mm (V)

- Brightness (Typ.): 500 nits
- Contrast Ratio: 4000:1
- Viewing Angle (H/V): 178° / 178°
- Response Time (G-to-G): 8 ms (Typ.)
- Display Colors: 16.7 million
- Color Gamut: 92% (DCI-P3, CIE 1976)
- Surface Treatment: 25% haze (without glass)
- Operation: 24/7 continuous

Special Features – Hardware

- Temperature sensor
- Pivot display mode
- Clock battery with 168 hrs clock keeping
- Built-in 10W × 2 channel speakers
- Video wall daisy chain support (HDCP2.2: 4EA, HDCP1.4: 7EA)
- IP5x rating (dust protection)
- Integrated Wi-Fi & Bluetooth connectivity

Special Features – Software

- Auto source switching & recovery
- LFD Home UI
- Button lock & hot key option
- Plug & Play initial setup

Accessories & Integration

- Supply of all necessary **cables, connectors, adaptors, mounting hardware, and power accessories** for complete installation.
- Display to be integrated with control systems, projection, and AV network as per site requirement.

3. Execution Methodology

1. Delivery and site verification.
2. Mounting using approved brackets/stands.
3. Electrical & signal connectivity.
4. Configuration of settings (brightness, source switching, networking).
5. Testing of **display quality, color calibration, and 24/7 operation capability**.
6. Handover with documentation and training.

4. Testing & Quality Assurance

- Display calibration tests (color accuracy, brightness, contrast).
- Burn-in and endurance testing for 24/7 operation.
- Network, daisy-chain, and source-switching functionality tests.
- Compliance with **OEM performance standards** and tender specifications.

5. Codes & Standard Compliance

-
- IEC 62368-1 (Audio/Video equipment safety).
 - ISO 9241 (Ergonomics of display use).
 - RoHS & CE compliance.
 - IP5x certification for dust resistance.

6. Deliverables

- One **55" professional-grade 4K display** with accessories.
- All **mounting hardware, adaptors, and cabling**.
- OEM installation & operation manuals.
- Test certificates and commissioning report.

7. Approved Makes

- Samsung
- Christie
- Equivalent subject to approval

8. Warranty & Post-Warranty Services

- **Warranty: 2 Years** – Comprehensive coverage for panel, electronics, and accessories.
- **Post-Warranty Services:** OEM/authorized service support with AMC options for extended coverage.

2.3 Mini PC for Info Kiosk

Mini PC Controller for Kiosk

1. General Description

Supply, installation, testing, and commissioning of a **Mini PC Controller for Kiosk**, compact in design, suitable for continuous operation, and capable of handling interactive kiosk applications with high reliability and performance.

2. Technical Specifications

- **Processor:** Intel Core i7, latest generation or higher.
- **Memory (RAM):** 16 GB DDR4.
- **Storage:** 1 TB SSD (NVMe preferred).
- **Operating System:** Windows 10 Pro 64-bit, genuine licensed version.
- **Form Factor:** Compact Mini PC (Intel NUC or equivalent).
- **Connectivity:** HDMI, USB (multiple ports), LAN, Wi-Fi, Bluetooth.
- **Accessories:**
 - Wireless Keyboard & Mouse (OEM-approved).
 - HDMI cable.
 - Power adaptor with surge protection.
 - All required connectors and adaptors.

3. Execution Methodology

1. Delivery and site readiness verification.
2. Installation in kiosk enclosure with secure fixing.
3. Connection to display, input devices, and power supply.
4. OS activation, driver installation, and configuration.
5. Testing of performance, connectivity, and kiosk integration.

4. Testing & Quality Assurance

- Verification of hardware specifications.
- Benchmarking and system stress test for stability.
- OS activation and license validation.
- Functional testing with kiosk application.
- Burn-in test for 24/7 operation reliability.

5. Codes & Standard Compliance

- IEC 60950 / IEC 62368-1 (Safety of IT equipment).
- RoHS & CE compliance.
- Energy Star certified hardware.
- BIS certification where applicable.

6. Deliverables

- Mini PC Controller with licensed OS.
- Wireless Keyboard & Mouse.
- HDMI cable, power adaptor, and required connectors.
- Installation and configuration documentation.
- OEM warranty cards and license certificates.

7. Approved Makes

- Intel
- Dell
- HP
- ASUS

8. Warranty & Post-Warranty Services

- **Warranty: 2 Years** – Comprehensive onsite support for hardware and licensed OS.
- **Post-Warranty Services:** OEM-authorized AMC support for hardware upgrades, replacements, and extended maintenance.

2.4 Interactive Kit for Interaction

Gesture-Based Interactive Installation

1. General Description

The work includes the **supply, installation, testing, and commissioning** of a **gesture-based interactive installation**, where digital content is triggered and controlled by visitor hand movement/gestures. The system shall deliver an intuitive, immersive, and user-friendly

experience with seamless integration of hardware, software, and content.

2. Scope of Work

- Supply and installation of **motion/gesture sensors** (IR/Camera-based).
- Provision of **processing unit** (Mini PC with media player as required).
- Integration with **display interface** (existing/provided separately).
- Supply of **mounting hardware, cabling, adaptors, and power supplies**.
- Licensed **gesture-recognition software** enabling real-time interaction.
- **Calibration, content integration, and commissioning** for functional readiness.
- Demonstration, O&M documentation, and training.

3. Technical Specifications

a) Hardware

- **Gesture Sensors:** IR depth camera or equivalent, minimum 30 fps, tracking distance 0.5–4 m.
- **Processing Unit:** Mini PC with Intel i7 / 16 GB RAM / 1 TB SSD / Windows 11 Pro.
- **Media Player:** Integrated or external (supporting FHD/4K playback).
- **Connectivity:** HDMI, USB 3.0/3.1, LAN, Wi-Fi, Bluetooth.
- **Mounting:** Wall/ceiling/floor mount depending on site layout.
- **Power:** Stabilized power adaptors, cabling, surge protection.

b) Software

- Licensed **gesture-interactive software** with:
 - Reliable multi-gesture recognition.
 - Content triggering, scaling, and mapping.
 - Customizable UI/UX.
 - Low-latency real-time performance (< 50 ms).
 - Compatibility with Windows OS.

c) Functionality

- **Real-time gesture tracking** with smooth rendering.
- **Low-latency interaction** for seamless user experience.
- **Stable, continuous operation** for long hours (museum/exhibition environments).
- **Calibration tools** for quick setup and content alignment.

4. Execution Methodology

7. **Design Approval:** Submission of sensor placement drawings & integration plan.
8. **Hardware Setup:** Installation of sensors, processing unit, and mounting.
9. **Software Installation:** Setup of licensed gesture-interactive software.
10. **Integration:** Linking to display/media system, content execution.
11. **Calibration:** Fine-tuning of sensors for accurate gesture response.
12. **Testing & Commissioning:** Verification of gesture responsiveness, latency, and reliability.

5. Testing & Quality Assurance

- Gesture accuracy test with multiple users and conditions.
- Latency check (< 50 ms).
- 24-hour stability/run test.
- Electrical safety test as per IS 732.
- Content trigger and playback verification.

6. Codes & Standard Compliance

- **Safety & EMC:** CE / FCC / BIS.
- **Electrical Safety:** IS 13252 (Part 1) / IEC 62368.
- **EMC/EMI:** IEC 61000.
- **RoHS** compliance.
- **Software License Compliance:** OEM-issued genuine license.

7. Scope of Deliverables

- Gesture sensors, processing unit, media player.
- Licensed interactive software.
- Mounting hardware, power adaptors, cabling.
- Content preloaded/executed as per requirement.
- User manuals, O&M documentation, and calibration guide.
- As-built drawings and test reports.

8. Warranty (2 Years)

- Comprehensive warranty for **2 years** covering hardware, software license, and integration.
- Free rectification/replacement of defective components during warranty.

9. Post-Warranty Services

- Availability of spares (sensors, adaptors, cables) for **minimum 5 years**.
- Software updates and technical support.
- Service response time within **72 hours**.

2.5 Integration

Power & Data Cabling Works for Projection & Technology Systems

1. General Description

The work includes the **supply, laying, testing, and commissioning** of all required electrical and data cabling for connecting power and signals from the Distribution Board (DB) to all digital projection and technology equipment. The scope covers **cables, conduits, junctions, termination, accessories, and system integration** to ensure a **fully functional and seamless setup**.

2. Scope of Work

- Supply and installation of **electrical power cabling** (FRLS/FRLSH copper) with conduits, trunking, and protective accessories.

- Supply and installation of **signal/data cabling** (HDMI, LAN, fibre optics if required, AV/IT cables with proper connectors).
- Termination, patching, and integration at **DB, junction boxes, equipment panels, and technology devices**.
- Supply of all **junction boxes, termination panels, patch cords, adaptors, connectors, and mounting hardware**.
- Cable routing through trays, conduits, or trunking for **neat, concealed, and protected installation**.
- Complete **integration, signal mapping, testing, and commissioning** to ensure smooth operation of connected systems.

3. Technical Specifications

a) Electrical Cabling

- Type: **FRLS/FRLSH copper conductor cables**.
- Size: As per load requirement (minimum 2.5 sq.mm for equipment power; higher sizes as per design load).
- Standards: IS 694 / IS 7098 / IEC 60228.
- Installation: In **PVC/HDPE conduits, GI trunking, or cable trays** with proper support.
- Protective Accessories: Circuit breakers, glands, lugs, ferrules, and identification tags.

b) Data/Signal Cabling

- HDMI: High-speed, 4K compliant, gold-plated connectors.
- LAN: CAT6 or higher, shielded/unshielded as per design.
- Fibre (if required): Single Mode/Multimode, terminated with LC/SC connectors.
- AV/IT Cables: As per OEM requirement for projection and interactive systems.
- Patch Panels: 19" rack-mountable with labeling.

c) Accessories & Termination

- Junction Boxes: Fire-retardant, dust-proof.
- Patch Cords: Factory-tested, certified.
- Termination Panels: For both electrical and data cables.
- Mounting Hardware: Brackets, clamps, saddles, supports.
- Cable Management: Conduits, trays, raceways, labels, ferrules.

4. Execution Methodology

7. **Pre-installation survey** for cable routing.
8. **Laying of conduits/trunking** with proper alignment and support.
9. **Pulling and dressing of cables** with tagging/labeling for identification.
10. **Termination at DB, junction boxes, patch panels, and equipment**.
11. **Integration and signal mapping** for correct connectivity.
12. **Testing & Commissioning** for continuity, insulation resistance, and data transfer performance.

5. Testing & Quality Assurance

- Electrical cables: Insulation Resistance Test, Polarity Test, Earth Continuity Test (as per IS 732).
- LAN: Fluke test for CAT6 performance.
- HDMI/Fibre: End-to-end connectivity and resolution test (Full HD/4K).
- Proper labeling and documentation of all cables and terminations.

6. Standards & Compliance

- **Electrical:** IS 732, IS 694, IEC 60228.
- **LAN Cabling:** ANSI/TIA-568-C.2, ISO/IEC 11801.
- **HDMI:** HDMI 2.0/2.1 compliance.
- **Fibre:** ISO/IEC 14763-3.
- **Safety:** IS 16406 (FRLS/FRLSH requirements), IEC 60332 (fire propagation).

7. Deliverables

- All electrical and data cabling with accessories.
- Junction boxes, patch panels, terminations, and patch cords.
- As-built cable routing diagrams and test certificates.
- Labeling of all circuits and data points.

8. Warranty (2 Years)

- Comprehensive warranty on all supplied cabling, connectors, patch panels, and accessories.
- Free rectification of cable faults within the warranty period.

2.6 Content for Display

Content Research, Development & Production Services for Galleries

1. General Description

The work involves the **end-to-end development of interpretive content** for the galleries, including **research, scripting, translations, design, and media production**, to deliver a cohesive, authentic, and visitor-friendly narrative experience. The agency shall coordinate closely with **VOCPA (or their nominated representatives)** throughout the process to ensure historical accuracy, cultural sensitivity, and thematic alignment.

2. Scope of Work

a) Research & Framework

- Conduct in-depth **historical and thematic research** relevant to the gallery content.
- Develop **narrative frameworks, storylines, and timelines**, aligned with curatorial objectives.
- Curatorial discussions and validation with VOCPA representatives.

b) Content Creation

- Prepare **interpretive texts** for panels, captions, labels, and narratives.
- Write **scripts for audio-visuals, films, and interactives**.
- Ensure content is **visitor-centric, accessible, and engaging**.

c) Language Services

- **Translation** of all approved content into **Hindi, English, and Tamil**.
- **Proofreading and editing** by professional linguists to ensure accuracy and consistency.

d) Design & Visualization

- Create **infographics, maps, diagrams, and illustrations** to enhance interpretation.
- Develop **digital visualizations and interactive mock-ups** for content presentation.

e) Media Production

- Produce **short films, audio-visuals, animations, voiceovers, and digital interactive content**.
- All media to be **museum-grade quality** with licensed professional narration, music, and effects.

f) Integration & Formatting

- Deliver **final content packages** in both **print-ready and digital formats**.
- Content prepared for **integration with display panels, AV systems, and interactive technology**.

g) Approvals & Deliverables

- Submit **draft content** for review and approvals at each stage.
- Incorporate feedback and finalize all content.
- Deliver **master files (editable + final formats)** for all textual, graphic, and media content.

h) Rights & Licenses

- All content, media, and visuals to be **original and copyright-cleared**.
- Agency to provide **full transfer of rights, licenses, and clearances** to the client.

3. Execution Methodology

7. **Inception Meeting** with VOCPA for project orientation.
8. **Research & Draft Narrative** preparation with references and citations.
9. **Content Development** for text, graphics, and media in iterative stages.
10. **Stakeholder Review Workshops** for validation and approvals.
11. **Media Production & Formatting** in compliance with gallery specifications.
12. **Final Submission & Handover** of content package with documentation.

4. Testing & Quality Assurance

- Proofreading and language checks by certified linguists.
- Validation of **historical accuracy** through references and expert review.
- Compliance with **museum communication standards** (clarity, readability, accessibility).
- Trial integration of media content with target hardware/software.

5. Codes & Standard Compliance

- **UNESCO/ICOM museum communication guidelines** for interpretive content.
- **ISO 17100** for translation quality management.

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- **ISO/IEC 27001** for digital content handling & licensing.
 - **Broadcast/Media Standards** for AV production quality.

6. Deliverables

- Narrative framework, scripts, and content documentation.
- Text panels, captions, labels, and storylines in approved languages.
- Infographics, maps, diagrams, and illustrations in digital + print-ready formats.
- Audio-visual films, animations, and interactives with voiceovers.
- Final approved content in both **editable (source) and finalized formats**.
- Licensing documents, copyright clearance certificates, and transfer of rights.

7. Warranty & Post-Warranty Support

- **Warranty: 2 Years** – Free rectification of errors in content, translations, or formatting.
- **Post-Warranty Services:** Paid support for content updates, reformatting, and additional translations as required.

2.7 Display Graphics

Backlit Stretch Fabric Graphic Partitions

1. General Description

Supply, installation, testing, and commissioning of **backlit stretch fabric graphic partitions**, fixed to walls on a **custom metal framework**, designed to form **organic shapes** with integrated lighting and automation features. The system shall be executed to provide a **frameless, edgeless appearance** with high-quality visuals and smooth finishes, suitable for long-term use in museum/gallery environments.

2. Scope of Work

- Design, fabrication, and installation of metal framework shaped to organic forms.
- Supply and fixing of UV-printed stretch fabric using SEG (Silicon Edge Graphics) system.
- Integration of LED backlighting with programmable automation.
- Supply of all accessories, profiles, power supplies, controllers, wiring, and terminations.
- Testing, commissioning, and handover of a fully functional system.

3. Technical Specifications

a) Fabric

- Material: High-quality polyester fabric, **150–300 gsm**.
- Printing: UV digital printing with high resolution (≥ 1200 dpi).
- Safety: **FR-rated (fire-retardant)** and UV resistant.
- Fixing: **SEG (Silicon Edge Graphics)** system for seamless, frameless appearance.
- Approved Makes: **Barrisol / LG / Dinolax or equivalent**.

b) Framework

- Powder-coated **metal frame structure**, shaped to required organic profiles.
- Supporting flexi-ply or equivalent backing wherever necessary.
- Concealed fixing system to achieve clean aesthetics.

c) Graphics

- High-resolution UV-printed fabric panels, precisely color-calibrated.
- Seamless joins, properly tensioned to ensure wrinkle-free finish.

d) Lighting

- Integrated **LED backlighting system** with uniform distribution (no hotspots).
- Minimum CRI ≥ 90 , CCT range: 3000K–6500K (tunable as per design).
- Provision for **programmable dimming and color-changing controls**.
- Automation: Compatible with DMX/DALI/other lighting control systems.

e) Accessories & Integration

- Complete supply of **aluminium profiles, tensioning systems, connectors, wiring, and power supplies**.
- Controllers for dimming, automation, and lighting effects.
- All terminations, junction boxes, and cabling as per IS/IEC standards.

4. Execution Methodology

- **Mock-up** of a sample section for client approval before final execution.
- Framework fabrication and wall mounting.
- Fabric printing, finishing, and SEG fixing.
- Installation of LED lighting system and integration with automation controls.
- On-site calibration, testing, and commissioning.

5. Testing & Quality Assurance

- Fabric print quality, color accuracy, and fire-retardancy certification.
- Electrical testing of LED modules, drivers, and control systems.
- Uniformity of backlighting across entire surface (no dark zones).
- Joint inspection and approval with client representatives.

6. Standards & Compliance

- **IS 10322 / IEC 60598** – LED luminaire safety.
- **IS 694 / IEC 60227** – Electrical wiring.
- **NFPA / ASTM / EN 13501-1** – Fire-retardant certification for fabric.
- **RoHS / CE certified** lighting and control components.

7. Deliverables

- Installed and commissioned stretch fabric partitions with integrated backlighting.
- Controllers, wiring, and automation system integrated with central lighting controls.
- As-built drawings, operation manuals, and test certificates.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** on fabric print, framework, LED lighting, and control systems.
- Post-warranty support for content updates, re-printing, or system maintenance on mutually agreed terms.

2.8 Sound

Immersive Professional-Grade Sound System

1. General Description

Supply, installation, testing, and commissioning of a **professional-grade immersive sound system** from leading international brands, designed to enhance visitor engagement through **interactive installations and spatial audio experiences**. The system shall deliver **high-quality, multi-channel immersive sound** with seamless integration into the overall AV and interactive environment.

2. Scope of Work

- Supply and installation of full-range loudspeakers, satellite speakers, and subwoofers as per acoustic design.
- Supply, installation, and programming of amplifiers and DSPs for system tuning and immersive audio mapping.
- Integration with central control systems for content triggering and synchronization with interactive media.
- Provision of all cabling, connectors, racks, mounts, and accessories.
- Supply of licensed immersive audio management software.
- Testing, calibration, and commissioning of the complete system.

3. Technical Specifications

a) Speakers

- **Full-range loudspeakers** with frequency response suitable for clear dialogue, effects, and music playback.
- **Satellite speakers** for distributed immersive soundscapes.
- **Subwoofers** for extended low-frequency performance.
- Wide dispersion and high SPL capability for even coverage.
- Mounting brackets/rigging as per site requirements.

b) Amplifiers & Processors (DSP)

- Digital signal processors with capabilities for **EQ, delay, crossover, audio routing, and immersive audio mapping**.
- Multi-channel amplifiers with sufficient power rating for connected speakers.
- Built-in protection for overcurrent, overheating, and short-circuit.

c) Control & Integration

- Central audio control system with **content triggering, scheduling, and synchronization** with visual/interactive systems.
- Integration with show control or AV control system for automation.

d) Cabling & Accessories

- High-quality audio cabling (shielded as required).
- Professional-grade connectors (Neutrik or equivalent).
- Equipment racks with cooling, mounts, and cable management accessories.

e) Software

- Licensed immersive audio playback and management software.
- Features: channel mapping, real-time control, and synchronization with projection/interactive systems.

f) Approved Makes

- **Bose / JBL / Yamaha / Harman / d&b audiotechnik / equivalent international make.**

4. Execution Methodology

- Acoustic assessment of site and speaker layout design.
- Installation of loudspeakers, subwoofers, and satellite units with mounts.
- Rack integration of amplifiers, DSPs, and control units.
- Software installation and configuration.
- Audio calibration for **balanced coverage, immersive spatial effects, and clarity.**
- Testing and commissioning with client representatives.

5. Testing & Quality Assurance

- Measurement of **SPL, frequency response, and coverage uniformity.**
- System tuning using real-time analyzers.
- Functional testing of immersive playback with synchronized visuals/interactive content.
- Verification of safety standards, cabling integrity, and redundancy checks.

6. Standards & Compliance

- **IEC 60268** – Sound system equipment.
- **ISO 3382** – Acoustics measurement for performance spaces.
- IEC 60268-5– Loudspeaker specifications.
- CE / RoHS certified equipment.

7. Deliverables

- Fully functional immersive audio system with installed hardware and configured software.
- As-built wiring diagrams, equipment layout drawings, and configuration documentation.
- Training for operators on system usage and basic troubleshooting.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** on all supplied equipment, including amplifiers, DSPs, and speakers.
- Post-warranty services: Calibration, software updates, and extended support.

2.9 Software / Application

Supplementary Technical Requirement – Functional Completeness

The contractor shall provide **all necessary technological equipment, software, applications, accessories, special effects, or any other mechanisms** required to ensure the **complete functionality and intended operation** of the system, installation, or exhibit.

This includes, but is not limited to:

- **Hardware components:** Sensors, controllers, displays, processing units, AV/IT devices, and interactive peripherals.
- **Software & Applications:** Licensed software, content management systems, interactive applications, drivers, and control interfaces.
- **Accessories & Cabling:** Power and data cables, adapters, connectors, mounting hardware, and protective components.
- **Special Effects / Mechanisms:** Lighting effects, projection mapping, actuators, haptic or motion feedback devices, and any additional mechanisms required to achieve the intended experience.
- **Integration & Commissioning:** Full integration of all components with seamless operation, testing, calibration, and handover.

All supplied items shall comply with relevant IS/IEC standards, safety regulations, and manufacturer guidelines, ensuring the system is fully operational, reliable, and visitor-ready. All necessary technology equipment, licensed software, applications, accessories, special effects, and any other mechanisms required to ensure full functionality, seamless operation, and integration of the system shall be included in the scope of supply.

3. PART-3 : BOAT & SAIL SHIPS

3.1 Model/ Replica for Boat & Sail Ships

Replica Models of Boats & Sail Ships with Wall Installation

1. General Description

Supply, fabrication, installation, testing, and commissioning of **replica models of Boats & Sail Ships with wall**, covering an area of **4000 mm (L) × 3000 mm (H)**. The replicas shall be **constructed in FRP (Fiberglass Reinforced Plastic) and wood**, reinforced with an **MS steel frame structure**, and finished with **high-quality paint**. The installation shall be **museum-grade**, with **seamless, groove-less finish and concealed joints** to achieve historical authenticity and durability.

2. Scope of Work

- Preparation of detailed designs and fabrication drawings.
- **Prototyping and mock-up** for approval prior to execution.
- Fabrication of **MS structural frame**, FRP shelling, and wood detailing.
- Seamless finishing with high-quality, durable paint (PU/Epoxy).
- Supply and installation of **fixtures, fittings, hardware, and concealed hanging/bolting systems**.

- Integration of **electrical & mechanical components** including inlit LED lighting, cabling, and drivers.
- Supply of **all accessories, adhesives, and mechanisms** required to make the exhibit visually authentic and fully functional.

3. Technical Specifications

a) Structure & Materials

- **FRP (Fiberglass Reinforced Plastic)** – IS 6746 compliant, museum-grade quality.
- **MS Steel Frame** – IS 2062 grade, epoxy primer and anti-rust coated.
- **Wood/Engineered Wood** – Seasoned, treated, IS 4020 compliant.
- **Paint Finish** – PU/Epoxy, high-quality matt/wood finish, UV resistant.

b) Detailing

- Seamless fabrication with groove-less fixing.
- Concealed joints, bolts, and fittings for clean aesthetics.
- Authentic reproduction of Sangam-age/Post-Sangam boats & sail ships (design intent).

c) Electrical & Mechanical

- Inlit **LED lighting system** with CRI ≥ 90 , warm white (3000–3500K).
- Low-heat, UV-free, dimmable drivers with concealed wiring.
- Proper earthing and electrical safety measures as per IS/IEC standards.

d) Accessories & Integration

- Anchors, adhesives, structural hardware, and fixing accessories.
- Complete integration with gallery wall and supporting structures.

4. Execution Methodology

- Preparation of shop drawings and prototypes.
- Mock-up installation for client approval.
- Fabrication of structural frame, FRP components, and wood detailing.
- Trial assembly at workshop, followed by site installation.
- Surface finishing, lighting integration, and final detailing.
- Testing, commissioning, and client handover.

5. Testing & Quality Assurance

- Mock-up review and approval prior to final fabrication.
- Inspection of welds, frame strength, and FRP curing.
- Paint quality check for adhesion, finish, and durability.
- Lighting system testing (uniformity, dimming, safety compliance).
- Joint inspection with client representatives.

6. Standards & Compliance

- **IS 6746** – FRP specifications.
- **IS 2062** – Structural steel grade.
- **IS 4020** – Wooden material tests.
- **IS 10322 / IEC 60598** – Luminaire safety standards.
- **IS/IEC 61347** – LED driver compliance.

- Fire safety: Materials to be **FR/FRLS certified** wherever applicable.

7. Deliverables

- Fully fabricated and installed replica wall models with lighting.
- As-built drawings, prototypes, and documentation.
- Operation and maintenance manuals.
- Certificates of material compliance and finishes.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** covering structural integrity, finishes, lighting, and accessories.
- Post-warranty services: System upgrades.

3.2 55" Display

55" Professional-Grade 4K UHD Display

1. General Description

Supply, installation, testing, and commissioning of a **55" diagonal professional-grade display** suitable for continuous **24/7 operation**, with **4K UHD resolution**, robust build quality, and advanced features for reliable usage in gallery/museum/AV integration environments.

2. Technical Specifications

Display Panel

- Type: Edge LED BLU
- Resolution: 3840 × 2160 (4K UHD)
- Pixel Pitch: 0.315 × 0.315 mm
- Active Display Area: 1209.6 mm (H) × 680.4 mm (V)
- Brightness (Typ.): 500 nits
- Contrast Ratio: 4000:1
- Viewing Angle (H/V): 178° / 178°
- Response Time (G-to-G): 8 ms (Typ.)
- Display Colors: 16.7 million
- Color Gamut: 92% (DCI-P3, CIE 1976)
- Surface Treatment: 25% haze (without glass)
- Operation: 24/7 continuous

Special Features – Hardware

- Temperature sensor
- Pivot display mode
- Clock battery with 168 hrs clock keeping
- Built-in 10W × 2 channel speakers
- Video wall daisy chain support (HDCP2.2: 4EA, HDCP1.4: 7EA)
- IP5x rating (dust protection)
- Integrated Wi-Fi & Bluetooth connectivity

Special Features – Software

-
- Auto source switching & recovery
 - LFD Home UI
 - Button lock & hot key option
 - Plug & Play initial setup

Accessories & Integration

- Supply of all necessary **cables, connectors, adaptors, mounting hardware, and power accessories** for complete installation.
- Display to be integrated with control systems, projection, and AV network as per site requirement.

3. Execution Methodology

7. Delivery and site verification.
8. Mounting using approved brackets/stands.
9. Electrical & signal connectivity.
10. Configuration of settings (brightness, source switching, networking).
11. Testing of **display quality, color calibration, and 24/7 operation capability**.
12. Handover with documentation and training.

4. Testing & Quality Assurance

- Display calibration tests (color accuracy, brightness, contrast).
- Burn-in and endurance testing for 24/7 operation.
- Network, daisy-chain, and source-switching functionality tests.
- Compliance with **OEM performance standards** and tender specifications.

5. Codes & Standard Compliance

- IEC 62368-1 (Audio/Video equipment safety).
- ISO 9241 (Ergonomics of display use).
- RoHS & CE compliance.
- IP5x certification for dust resistance.

6. Deliverables

- One **55” professional-grade 4K display** with accessories.
- All **mounting hardware, adaptors, and cabling**.
- OEM installation & operation manuals.
- Test certificates and commissioning report.

7. Approved Makes

- Samsung
- Christie
- Equivalent subject to approval

8. Warranty & Post-Warranty Services

- **Warranty: 2 Years** – Comprehensive coverage for panel, electronics, and accessories.

- **Post-Warranty Services:** OEM/authorized service support with AMC options for extended coverage.

3.3 Mini PC for Info Kiosk

Mini PC Controller for Kiosk

1. General Description

Supply, installation, testing, and commissioning of a **Mini PC Controller for Kiosk**, compact in design, suitable for continuous operation, and capable of handling interactive kiosk applications with high reliability and performance.

2. Technical Specifications

- **Processor:** Intel Core i7, latest generation or higher.
- **Memory (RAM):** 16 GB DDR4.
- **Storage:** 1 TB SSD (NVMe preferred).
- **Operating System:** Windows 10 Pro 64-bit, genuine licensed version.
- **Form Factor:** Compact Mini PC (Intel NUC or equivalent).
- **Connectivity:** HDMI, USB (multiple ports), LAN, Wi-Fi, Bluetooth.
- **Accessories:**
 - Wireless Keyboard & Mouse (OEM-approved).
 - HDMI cable.
 - Power adaptor with surge protection.
 - All required connectors and adaptors.

3. Execution Methodology

6. Delivery and site readiness verification.
7. Installation in kiosk enclosure with secure fixing.
8. Connection to display, input devices, and power supply.
9. OS activation, driver installation, and configuration.
10. Testing of performance, connectivity, and kiosk integration.

4. Testing & Quality Assurance

- Verification of hardware specifications.
- Benchmarking and system stress test for stability.
- OS activation and license validation.
- Functional testing with kiosk application.
- Burn-in test for 24/7 operation reliability.

5. Codes & Standard Compliance

- IEC 60950 / IEC 62368-1 (Safety of IT equipment).
- RoHS & CE compliance.
- Energy Star certified hardware.
- BIS certification where applicable.

6. Deliverables

- Mini PC Controller with licensed OS.
- Wireless Keyboard & Mouse.
- HDMI cable, power adaptor, and required connectors.
- Installation and configuration documentation.
- OEM warranty cards and license certificates.

7. Approved Makes

- Intel
- Dell
- HP
- ASUS

8. Warranty & Post-Warranty Services

- **Warranty: 3 Years** – Comprehensive onsite support for hardware and licensed OS.
- **Post-Warranty Services:** OEM-authorized AMC support for hardware upgrades, replacements, and extended maintenance.

3.4 Interactive Kit for Interaction

Gesture-Based Interactive Installation

1. General Description

The work includes the **supply, installation, testing, and commissioning** of a **gesture-based interactive installation**, where digital content is triggered and controlled by visitor hand movement/gestures. The system shall deliver an intuitive, immersive, and user-friendly experience with seamless integration of hardware, software, and content.

2. Scope of Work

- Supply and installation of **motion/gesture sensors** (IR/Camera-based).
- Provision of **processing unit** (Mini PC with media player as required).
- Integration with **display interface** (existing/provided separately).
- Supply of **mounting hardware, cabling, adaptors, and power supplies**.
- Licensed **gesture-recognition software** enabling real-time interaction.
- **Calibration, content integration, and commissioning** for functional readiness.
- Demonstration, O&M documentation, and training.

3. Technical Specifications

a) Hardware

- **Gesture Sensors:** IR depth camera or equivalent, minimum 30 fps, tracking distance 0.5–4 m.
- **Processing Unit:** Mini PC with Intel i7 / 16 GB RAM / 1 TB SSD / Windows 11 Pro.
- **Media Player:** Integrated or external (supporting FHD/4K playback).
- **Connectivity:** HDMI, USB 3.0/3.1, LAN, Wi-Fi, Bluetooth.
- **Mounting:** Wall/ceiling/floor mount depending on site layout.

- **Power:** Stabilized power adaptors, cabling, surge protection.

b) Software

- Licensed **gesture-interactive software** with:
 - Reliable multi-gesture recognition.
 - Content triggering, scaling, and mapping.
 - Customizable UI/UX.
 - Low-latency real-time performance (< 50 ms).
 - Compatibility with Windows OS.

c) Functionality

- **Real-time gesture tracking** with smooth rendering.
- **Low-latency interaction** for seamless user experience.
- **Stable, continuous operation** for long hours (museum/exhibition environments).
- **Calibration tools** for quick setup and content alignment.

4. Execution Methodology

13. **Design Approval:** Submission of sensor placement drawings & integration plan.
14. **Hardware Setup:** Installation of sensors, processing unit, and mounting.
15. **Software Installation:** Setup of licensed gesture-interactive software.
16. **Integration:** Linking to display/media system, content execution.
17. **Calibration:** Fine-tuning of sensors for accurate gesture response.
18. **Testing & Commissioning:** Verification of gesture responsiveness, latency, and reliability.

5. Testing & Quality Assurance

- Gesture accuracy test with multiple users and conditions.
- Latency check (< 50 ms).
- 24-hour stability/run test.
- Electrical safety test as per IS 732.
- Content trigger and playback verification.

6. Codes & Standard Compliance

- **Safety & EMC:** CE / FCC / BIS.
- **Electrical Safety:** IS 13252 (Part 1) / IEC 62368
- **EMC/EMI:** IEC 61000.
- **RoHS** compliance.
- **Software License Compliance:** OEM-issued genuine license.

7. Scope of Deliverables

- Gesture sensors, processing unit, media player.
- Licensed interactive software.
- Mounting hardware, power adaptors, cabling.
- Content preloaded/executed as per requirement.
- User manuals, O&M documentation, and calibration guide.
- As-built drawings and test reports.

8. Warranty (2 Years)

- Comprehensive warranty for 2 **years** covering hardware, software license, and integration.
- Free rectification/replacement of defective components during warranty.

9. Post-Warranty Services

- Availability of spares (sensors, adaptors, cables) for **minimum 5 years**.
- Software updates and technical support.
- Service response time within **72 hours**.

3.5 Installation & Integration

Electrical & Data Cabling for Projection and Technology Equipment

1. General Description

Supply, laying, fixing, testing, and commissioning of **all wiring and associated items** required to connect power and data from the **Distribution Board (DB)** to respective digital projection and interactive technology equipment. The system shall ensure **reliable power delivery, signal integrity, and seamless operation** of all connected devices.

2. Scope of Work

- Supply, laying, and fixing of **electrical cabling** from DB to equipment locations.
- Supply, laying, and termination of **signal/data cabling** for HDMI, LAN, fibre, and other AV/IT connections.
- Provision of **all accessories**, racks, patch panels, cable management, and mounting hardware.
- Integration, mapping, and calibration of all power and signal connections for seamless operation of projectors, displays, and interactive systems.
- Testing, commissioning, and documentation of the complete cabling infrastructure.

3. Technical Specifications

a) Electrical Cabling

- Copper FRLS/FRLSH cables of suitable sizes for power distribution.
- Conduits, trays, raceways, and protective accessories.
- Junction boxes, terminations, and proper earthing.

b) Signal/Data Cabling

- HDMI, LAN (Cat6/Cat6a), fibre optic, and other AV/IT cables.
- Connectors, patch cords, adaptors, and patch panels as required.
- Structured cabling to maintain signal integrity and minimize interference.

c) Accessories & Integration

- Racks, cable trays, mounting hardware, and power distribution units (PDUs).
- Cable dressing and management for clean and safe installation.
- Integration with control systems and technology equipment for proper mapping and signal routing.

4. Execution Methodology

- Site survey to determine optimal cable routes and mounting points.
- Laying and fixing of electrical and data cables according to site conditions.
- Termination, dressing, and labeling of all cables.
- Integration with connected equipment and testing of signal/power continuity.
- Calibration and verification of signal quality and functionality.

5. Testing & Quality Assurance

- Continuity and insulation resistance testing of electrical cables.
- Verification of signal integrity for HDMI, LAN, and fibre connections.
- Functional testing of all integrated systems with connected devices.
- Compliance check against design drawings and site standards.

6. Standards & Compliance

- IS 694 / IS 1554 – Electrical wiring standards.
- IEC 60227 / IEC 60332 – Cables and fire safety.
- IS/IEC standards for HDMI, LAN, fibre, and AV cabling.
- RoHS and CE compliance for all electronic components.

7. Deliverables

- Installed, tested, and commissioned electrical and data cabling network.
- As-built drawings and schematics.
- Test reports and compliance certificates.
- Operation and maintenance documentation.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** covering cabling, terminations, and accessories.
- Post-warranty support: troubleshooting, repairs, or modifications as required.

3.6 Display Graphics;

Backlit Stretch Fabric Graphic Partitions

1. General Description

Supply, installation, testing, and commissioning of **backlit stretch fabric graphic partitions**, fixed to walls on a **custom metal framework**, designed to form **organic shapes** with integrated lighting and automation features. The system shall be executed to provide a **frameless, edgeless appearance** with high-quality visuals and smooth finishes, suitable for long-term use in museum/gallery environments.

2. Scope of Work

- Design, fabrication, and installation of metal framework shaped to organic forms.
- Supply and fixing of UV-printed stretch fabric using SEG (Silicon Edge Graphics) system.

- Integration of LED backlighting with programmable automation.
- Supply of all accessories, profiles, power supplies, controllers, wiring, and terminations.
- Testing, commissioning, and handover of a fully functional system.

3. Technical Specifications

a) Fabric

- Material: High-quality polyester fabric, **150–300 gsm**.
- Printing: UV digital printing with high resolution (≥ 1200 dpi).
- Safety: **FR-rated (fire-retardant)** and UV resistant.
- Fixing: **SEG (Silicon Edge Graphics)** system for seamless, frameless appearance.
- Approved Makes: **Barrisol / LG / Dinolax or equivalent**.

b) Framework

- Powder-coated **metal frame structure**, shaped to required organic profiles.
- Supporting flexi-ply or equivalent backing wherever necessary.
- Concealed fixing system to achieve clean aesthetics.

c) Graphics

- High-resolution UV-printed fabric panels, precisely color-calibrated.
- Seamless joins, properly tensioned to ensure wrinkle-free finish.

d) Lighting

- Integrated **LED backlighting system** with uniform distribution (no hotspots).
- Minimum CRI ≥ 90 , CCT range: 3000K–6500K (tunable as per design).
- Provision for **programmable dimming and color-changing controls**.
- Automation: Compatible with DMX/DALI/other lighting control systems.

e) Accessories & Integration

- Complete supply of **aluminium profiles, tensioning systems, connectors, wiring, and power supplies**.
- Controllers for dimming, automation, and lighting effects.
- All terminations, junction boxes, and cabling as per IS/IEC standards.

4. Execution Methodology

- **Mock-up** of a sample section for client approval before final execution.
- Framework fabrication and wall mounting.
- Fabric printing, finishing, and SEG fixing.
- Installation of LED lighting system and integration with automation controls.
- On-site calibration, testing, and commissioning.

5. Testing & Quality Assurance

- Fabric print quality, color accuracy, and fire-retardancy certification.
- Electrical testing of LED modules, drivers, and control systems.
- Uniformity of backlighting across entire surface (no dark zones).
- Joint inspection and approval with client representatives.

6. Standards & Compliance

- **IS 10322 / IEC 60598** – LED luminaire safety.

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- **IS 694 / IEC 60227** – Electrical wiring.
 - **NFPA / ASTM / EN 13501-1** – Fire-retardant certification for fabric.
 - **RoHS / CE certified** lighting and control components.

7. Deliverables

- Installed and commissioned stretch fabric partitions with integrated backlighting.
- Controllers, wiring, and automation system integrated with central lighting controls.
- As-built drawings, operation manuals, and test certificates.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** on fabric print, framework, LED lighting, and control systems.
- Post-warranty support for content updates, re-printing, or system maintenance on mutually agreed terms.

3.7 Software / Application:

Supplementary Technical Requirement – Functional Completeness

The contractor shall provide **all necessary technological equipment, software, applications, accessories, special effects, or any other mechanisms** required to ensure the **complete functionality and intended operation** of the system, installation, or exhibit.

This includes, but is not limited to:

- **Hardware components:** Sensors, controllers, displays, processing units, AV/IT devices, and interactive peripherals.
- **Software & Applications:** Licensed software, content management systems, interactive applications, drivers, and control interfaces.
- **Accessories & Cabling:** Power and data cables, adapters, connectors, mounting hardware, and protective components.
- **Special Effects / Mechanisms:** Lighting effects, projection mapping, actuators, haptic or motion feedback devices, and any additional mechanisms required to achieve the intended experience.
- **Integration & Commissioning:** Full integration of all components with seamless operation, testing, calibration, and handover.

All supplied items shall comply with relevant IS/IEC standards, safety regulations, and manufacturer guidelines, ensuring the system is fully operational, reliable, and visitor-ready. All necessary technology equipment, licensed software, applications, accessories, special effects, and any other mechanisms required to ensure full functionality, seamless operation, and integration of the system shall be included in the scope of supply.

4. PART-4 : NAVIGATION

4.1 Kiosk

Interactive Sailor Wheel Kiosk

1. General Description

Supply, fabrication, installation, testing, and commissioning of a **museum-grade interactive Sailor Wheel Kiosk** designed for **navigation-based content and visitor interaction**. The kiosk shall combine **realistic physical interaction** with **digital display output**, providing an immersive and educational experience.

2. Scope of Work

- Design, fabrication, and installation of the kiosk structure with **FRP/wood panels and MS frame reinforcement**, finished with **durable paint or polish**.
- Integration of the **interactive Sailor Wheel mechanism** with sensors, encoders, or rotary controllers for **smooth and precise navigation input**.
- Supply and installation of **processing unit** (Mini PC or equivalent controller) to process inputs and trigger content.
- Connectivity and integration with **digital display/screens** for real-time navigation feedback.
- Provision of all **fixtures, fittings, wiring, power adapters, and concealed hardware** to ensure functional and aesthetic completeness.

3. Technical Specifications

a) Kiosk Structure

- Custom-designed, free-standing kiosk with realistic Sailor Wheel replica.
- Material: FRP/wood panels with MS steel frame reinforcement.
- Finish: High-quality, durable paint or polish resistant to wear and tear.
- Dimensions: As per site and ergonomic requirements for visitor interaction.

b) Interactive Hardware

- Sensors, encoders, or rotary controllers for detecting wheel rotation.
- Smooth and precise input response with minimal latency.
- Integration with processing unit for real-time interaction.

c) Processing Unit

- Mini PC or equivalent controller (Intel i7 or approved alternative).
- Sufficient RAM and storage for content playback and interaction processing.
- Connectivity to display screens and sensors.

d) Display Integration

- Connection to designated digital display(s) for real-time visual feedback.
- Support for interactive content rendering and smooth navigation simulation.

e) Accessories & Integration

- All necessary wiring, power adapters, mounting hardware, and concealed fixings.
- Cable management and electrical safety compliance.

4. Execution Methodology

- Fabrication of kiosk structure in workshop, including FRP/wood panels and MS frame assembly.
- Integration of interactive Sailor Wheel hardware and sensors.
- Installation of processing unit and connectivity with display systems.
- Site installation, calibration, and testing of interactive functionality.
- Final finishing, inspection, and client handover.

5. Testing & Quality Assurance

- Verification of mechanical integrity of Sailor Wheel and kiosk structure.
- Functional testing of sensors, encoders, and navigation response.
- Integration testing with processing unit and display output.
- Compliance with IS/IEC standards for electrical and safety aspects.

6. Standards & Compliance

- IS/IEC electrical safety standards for wiring and power systems.
- FRP and wood quality compliant with **museum-grade durability**.
- IP-rated or fire-retardant components where applicable.

7. Deliverables

- Fully fabricated and installed interactive Sailor Wheel Kiosk.
- Integrated hardware and processing unit with functional display output.
- As-built drawings, wiring diagrams, and calibration reports.
- User manuals and maintenance guides.

8. Warranty & Post-Completion Support

- **Warranty: 3 years** covering mechanical, electrical, and interactive components.
- Post-warranty support for repairs, recalibration, or software updates.

4.2 Sound

Immersive Professional-Grade Sound System

1. General Description

Supply, installation, testing, and commissioning of a **professional-grade immersive sound system** from leading international brands, designed to enhance visitor engagement through **interactive installations and spatial audio experiences**. The system shall deliver **high-quality, multi-channel immersive sound** with seamless integration into the overall AV and interactive environment.

2. Scope of Work

- Supply and installation of full-range loudspeakers, satellite speakers, and subwoofers as per acoustic design.
- Supply, installation, and programming of amplifiers and DSPs for system tuning and immersive audio mapping.

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- Integration with central control systems for content triggering and synchronization with interactive media.
 - Provision of all cabling, connectors, racks, mounts, and accessories.
 - Supply of licensed immersive audio management software.
 - Testing, calibration, and commissioning of the complete system.

3. Technical Specifications

a) Speakers

- **Full-range loudspeakers** with frequency response suitable for clear dialogue, effects, and music playback.
- **Satellite speakers** for distributed immersive soundscapes.
- **Subwoofers** for extended low-frequency performance.
- Wide dispersion and high SPL capability for even coverage.
- Mounting brackets/rigging as per site requirements.

b) Amplifiers & Processors (DSP)

- Digital signal processors with capabilities for **EQ, delay, crossover, audio routing, and immersive audio mapping**.
- Multi-channel amplifiers with sufficient power rating for connected speakers.
- Built-in protection for overcurrent, overheating, and short-circuit.

c) Control & Integration

- Central audio control system with **content triggering, scheduling, and synchronization** with visual/interactive systems.
- Integration with show control or AV control system for automation.

d) Cabling & Accessories

- High-quality audio cabling (shielded as required).
- Professional-grade connectors (Neutrik or equivalent).
- Equipment racks with cooling, mounts, and cable management accessories.

e) Software

- Licensed immersive audio playback and management software.
- Features: channel mapping, real-time control, and synchronization with projection/interactive systems.

f) Approved Makes

- **Bose / JBL / Yamaha / Harman / d&b audiotechnik / equivalent international make.**

4. Execution Methodology

- Acoustic assessment of site and speaker layout design.
 - Installation of loudspeakers, subwoofers, and satellite units with mounts.
 - Rack integration of amplifiers, DSPs, and control units.
 - Software installation and configuration.
 - Audio calibration for **balanced coverage, immersive spatial effects, and clarity**.
 - Testing and commissioning with client representatives.
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5. Testing & Quality Assurance

- Measurement of **SPL, frequency response, and coverage uniformity**.
- System tuning using real-time analyzers.
- Functional testing of immersive playback with synchronized visuals/interactive content.
- Verification of safety standards, cabling integrity, and redundancy checks.

6. Standards & Compliance

- **IEC 60268** – Sound system equipment.
- **ISO 3382** – Acoustics measurement for performance spaces.
- IEC 60268-5– Loudspeaker specifications.
- CE / RoHS certified equipment.

7. Deliverables

- Fully functional immersive audio system with installed hardware and configured software.
- As-built wiring diagrams, equipment layout drawings, and configuration documentation.
- Training for operators on system usage and basic troubleshooting.

8. Warranty & Post-Completion Support

- **Warranty: 3 years** on all supplied equipment, including amplifiers, DSPs, and speakers.
- Post-warranty services: Calibration, software updates, and extended support.

4.3 Projector

1-Chip DLP Laser Phosphor Multimedia Projection System

1. General Description

Supply, installation, testing, and commissioning of a **high-performance 1-chip DLP laser phosphor multimedia projector** suitable for **museum, gallery, or auditorium use**. The system shall provide **high brightness, WUXGA resolution, long operational life, and seamless integration** with AV and interactive systems.

2. Scope of Work

- Supply and installation of the projector with **mounting brackets and structural supports**.
- Integration with media servers, AV controllers, and display systems.
- Provision of **all necessary cabling, adapters, and accessories** for complete operational setup.
- Calibration of brightness, focus, zoom, and alignment for optimal projection.
- Testing, commissioning, and handover to client with full documentation.

3. Technical Specifications

a) Light Source

- Laser Phosphor technology with **minimum 20,000 hours life**.

b) Brightness

- 6,500 – 7,000 ANSI lumens suitable for large projection surfaces.

c) Resolution & Image Quality

- Native Resolution: 1920 × 1200 (WUXGA)
- Contrast Ratio: 10,000:1
- Lens: Manual or motorized zoom and focus adjustment
- Supplied with **long-throw zoom lens** appropriate for site requirements

d) Connectivity

- HDMI inputs
- HDBaseT input
- USB ports for media or control

e) Mounting & Accessories

- Projector mounting bracket with structural support
- All necessary cabling, adapters, and installation accessories

f) Approved Makes

- **Christie / Barco / Digital Projection**

4. Execution Methodology

- Site survey to determine projector placement and throw distance.
- Installation of mounting brackets and structural supports.
- Mounting of projector and lens installation.
- Connection to power, data, and media sources.
- Calibration of brightness, focus, zoom, and alignment.
- Functional testing and commissioning of projection system.

5. Testing & Quality Assurance

- Verification of image brightness, resolution, and contrast.
- Lens zoom and focus functionality check.
- Connectivity testing: HDMI, HDBaseT, USB inputs.
- Long-term operational test for stability and image quality.
- Compliance with IS/IEC electrical safety standards.

6. Standards & Compliance

- IEC 60950 / IEC 62368-1 – Electrical safety for IT/AV equipment
- RoHS & CE compliance
- Laser safety standards for Class 1 or as applicable

7. Deliverables

- Fully installed, tested, and commissioned projector system
- Projector mounting brackets and structural supports
- Cabling, adapters, and installation accessories

-
- As-built drawings, calibration reports, and operational manuals

8. Warranty & Post-Completion Support

- **Warranty: 2 years** covering projector, light source, and accessories
- Post-warranty support for servicing, lamp replacement, or calibration

4.4 Media Server

Professional-Grade Display Media Server / Workstation

1. General Description

Supply, installation, testing, and commissioning of a **high-performance display media server / workstation** capable of **4K content playback, synchronized multi-display output, and real-time content capture**. The system shall support interactive installations, projection mapping, and advanced media display applications.

2. Scope of Work

- Supply of **rack-mountable workstation** with specified hardware and software.
- Integration with multiple display systems, lighting controllers, and media playback infrastructure.
- Installation, configuration, and testing for **multi-display synchronization, real-time capture, and Art-Net integration**.
- Provision of all necessary cabling, adapters, mounts, and accessories.
- Documentation, calibration, and handover to client.

3. Technical Specifications

a) Processor & Form Factor

- Intel® Core i9, 10th Gen or higher.
- Rack-mountable workstation suitable for AV/IT infrastructure.

b) Memory & Storage

- 32 GB DDR4 RAM minimum.
- Storage: 1 TB SSD for OS and applications; 2 TB HDD for content storage.

c) Graphics & Display Outputs

- NVIDIA Quadro 8 GB or equivalent GPU.
- 3 × DisplayPort outputs, 4K-ready.
- Support for multi-display synchronization and high-fidelity rendering.

d) Operating System

- Windows 10 Pro 64-bit or higher (licensed).

e) Features

- Genlock and Framelock for synchronized display outputs.
- Art-Net Ethernet in/out for integration with lighting and show control systems.
- Real-time content capture capability.
- Support for 4K content playback, projection mapping, and interactive applications.

f) Approved Makes

- Dell / HP / ASUS

4. Execution Methodology

- Site survey to determine rack space, power, and network connectivity.
- Installation of workstation in server racks with proper mounting and cable management.
- Configuration of OS, GPU drivers, and playback software.
- Integration with display screens, lighting, and control systems.
- Testing for multi-display synchronization, real-time capture, and Art-Net integration.

5. Testing & Quality Assurance

- Verification of multi-display output and synchronization.
- Real-time content capture testing.
- Art-Net input/output functional test.
- Stress testing under continuous 4K playback.
- Compliance with IS/IEC standards for electrical and network safety.

6. Standards & Compliance

- IEC/IS electrical safety standards.
- RoHS and CE compliance for all hardware components.
- Rack-mount standards for AV/IT equipment.

7. Deliverables

- Fully installed and commissioned media server/workstation.
- Connected and tested with displays and interactive systems.
- Cable management, documentation, as-built drawings, and operational manuals.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** covering workstation hardware, GPU, storage, and accessories.
- Post-warranty support for software updates, troubleshooting, and hardware replacement.

4.5 Mapping Software

3D Projection Mapping Software & Playback Control System

1. General Description

Supply, installation, testing, and commissioning of a **3D projection mapping software and playback control system** capable of managing, scheduling, and controlling media servers for **projection mapping and immersive experiences**. The system shall provide **real-time content management, multi-server synchronization, and automated playback** functionality.

2. Scope of Work

- Supply of **licensed 3D projection mapping software** and playback control system.
- Integration with specified **media servers, displays, and interactive installations**.
- Installation, configuration, and calibration for seamless content playback.
- Training of client personnel for operational use and content management.
- Testing and commissioning of the complete system to ensure full functionality.
- Provision of all consumables, incidentals, cables, adapters, and hardware required for full system operation.

3. System Requirements & Features

a) Software & Playback Control

- Direct control of inputs and media timelines.
- Multi-display and multi-server synchronized playback.
- Real-time editing, layering, and content management tools.
- Scheduling features for automated playback.
- Option for external control via hardware controllers or automation units.
- Compatibility with the project-specified media servers.
- Licensed software with **perpetual or long-term license transfer** to the client.

b) Approved Makes

- **Dataton (Watchout) / Coolux (Pandas) / Pixera** or equivalent.

c) Integration & Accessories

- Playback controller, cabling, adapters, and hardware for integration.
- All consumables and accessories necessary for fully functional system.

4. Execution Methodology

- Review and survey of site for media server and display integration.
- Installation of playback control system and software on specified servers.
- Configuration for multi-display and multi-server synchronized playback.
- Real-time testing, calibration, and validation of projection mapping content.
- Training for client staff on operational and content management procedures.
- Final commissioning and handover with documentation.

5. Testing & Quality Assurance

- Verification of multi-server synchronization and playback stability.
- Testing of automated playback, scheduling, and content layering functions.
- Functional integration with all media servers and displays.
- Compliance with IS/IEC standards for electrical and operational safety.

6. Standards & Compliance

- Licensed software and hardware compliant with **international IP and copyright standards**.
- Electrical safety compliance as per IS/IEC standards.
- Fire-retardant and safety-compliant mounting and cabling materials.

7. Deliverables

- Fully installed and commissioned 3D projection mapping and playback control system.
- Licensed software with documentation and operational manuals.
- Training materials and records of training provided.
- Integration with media servers, displays, and interactive installations.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** covering software, playback controller, and integration hardware.
- Post-warranty support for updates, troubleshooting, and reconfiguration.

4.6 Cable & Accessories

Custom Controller System & Networking Infrastructure

1. General Description

Supply, installation, testing, and commissioning of a **centralized custom controller system** with **all necessary cabling and network infrastructure**, ensuring seamless integration and operation of AV, projection, and IT systems.

2. Scope of Work

- Supply and installation of **custom centralized control unit** with all required interfaces for AV/IT integration.
- Provision of **complete cabling and connectors** (HDMI, LAN, power, control, and other signal cables) with proper terminations.
- Supply and installation of **network infrastructure**, including network rack, patch panels, switches (managed/unmanaged), and Power Distribution Units (PDU).
- Supply and installation of all **accessories** such as adaptors, junction boxes, mounting hardware, and cable management systems.
- Integration of controller with projection/display equipment, AV/IT systems, and network components to ensure **full system functionality**.
- Testing, calibration, and commissioning of the complete system.

3. Technical Specifications

a) Custom Controller

- Centralized control unit with interfaces for AV/IT system integration.
- Compatibility with media servers, projectors, displays, and interactive installations.

b) Cables & Connectors

- HDMI, LAN, control, and power cables with proper terminations.
- High-quality connectors and adapters suitable for continuous operation.

c) Network Infrastructure

- Network rack with patch panels, managed/unmanaged switch, and PDU.
- Accessories for structured cabling, cable dressing, and organization.

d) Accessories & Integration

- Junction boxes, adaptors, cable management hardware, and mounting fixtures.
- Complete interconnection for seamless control and AV/IT system operation.

4. Execution Methodology

- Site survey and planning for controller and network installation.
- Installation of controller, racks, switches, and cabling.
- Structured cabling with proper terminations and cable management.
- Integration with AV/IT systems, projection/display units, and interactive devices.
- Functional testing, calibration, and commissioning.
- Handover with operational manuals and system documentation.

5. Testing & Quality Assurance

- Verification of controller input/output functionality.
- Signal integrity tests for HDMI, LAN, and control cables.
- Network connectivity and redundancy checks.
- System-wide testing to ensure full operational functionality.
- Compliance with IS/IEC electrical and networking standards.

6. Standards & Compliance

- IEC/IS standards for electrical safety and cabling.
- Fire-rated or flame-retardant cabling and mounting materials.
- RoHS and CE compliance for all electronic equipment.

7. Deliverables

- Fully installed, tested, and commissioned controller system with network infrastructure.
- Complete cabling, adapters, and accessory installation.
- As-built drawings, wiring diagrams, and operational manuals.
- Test reports and calibration certificates.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** covering controller, cabling, switches, racks, and accessories.
- Post-warranty support for system updates, troubleshooting, or reconfiguration.

4.7 Installation & Integration

Electrical & Data Cabling for Projection and Technology Equipment

1. General Description

Supply, laying, fixing, testing, and commissioning of **all wiring and associated items** required to connect power and data from the **Distribution Board (DB)** to respective digital projection and interactive technology equipment. The system shall ensure **reliable power delivery, signal integrity, and seamless operation** of all connected devices.

2. Scope of Work

- Supply, laying, and fixing of **electrical cabling** from DB to equipment locations.
- Supply, laying, and termination of **signal/data cabling** for HDMI, LAN, fibre, and other AV/IT connections.
- Provision of **all accessories**, racks, patch panels, cable management, and mounting hardware.
- Integration, mapping, and calibration of all power and signal connections for seamless operation of projectors, displays, and interactive systems.
- Testing, commissioning, and documentation of the complete cabling infrastructure.

3. Technical Specifications

a) Electrical Cabling

- Copper FRLS/FRLSH cables of suitable sizes for power distribution.
- Conduits, trays, raceways, and protective accessories.
- Junction boxes, terminations, and proper earthing.

b) Signal/Data Cabling

- HDMI, LAN (Cat6/Cat6a), fibre optic, and other AV/IT cables.
- Connectors, patch cords, adaptors, and patch panels as required.
- Structured cabling to maintain signal integrity and minimize interference.

c) Accessories & Integration

- Racks, cable trays, mounting hardware, and power distribution units (PDUs).
- Cable dressing and management for clean and safe installation.
- Integration with control systems and technology equipment for proper mapping and signal routing.

4. Execution Methodology

- Site survey to determine optimal cable routes and mounting points.
- Laying and fixing of electrical and data cables according to site conditions.
- Termination, dressing, and labeling of all cables.
- Integration with connected equipment and testing of signal/power continuity.
- Calibration and verification of signal quality and functionality.

5. Testing & Quality Assurance

- Continuity and insulation resistance testing of electrical cables.
- Verification of signal integrity for HDMI, LAN, and fibre connections.
- Functional testing of all integrated systems with connected devices.
- Compliance check against design drawings and site standards.

6. Standards & Compliance

- IS 694 / IS 1554 – Electrical wiring standards.
- IEC 60227 / IEC 60332 – Cables and fire safety.
- IS/IEC standards for HDMI, LAN, fibre, and AV cabling.
- RoHS and CE compliance for all electronic components.

7. Deliverables

- Installed, tested, and commissioned electrical and data cabling network.
- As-built drawings and schematics.
- Test reports and compliance certificates.
- Operation and maintenance documentation.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** covering cabling, terminations, and accessories.
- Post-warranty support: troubleshooting, repairs, or modifications as required.

4.8 Content

Projection Film Development and Production (Approx. 5–7 Minutes)

1. General Description

Carrying out **end-to-end services** for the **development and production of a projection film** of approximately 5–7 minutes duration, to be projected on the **replica Port**, highlighting its **architectural, functional, and aesthetic details**. The project includes concept development, content creation, audio-visual production, integration, and delivery in projection-ready formats.

2. Scope of Work

a) Concept & Script

- Research and analysis of historical, architectural, and thematic aspects of the replica Port.
- Preparation of storyline, narrative framework, and script aligned with the interpretive theme.
- Presentation for approvals at draft and final stages.

b) Visual Content Creation

- Development of mixed media content:
 - Infographics, illustrations, 2D animation/motion graphics.
 - 3D animation wherever required for realism and immersion.
- Alignment of visual content with narrative and projection requirements.

c) Audio Design

- Professional sound design including:
 - Background music/score.
 - Synchronised audio effects for immersive experience.

d) Voiceover

- Recording of **professional voiceover** in Hindi, English, and Tamil.
- Integration of voiceover with visual content and timeline.

e) Integration & Optimization

- Editing, layering, and formatting of content for **projection mapping**.
- Optimization for resolution, color, and brightness as per site/projector requirements.

f) Deliverables

- Final approved film delivered in digital formats:

- Master files.
- Projection-ready formats compatible with playback systems.

g) Rights & Licenses

- All intellectual property rights, licenses, and usage rights to be **transferred fully to the client**.
- Clearances for all third-party content, if used.

3. Execution Methodology

1. Research & script development with client/VOCPA consultations.
2. Visual concept development and preliminary animations.
3. Audio design and voiceover recording in specified languages.
4. Content integration, editing, and optimization for projection.
5. Internal review and client approval at draft and final stages.
6. Final delivery in specified digital formats.

4. Quality Assurance

- Storyline consistency with historical and thematic accuracy.
- Visual and audio quality aligned to **projection standards**.
- Multi-language voiceover clarity and synchronization.
- Compatibility testing with projection system and playback devices.

5. Standards & Compliance

- Content shall conform to copyright, IP, and licensing standards.
- Audio and video production to adhere to **industry best practices**.
- Projection formats optimized for **standard AV playback systems**.

6. Deliverables

- Concept and script document (approved by client).
- Mixed media visual content (2D/3D animations, illustrations, infographics).
- Audio files including background score, effects, and multi-language voiceover.
- Fully integrated and formatted projection-ready film.
- Master files and playback-ready digital formats.

7. Warranty & Post-Completion Support

- Support for **minor edits, formatting adjustments, and projection optimization** for up to 3 months post-delivery.
- Transfer of all rights and licenses to client ensures long-term usability.

4.9 Software & Application:

Supplementary Technical Requirement – Functional Completeness

The contractor shall provide **all necessary technological equipment, software, applications, accessories, special effects, or any other mechanisms** required to ensure the **complete functionality and intended operation** of the system, installation, or exhibit.

This includes, but is not limited to:

- **Hardware components:** Sensors, controllers, displays, processing units, AV/IT devices, and interactive peripherals.
- **Software & Applications:** Licensed software, content management systems, interactive applications, drivers, and control interfaces.
- **Accessories & Cabling:** Power and data cables, adapters, connectors, mounting hardware, and protective components.
- **Special Effects / Mechanisms:** Lighting effects, projection mapping, actuators, haptic or motion feedback devices, and any additional mechanisms required to achieve the intended experience.
- **Integration & Commissioning:** Full integration of all components with seamless operation, testing, calibration, and handover.

All supplied items shall comply with relevant IS/IEC standards, safety regulations, and manufacturer guidelines, ensuring the system is fully operational, reliable, and visitor-ready. All necessary technology equipment, licensed software, applications, accessories, special effects, and any other mechanisms required to ensure full functionality, seamless operation, and integration of the system shall be included in the scope of supply.

5. PART-5 : COIN AND ARTEFACTS DISPLAY

5.1 Display

Museum Showcase — Technical Specification & Scope of Work

1. General Description

The work under this specification covers the **design, supply, fabrication, installation, testing, and commissioning** of a free-standing, floor-mounted museum showcase with maximum external dimensions of **4800 mm (L) × 1200 mm (W) × 2400 mm (H)**.

The showcase shall be designed to:

- Safely house and conserve archaeological artifacts.
- Provide high security, long-term stability, and environmental protection.
- Incorporate museum-grade lighting with low UV/heat emission.
- Meet the requirements of artifact preservation, display aesthetics, and operational durability.

2. Scope of Work & Technical Specification

2.1 Base / Pedestal

- Mild Steel (MS) pedestal with welded construction.
- Anti-corrosion treatment: blasting, priming, epoxy/polyurethane powder coating.
- Adjustable leveling feet and secure anchoring to floor.
- Color/finish as approved by Client.

2.2 Showcase Frame & Glazing

- Precision-engineered aluminium or stainless steel frame with concealed joints.

- Toughened safety glass (10–15 mm thick) or laminated glass as per security requirement.
- Concealed seals/gaskets: museum-grade, non-off-gassing, chemically stable.
- Doors fitted with continuous concealed hinges and multi-point locking.

2.3 Security & Hardware

- High-security locks (master key/euro profile cylinder) with minimum 2 keys.
- Tamper-proof fasteners and concealed fixings.
- Option for electronic locks or RFID control if required.

2.4 Lighting & Electrical

- Integrated museum-grade LED system:
 - CRI ≥ 90
 - CCT 3000–3500 K (warm white)
 - Low UV, low heat output
 - Flicker-free, dimmable drivers
- Internal concealed wiring, with earthing and surge protection.
- Local/remote dimming controls as specified.

2.5 Mechanical & Conservation Requirements

- Internal shelving and artifact mounts from inert, non-off-gassing materials.
- Stainless steel/brass fixings; corrosion resistant.
- Environmental sealing with dust-proof gaskets.
- Conservation-grade adhesives, sealants, paints.

2.6 Prototyping & Approval

- Supplier shall provide a **mock-up/prototype** of one representative section including glazing, finish, lighting, and locks for approval before full production.

3. Execution Methodology

1. Design & Shop Drawings

- Submit detailed shop drawings, GA, and finish samples for client review.
- Incorporate conservator's requirements for object safety and display conditions.

2. Fabrication

- Controlled workshop fabrication with certified materials.
- Ensure concealed joints, smooth finishes, and dimensional accuracy.

3. Surface Treatment

- Apply anti-corrosion treatment and final approved color finish.

4. Assembly & Transport

- Pack and transport components in protective crates.
- Deliver to site with handling precautions for glass and finished surfaces.

5. Installation

- Fix pedestal to floor with chemical anchors.
- Assemble showcase, install glazing, lighting, and electrical systems.
- Seal joints and check alignment/leveling.

6. Commissioning

- Connect electrical supply and test lighting.

-
- Perform sealing and security checks.
 - Record lux levels, CRI, CCT, and safety compliance.

4. Testing & Quality Assurance

Supplier shall implement a **Quality Assurance Plan** covering:

- **Dimensional checks** against approved drawings.
- **Material certification** (glass, metals, coatings, adhesives, gaskets).
- **Lock & access test** (operation of all locks and doors).
- **Lighting tests:** CRI, CCT, lux levels at artifact plane.
- **Electrical safety tests:** insulation resistance, continuity, earthing.
- **Environmental sealing test** for dust and air leakage.
- **Visual inspection** for finish, surface defects, or glass distortion.
- **Handover documentation:** manuals, test certificates, and warranty.

5. Codes & Standards Compliance

All works shall conform to relevant international/national standards including but not limited to:

- **Glass & Safety:** EN 12150 / IS 2553 (Toughened Safety Glass), EN 356 (Security Glazing).
- **Lighting:** CIE standards for museum lighting, IEC/EN 60598 (Luminaires), IES LM-79 & LM-80.
- **Electrical:** IEC 60364 / IS 732 (Electrical Installations), IEC 60529 (IP Rating), IS 3043 (Earthing).
- **Conservation Materials:** British Museum / AIC guidelines for conservation-safe materials.
- **Metal Fabrication:** IS 2062 / ASTM A36 (structural steel), IS/ISO 12944 (anti-corrosion coatings).

6. Scope of Supply / Deliverables

The Supplier shall provide the following:

1. One (1) free-standing museum showcase (up to 4800×1200×2400 mm) complete in all respects.
2. MS pedestal with anti-corrosion finish, levelling, and anchoring system.
3. Showcase frame, glazing, locking system, and conservation seals.
4. Integrated museum-grade LED lighting system, drivers, wiring, and earthing.
5. Internal shelves/mounts fabricated from conservation-grade materials.
6. Prototype/mock-up unit for approval prior to fabrication.
7. Shop drawings, GA, fabrication drawings, finishes schedule.
8. Installation, testing & commissioning at site.
9. Test certificates (materials, electrical, lighting performance).
10. Operation & Maintenance (O&M) manual with cleaning guidelines.
11. As-built drawings and spare parts list.
12. Warranty certificate (minimum 12 months).

7. Warranty & Post-Completion Support

- **Warranty: 2 years** covering hardware, display panel, and built-in components.
- Post-warranty support for replacement, calibration, and software updates.

5.2 Fibre Reinforced Plastic (FRP) Replica of Coin

FRP Circular Replica Models of Historic Coins (Period 03 – City Timeline)

1. General Description

This specification covers the **supply, fabrication, installation, testing, and commissioning of circular replica models of historic coins**, representing Period 03 of the City Timeline. The replicas shall be fabricated in **Fiberglass Reinforced Plastic (FRP)** with varying diameters up to **50 mm – 350 mm** and thickness ranging from **10 mm – 100 mm**, finished to match the color, motifs, and relief details of the original artifacts. The models shall be durable, lightweight, environmentally stable, and finished with **museum-grade paints and coatings** to ensure long-term preservation of aesthetics and surface integrity.

2. Scope of Work & Technical Specification

2.1 Material & Construction

- **Primary Material:** Fiberglass Reinforced Plastic (FRP) of approved grade.
- **Framework & Reinforcement:** Mild Steel (MS) or FRP reinforcement as required for stability and mounting.
- **Sizes:** Diameter 50 mm to 350 mm; thickness 10 mm to 100 mm.
- **Surface Detailing:** Precision moulding, relief carving, seamless joints, and detailing to replicate original motifs.
- **Finish:** High-quality paint and coatings as per approved color samples.

2.2 Mounting & Installation

- **Mounting Systems:** Suitable fixtures, hardware, hanging/bolting arrangements for:
 - Wall-mounted,
 - Floor-mounted, or
 - Ceiling-suspended installations.
- **Supports:** Adequate load-bearing supports and concealed fixings to ensure safety.

2.3 Additional Provisions

- **Prototyping:** Development of sample/mock-up for approval prior to final fabrication.
- **Electrical/Mechanical Integration:**
 - Provision for lighting (if specified).
 - Structural/mechanical supports for stability.
 - Integration with surrounding exhibition design.

3. Execution Methodology

1. Design & Approval

- Preparation of detailed 3D design drawings and mock-ups.
- Submission of prototypes for review and approval.

2. Fabrication

- Precision moulding of FRP with MS/FRP reinforcement.
- Surface finishing with detailing to match original coins.
- Application of protective coatings (UV-resistant, anti-fungal, scratch-resistant).

3. Installation

- Safe handling and transportation to site.
- Fixing using appropriate mounting systems (concealed or exposed as per design).
- Alignment and integration with exhibition displays.

4. Commissioning

- Verification of finish, detailing, stability, and safety.
- Testing of integrated lighting/mechanical supports (if applicable).

4. Testing & Quality Assurance

- **Visual Inspection:** Finish, detailing, and color fidelity compared with approved samples.
- **Dimensional Verification:** Sizes and proportions as per approved design.
- **Surface Quality Test:** Smooth finish, no visible cracks, bubbles, or deformities.
- **Structural Stability Test:** Reinforcement and mounting strength verification.
- **Mock-Up Approval:** Sample prototype approval before mass fabrication.
- **Environmental Durability Test:** Resistance to UV fading, moisture, humidity, and temperature variations.

5. Codes & Standards Compliance

- **Material Safety:** IS/ISO standards for FRP composites.
- **Paint & Finish:** Non-toxic, low-VOC, UV-resistant coatings.
- **Fire Rating:** FRP material to be flame-retardant as per ASTM E84 / IS 1642 (where specified).
- **Structural Stability:** As per IS 875 (Part 2) – Imposed Loads.
- **Environmental Durability:** Protection against humidity, moisture, and temperature fluctuations.

6. Scope of Supply / Deliverables

The Supplier shall provide:

1. FRP replica coin models (sizes up to 350 mm dia, thickness 10–100 mm).
2. MS/FRP reinforcement and mounting systems.
3. High-quality painted and finished surfaces as per approvals.
4. UV- and moisture-resistant protective coatings.
5. Prototypes/mock-ups for prior approval.
6. Integrated lighting/mechanical systems (if specified).
7. Installation, testing, and commissioning services.
8. OEM/product documentation, drawings, and handover materials.
9. Warranty – minimum **3 years for structural and surface integrity**.

The quoted rate shall be **inclusive of all materials, fabrication, accessories, installation, testing, commissioning, consumables, incidentals, taxes, and duties** to deliver the replica coin models complete in all respects.

5.3 **65" Displays**

Professional-Grade 65" 4K UHD Display

1. General Description

This specification covers the **supply, installation, testing, and commissioning (SITC)** of a **professional-grade 65" diagonal display** designed for continuous **24/7 operation** in digital signage, museum, or control environments. The display shall deliver **ultra-high-definition visuals**, robust performance, and integrated hardware/software features for long-term reliability.

2. Scope of Work & Technical Specification

2.1 Display Specifications

- **Type:** Edge LED BLU
- **Diagonal Size:** 65" (approx. 1651 mm)
- **Resolution:** 3840 × 2160 (4K UHD)
- **Pixel Pitch:** 0.315 × 0.315 mm
- **Active Display Area (approx.):** 1428.5 (H) × 803.5 (V) mm
- **Brightness (Typ.):** 500 nits
- **Contrast Ratio:** 4000:1
- **Viewing Angle (H/V):** 178° / 178°
- **Response Time (G-to-G):** 8 ms (Typ.)
- **Display Colors:** 16.7 million
- **Color Gamut:** 92% (DCI-P3, CIE 1976)
- **Operation:** 24/7 continuous operation
- **Surface Treatment:** 25% haze (anti-glare, without glass)

2.2 Special Hardware Features

- Temperature sensor
- Pivot display support
- Clock battery (168 hrs clock keeping)
- Built-in speakers: 10 W × 2 channels
- Video wall daisy chain: HDCP2.2 (4EA), HDCP1.4 (7EA)
- IP5X dust protection rating
- Wi-Fi and Bluetooth connectivity

2.3 Special Software Features

- Auto source switching & recovery
- LFD Home UI
- Button lock and hot key option
- Plug & Play initial setup

2.4 Approved Makes

- **Samsung / Christie** (or equivalent approved)

3. Execution Methodology

1. Pre-Installation

- Verification of site conditions, power/data availability, and mounting structure.
- Coordination with civil/architectural works for concealed wiring/cable pathways.

2. Installation

- Secure mounting with OEM-approved brackets.
- Cable dressing and connection of HDMI, LAN, and power.
- Configuration of display settings.

3. Commissioning

- Verification of UHD resolution, brightness, and color reproduction.
- Functional testing of hardware/software features.
- Demonstration of 24/7 operational reliability.

4. Testing & Quality Assurance

- **Display Quality Test:** Brightness, contrast, and UHD resolution.
- **Uniformity Test:** Even backlight without hotspots.
- **Connectivity Test:** HDMI, LAN, Wi-Fi/BT, daisy chain ports.
- **Operational Test:** Minimum 4-hour continuous run.
- **Reliability Test:** Verification of temperature sensor, pivot, and automation features.

5. Codes & Standards Compliance

- **Electrical Safety:** IEC 62368-1
- **Electromagnetic Compatibility (EMC):** EN 55032, EN 55024
- **Ingress Protection:** IEC 60529 (IP5X)
- **Environmental Compliance:** RoHS, WEEE directives
- **Performance:** Energy Star (where applicable)

6. Scope of Supply / Deliverables

The Supplier shall provide:

1. 65" 4K UHD Professional Display (as per specification)
2. OEM-approved mounting hardware and accessories
3. Power cables, HDMI/DisplayPort cables, and required connectors
4. Installation, testing, and commissioning services
5. User manuals, O&M documentation, and as-built drawings
6. Warranty – minimum **2 years comprehensive onsite warranty**

The quoted rate shall be **inclusive of all equipment, mounting hardware, cabling, accessories, installation, testing, commissioning, consumables, incidentals, taxes, and duties** to deliver the display fully functional in all respects.

5.4 Mini PC for Info Kiosk

Mini PC Controller for Kiosk

1. General Description

Supply, installation, testing, and commissioning of a **Mini PC Controller for Kiosk**, compact in design, suitable for continuous operation, and capable of handling interactive kiosk applications with high reliability and performance.

2. Technical Specifications

- **Processor:** Intel Core i7, latest generation or higher.
- **Memory (RAM):** 16 GB DDR4.
- **Storage:** 1 TB SSD (NVMe preferred).
- **Operating System:** Windows 10 Pro 64-bit, genuine licensed version.
- **Form Factor:** Compact Mini PC (Intel NUC or equivalent).
- **Connectivity:** HDMI, USB (multiple ports), LAN, Wi-Fi, Bluetooth.
- **Accessories:**
 - Wireless Keyboard & Mouse (OEM-approved).
 - HDMI cable.
 - Power adaptor with surge protection.
 - All required connectors and adaptors.

3. Execution Methodology

11. Delivery and site readiness verification.
12. Installation in kiosk enclosure with secure fixing.
13. Connection to display, input devices, and power supply.
14. OS activation, driver installation, and configuration.
15. Testing of performance, connectivity, and kiosk integration.

4. Testing & Quality Assurance

- Verification of hardware specifications.
- Benchmarking and system stress test for stability.
- OS activation and license validation.
- Functional testing with kiosk application.
- Burn-in test for 24/7 operation reliability.

5. Codes & Standard Compliance

- IEC 60950 / IEC 62368-1 (Safety of IT equipment).
- RoHS & CE compliance.
- Energy Star certified hardware.
- BIS certification where applicable.

6. Deliverables

- Mini PC Controller with licensed OS.
- Wireless Keyboard & Mouse.

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- HDMI cable, power adaptor, and required connectors.
 - Installation and configuration documentation.
 - OEM warranty cards and license certificates.

7. Approved Makes

- Intel
- Dell
- HP
- ASUS

8. Warranty & Post-Warranty Services

- **Warranty: 2 Years** – Comprehensive onsite support for hardware and licensed OS.
- **Post-Warranty Services:** OEM-authorized AMC support for hardware upgrades, replacements, and extended maintenance.

5.5 Sensors with Accessories

TF Mini LiDAR Sensor with Accessories

1. General Description

This specification covers the **supply, installation, testing, and commissioning** of a **compact LiDAR sensor (TF Mini or equivalent)** for integration with interactive/automation systems. The sensor shall include all required accessories, wiring, and mounting hardware to deliver a fully functional installation.

2. Scope of Work & Technical Specification

2.1 Sensor Specifications (Minimum)

- **Type:** Compact LiDAR distance measurement sensor.
- **Range:** As per OEM datasheet (typical: short to medium range applications).
- **Measurement:** High-precision distance measurement with stable output.
- **Interfaces:** UART / I²C (or equivalent standard communication protocols).
- **Power Consumption:** Low, suitable for continuous 24/7 operation.
- **Durability:** Designed for reliable operation in kiosk/interactive environments.

2.2 Accessories

- OEM-recommended **mounting brackets** for fixed and secure installation.
- **Wiring harnesses**, adaptors, and connectors for integration.
- Protection covers or housings (if required by site conditions).

2.3 Approved Makes

- **TF Mini** or equivalent (with proven track record in LiDAR-based automation).

3. Execution Methodology

1. Pre-Installation

- Verify mounting location, angle, and range requirements.
- Confirm power supply and communication interface compatibility with host system.

2. Supply & Delivery

- Deliver sensor and accessories in OEM packaging with datasheet, manuals, and certificates.
- Ensure safe handling and storage to prevent dust, shock, or electrostatic damage.

3. Installation & Integration

- Install LiDAR sensor using supplied brackets and hardware.
- Connect wiring harness to host controller via UART/I²C or equivalent.
- Secure and conceal cabling where required.

4. Commissioning

- Power-up and functional test.
- Configure sensor parameters as per OEM documentation.
- Integrate with host system (interactive/automation).
- Verify range, accuracy, and stability under operational conditions.

4. Testing & Quality Assurance

- **Functional Test:** Verification of range, accuracy, and output signal stability.
- **Interface Test:** Communication with host system via UART/I²C.
- **Power Test:** Voltage/current compliance with datasheet.
- **Continuous Operation Test:** 2–4 hours continuous run to verify stability.
- **Integration Test:** Full system operation with interactive/automation application.

5. Codes & Standards Compliance

- **Electrical Safety:** IEC 62368-1.
- **EMC:** EN 55032, EN 55024 (or equivalent).
- **Environmental:** RoHS compliance, low power eco-friendly design.
- **OEM Documentation:** Sensor must comply with published OEM datasheet specifications.

6. Scope of Supply / Deliverables

The Supplier shall provide:

1. **TF Mini LiDAR sensor** (or approved equivalent).
2. OEM-recommended **mounting brackets, wiring harness, connectors, and adaptors.**
3. Installation and secure mounting at designated location.
4. Integration with host automation/interactive system.
5. Testing, commissioning, and demonstration of functionality.
6. Datasheets, manuals, and wiring diagrams.
7. Warranty certificate (minimum **12 months**).

The quoted rate shall be **inclusive of all equipment, accessories, installation, integration, testing, commissioning, consumables, incidentals, taxes, and duties** to deliver the LiDAR sensor system fully functional in all respects.

5.6 Installation & Integration

Electrical & Data Cabling for Projection and Technology Equipment

1. General Description

Supply, laying, fixing, testing, and commissioning of **all wiring and associated items** required to connect power and data from the **Distribution Board (DB)** to respective digital projection and interactive technology equipment. The system shall ensure **reliable power delivery, signal integrity, and seamless operation** of all connected devices.

2. Scope of Work

- Supply, laying, and fixing of **electrical cabling** from DB to equipment locations.
- Supply, laying, and termination of **signal/data cabling** for HDMI, LAN, fibre, and other AV/IT connections.
- Provision of **all accessories**, racks, patch panels, cable management, and mounting hardware.
- Integration, mapping, and calibration of all power and signal connections for seamless operation of projectors, displays, and interactive systems.
- Testing, commissioning, and documentation of the complete cabling infrastructure.

3. Technical Specifications

a) Electrical Cabling

- Copper FRLS/FRLSH cables of suitable sizes for power distribution.
- Conduits, trays, raceways, and protective accessories.
- Junction boxes, terminations, and proper earthing.

b) Signal/Data Cabling

- HDMI, LAN (Cat6/Cat6a), fibre optic, and other AV/IT cables.
- Connectors, patch cords, adaptors, and patch panels as required.
- Structured cabling to maintain signal integrity and minimize interference.

c) Accessories & Integration

- Racks, cable trays, mounting hardware, and power distribution units (PDUs).
- Cable dressing and management for clean and safe installation.
- Integration with control systems and technology equipment for proper mapping and signal routing.

4. Execution Methodology

- Site survey to determine optimal cable routes and mounting points.
- Laying and fixing of electrical and data cables according to site conditions.
- Termination, dressing, and labeling of all cables.
- Integration with connected equipment and testing of signal/power continuity.
- Calibration and verification of signal quality and functionality.

5. Testing & Quality Assurance

- Continuity and insulation resistance testing of electrical cables.

- Verification of signal integrity for HDMI, LAN, and fibre connections.
- Functional testing of all integrated systems with connected devices.
- Compliance check against design drawings and site standards.

6. Standards & Compliance

- IS 694 / IS 1554 – Electrical wiring standards.
- IEC 60227 / IEC 60332 – Cables and fire safety.
- IS/IEC standards for HDMI, LAN, fibre, and AV cabling.
- RoHS and CE compliance for all electronic components.

7. Deliverables

- Installed, tested, and commissioned electrical and data cabling network.
- As-built drawings and schematics.
- Test reports and compliance certificates.
- Operation and maintenance documentation.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** covering cabling, terminations, and accessories.
- Post-warranty support: troubleshooting, repairs, or modifications as required.

5.7 Display Graphics

Backlit Stretch Fabric Graphic Partitions

1. General Description

Supply, installation, testing, and commissioning of **backlit stretch fabric graphic partitions**, fixed to walls on a **custom metal framework**, designed to form **organic shapes** with integrated lighting and automation features. The system shall be executed to provide a **frameless, edgeless appearance** with high-quality visuals and smooth finishes, suitable for long-term use in museum/gallery environments.

2. Scope of Work

- Design, fabrication, and installation of metal framework shaped to organic forms.
- Supply and fixing of UV-printed stretch fabric using SEG (Silicon Edge Graphics) system.
- Integration of LED backlighting with programmable automation.
- Supply of all accessories, profiles, power supplies, controllers, wiring, and terminations.
- Testing, commissioning, and handover of a fully functional system.

3. Technical Specifications

a) Fabric

- Material: High-quality polyester fabric, **150–300 gsm**.
- Printing: UV digital printing with high resolution (≥ 1200 dpi).

- Safety: **FR-rated (fire-retardant)** and UV resistant.
- Fixing: **SEG (Silicon Edge Graphics)** system for seamless, frameless appearance.
- Approved Makes: **Barrisol / LG / Dinolax or equivalent.**

b) Framework

- Powder-coated **metal frame structure**, shaped to required organic profiles.
- Supporting flexi-ply or equivalent backing wherever necessary.
- Concealed fixing system to achieve clean aesthetics.

c) Graphics

- High-resolution UV-printed fabric panels, precisely color-calibrated.
- Seamless joins, properly tensioned to ensure wrinkle-free finish.

d) Lighting

- Integrated **LED backlighting system** with uniform distribution (no hotspots).
- Minimum CRI ≥ 90 , CCT range: 3000K–6500K (tunable as per design).
- Provision for **programmable dimming and color-changing controls.**
- Automation: Compatible with DMX/DALI/other lighting control systems.

e) Accessories & Integration

- Complete supply of **aluminium profiles, tensioning systems, connectors, wiring, and power supplies.**
- Controllers for dimming, automation, and lighting effects.
- All terminations, junction boxes, and cabling as per IS/IEC standards.

4. Execution Methodology

- **Mock-up** of a sample section for client approval before final execution.
- Framework fabrication and wall mounting.
- Fabric printing, finishing, and SEG fixing.
- Installation of LED lighting system and integration with automation controls.
- On-site calibration, testing, and commissioning.

5. Testing & Quality Assurance

- Fabric print quality, color accuracy, and fire-retardancy certification.
- Electrical testing of LED modules, drivers, and control systems.
- Uniformity of backlighting across entire surface (no dark zones).
- Joint inspection and approval with client representatives.

6. Standards & Compliance

- **IS 10322 / IEC 60598** – LED luminaire safety.
- **IS 694 / IEC 60227** – Electrical wiring.
- **NFPA / ASTM / EN 13501-1** – Fire-retardant certification for fabric.
- **RoHS / CE certified** lighting and control components.

7. Deliverables

- Installed and commissioned stretch fabric partitions with integrated backlighting.
- Controllers, wiring, and automation system integrated with central lighting controls.
- As-built drawings, operation manuals, and test certificates.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** on fabric print, framework, LED lighting, and control systems.
- Post-warranty support for content updates, re-printing, or system maintenance on mutually agreed terms.

5.8 Software / Application

Supplementary Technical Requirement – Functional Completeness

The contractor shall provide **all necessary technological equipment, software, applications, accessories, special effects, or any other mechanisms** required to ensure the **complete functionality and intended operation** of the system, installation, or exhibit.

This includes, but is not limited to:

- **Hardware components:** Sensors, controllers, displays, processing units, AV/IT devices, and interactive peripherals.
- **Software & Applications:** Licensed software, content management systems, interactive applications, drivers, and control interfaces.
- **Accessories & Cabling:** Power and data cables, adapters, connectors, mounting hardware, and protective components.
- **Special Effects / Mechanisms:** Lighting effects, projection mapping, actuators, haptic or motion feedback devices, and any additional mechanisms required to achieve the intended experience.
- **Integration & Commissioning:** Full integration of all components with seamless operation, testing, calibration, and handover.

All supplied items shall comply with relevant **IS/IEC standards, safety regulations, and manufacturer guidelines**, ensuring the system is **fully operational, reliable, and visitor-ready**. All necessary technology equipment, licensed software, applications, accessories, special effects, and any other mechanisms required to ensure full functionality, seamless operation, and integration of the system shall be included in the scope of supply.

6. PART -6: SHIP STAIRS

6.1 Display

32” 4K UHD Professional Display

1. General Description

This specification covers the **supply, installation, testing, and commissioning (SITC)** of a **professional-grade 32” diagonal display**, designed for **24/7 continuous operation**. The display shall provide **ultra-high-definition (UHD) resolution, wide viewing angles,**

high contrast, and robust performance suitable for use in museums, exhibitions, digital signage, and control environments. It shall include both **hardware and software features** to ensure reliable long-term operation.

2. Scope of Work with Technical Specification

2.1 Display Specifications

- **Type:** Edge LED BLU
- **Diagonal Size:** 32"
- **Resolution:** 3840 × 2160 (4K UHD)
- **Pixel Pitch (mm):** 0.315 × 0.315
- **Active Display Area (mm):** 708.5 (H) × 398.5 (V)
- **Brightness (Typ.):** 500 nits
- **Contrast Ratio:** 4000:1
- **Viewing Angle (H/V):** 178° / 178°
- **Response Time (G-to-G):** 8 ms (Typ.)
- **Display Colors:** 16.7 million
- **Color Gamut:** 92% (DCI-P3, CIE 1976)
- **Operation Hours:** 24/7 continuous operation
- **Surface Treatment:** 25% haze (anti-glare, without glass)

2.2 Special Hardware Features

- Temperature sensor
- Pivot display support
- Clock battery (168 hrs clock keeping)
- Built-in speakers: 10W × 2 channels
- Video wall daisy chain: HDCP2.2 (4EA), HDCP1.4 (7EA)
- IP5X dust protection rating
- Wi-Fi and Bluetooth connectivity

2.3 Special Software Features

- Auto source switching & recovery
- LFD Home UI
- Button lock & hot key option
- Plug & Play initial setup

2.4 Approved Makes

- **Samsung / Christie** (or equivalent with prior approval)

3. Execution Methodology

1. Pre-Installation

- Verification of site conditions, availability of power/data connections, and mounting locations.
- Review of civil/electrical provisions for cable routing and concealed installations.

2. Installation

- Secure mounting using OEM-approved brackets and fixtures.
- Proper cable dressing with HDMI, LAN, power connections.

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- Ensuring dust-proof sealing as per IP5X requirement.
 - 3. **Configuration & Commissioning**
 - Setting up UHD resolution and calibration of brightness, color, and contrast.
 - Enabling special hardware/software features (Wi-Fi, source switching, pivot).
 - Demonstration of continuous 24/7 operation.

4. Testing & Quality Assurance

- **Visual Quality Test:** UHD resolution, brightness, contrast, and color uniformity.
- **Backlight Uniformity Test:** To ensure no hotspots or dark patches.
- **Connectivity Test:** HDMI, LAN, Wi-Fi, Bluetooth, and daisy-chain functions.
- **Operational Test:** Minimum 4 hours of continuous operation.
- **Functionality Check:** Verification of sensors, pivot, clock battery, and audio.
- **User Acceptance Test (UAT):** Demonstration of all specified features to the Engineer/Client.

5. Codes & Standards Compliance

- **Safety:** IEC 62368-1 / IEC ~~60950-1~~.
- **Electromagnetic Compatibility (EMC):** EN 55032, EN 55024
- **Ingress Protection:** IEC 60529 (IP5X certified)
- **Environmental Compliance:** RoHS, WEEE directives
- **Performance & Energy Efficiency:** Energy Star (where applicable)

6. Scope of Supply / Deliverables

The Supplier shall provide:

1. **32" UHD Professional Display** (as per specification)
2. OEM-approved **mounting hardware and accessories**
3. **Power cables, HDMI/DisplayPort cables, LAN cables**, and all required connectors
4. Installation, testing, and commissioning services
5. **Documentation:** User manuals, warranty certificates, as-built drawings
6. **Factory datasheet** for the proposed display (to verify compliance at submittal stage)
7. **Warranty:** Minimum **3 years comprehensive onsite warranty**

The quoted rate shall be **inclusive of all equipment, mounting hardware, cabling, accessories, installation, testing, commissioning, consumables, incidentals, taxes, duties, and levies**, delivering the display **fully functional in all respects**.

6.2 Mini PC for Info Kiosk

Mini PC Controller for Kiosk

1. General Description

Supply, installation, testing, and commissioning of a **Mini PC Controller for Kiosk**, compact in design, suitable for continuous operation, and capable of handling interactive kiosk applications with high reliability and performance.

2. Technical Specifications

- **Processor:** Intel Core i7, latest generation or higher.
- **Memory (RAM):** 16 GB DDR4.
- **Storage:** 1 TB SSD (NVMe preferred).
- **Operating System:** Windows 10 Pro 64-bit, genuine licensed version.
- **Form Factor:** Compact Mini PC (Intel NUC or equivalent).
- **Connectivity:** HDMI, USB (multiple ports), LAN, Wi-Fi, Bluetooth.
- **Accessories:**
 - Wireless Keyboard & Mouse (OEM-approved).
 - HDMI cable.
 - Power adaptor with surge protection.
 - All required connectors and adaptors.

3. Execution Methodology

16. Delivery and site readiness verification.
17. Installation in kiosk enclosure with secure fixing.
18. Connection to display, input devices, and power supply.
19. OS activation, driver installation, and configuration.
20. Testing of performance, connectivity, and kiosk integration.

4. Testing & Quality Assurance

- Verification of hardware specifications.
- Benchmarking and system stress test for stability.
- OS activation and license validation.
- Functional testing with kiosk application.
- Burn-in test for 24/7 operation reliability.

5. Codes & Standard Compliance

- IEC 60950 / IEC 62368-1 (Safety of IT equipment).
- RoHS & CE compliance.
- Energy Star certified hardware.
- BIS certification where applicable.

6. Deliverables

- Mini PC Controller with licensed OS.
- Wireless Keyboard & Mouse.
- HDMI cable, power adaptor, and required connectors.
- Installation and configuration documentation.
- OEM warranty cards and license certificates.

7. Approved Makes

- Intel
- Dell
- HP

- ASUS

8. Warranty & Post-Warranty Services

- **Warranty: 2 Years** – Comprehensive onsite support for hardware and licensed OS.
- **Post-Warranty Services:** OEM-authorized AMC support for hardware upgrades, replacements, and extended maintenance.

6.3 Interactive Kit for Interaction

Gesture-Based Interactive Installation

1. General Description

The work includes the **supply, installation, testing, and commissioning** of a **gesture-based interactive installation**, where digital content is triggered and controlled by visitor hand movement/gestures. The system shall deliver an intuitive, immersive, and user-friendly experience with seamless integration of hardware, software, and content.

2. Scope of Work

- Supply and installation of **motion/gesture sensors** (IR/Camera-based).
- Provision of **processing unit** (Mini PC with media player as required).
- Integration with **display interface** (existing/provided separately).
- Supply of **mounting hardware, cabling, adaptors, and power supplies**.
- Licensed **gesture-recognition software** enabling real-time interaction.
- **Calibration, content integration, and commissioning** for functional readiness.
- Demonstration, O&M documentation, and training.

3. Technical Specifications

a) Hardware

- **Gesture Sensors:** IR depth camera or equivalent, minimum 30 fps, tracking distance 0.5–4 m.
- **Processing Unit:** Mini PC with Intel i7 / 16 GB RAM / 1 TB SSD / Windows 11 Pro.
- **Media Player:** Integrated or external (supporting FHD/4K playback).
- **Connectivity:** HDMI, USB 3.0/3.1, LAN, Wi-Fi, Bluetooth.
- **Mounting:** Wall/ceiling/floor mount depending on site layout.
- **Power:** Stabilized power adaptors, cabling, surge protection.

b) Software

- Licensed **gesture-interactive software** with:
 - Reliable multi-gesture recognition.
 - Content triggering, scaling, and mapping.
 - Customizable UI/UX.
 - Low-latency real-time performance (< 50 ms).
 - Compatibility with Windows OS.

c) Functionality

- **Real-time gesture tracking** with smooth rendering.

-
- **Low-latency interaction** for seamless user experience.
 - **Stable, continuous operation** for long hours (museum/exhibition environments).
 - **Calibration tools** for quick setup and content alignment.

4. Execution Methodology

19. **Design Approval:** Submission of sensor placement drawings & integration plan.
20. **Hardware Setup:** Installation of sensors, processing unit, and mounting.
21. **Software Installation:** Setup of licensed gesture-interactive software.
22. **Integration:** Linking to display/media system, content execution.
23. **Calibration:** Fine-tuning of sensors for accurate gesture response.
24. **Testing & Commissioning:** Verification of gesture responsiveness, latency, and reliability.

5. Testing & Quality Assurance

- Gesture accuracy test with multiple users and conditions.
- Latency check (< 50 ms).
- 24-hour stability/run test.
- Electrical safety test as per IS 732.
- Content trigger and playback verification.

6. Codes & Standard Compliance

- **Safety & EMC:** CE / FCC / BIS.
- **Electrical Safety:** IS 13252 (Part 1) / IEC 62368.
- **EMC/EMI:** IEC 61000.
- **RoHS** compliance.
- **Software License Compliance:** OEM-issued genuine license.

7. Scope of Deliverables

- Gesture sensors, processing unit, media player.
- Licensed interactive software.
- Mounting hardware, power adaptors, cabling.
- Content preloaded/executed as per requirement.
- User manuals, O&M documentation, and calibration guide.
- As-built drawings and test reports.

8. Warranty (2 Years)

- Comprehensive warranty for **2 years** covering hardware, software license, and integration.
- Free rectification/replacement of defective components during warranty.

9. Post-Warranty Services

- Availability of spares (sensors, adaptors, cables) for **minimum 5 years**.
- Software updates and technical support.
- Service response time within **72 hours**.

6.4 Installation & Integration

Electrical & Data Cabling for Projection and Technology Equipment

1. General Description

Supply, laying, fixing, testing, and commissioning of **all wiring and associated items** required to connect power and data from the **Distribution Board (DB)** to respective digital projection and interactive technology equipment. The system shall ensure **reliable power delivery, signal integrity, and seamless operation** of all connected devices.

2. Scope of Work

- Supply, laying, and fixing of **electrical cabling** from DB to equipment locations.
- Supply, laying, and termination of **signal/data cabling** for HDMI, LAN, fibre, and other AV/IT connections.
- Provision of **all accessories**, racks, patch panels, cable management, and mounting hardware.
- Integration, mapping, and calibration of all power and signal connections for seamless operation of projectors, displays, and interactive systems.
- Testing, commissioning, and documentation of the complete cabling infrastructure.

3. Technical Specifications

a) Electrical Cabling

- Copper FRLS/FRLSH cables of suitable sizes for power distribution.
- Conduits, trays, raceways, and protective accessories.
- Junction boxes, terminations, and proper earthing.

b) Signal/Data Cabling

- HDMI, LAN (Cat6/Cat6a), fibre optic, and other AV/IT cables.
- Connectors, patch cords, adaptors, and patch panels as required.
- Structured cabling to maintain signal integrity and minimize interference.

c) Accessories & Integration

- Racks, cable trays, mounting hardware, and power distribution units (PDUs).
- Cable dressing and management for clean and safe installation.
- Integration with control systems and technology equipment for proper mapping and signal routing.

4. Execution Methodology

- Site survey to determine optimal cable routes and mounting points.
- Laying and fixing of electrical and data cables according to site conditions.
- Termination, dressing, and labeling of all cables.
- Integration with connected equipment and testing of signal/power continuity.
- Calibration and verification of signal quality and functionality.

5. Testing & Quality Assurance

- Continuity and insulation resistance testing of electrical cables.
- Verification of signal integrity for HDMI, LAN, and fibre connections.

- Functional testing of all integrated systems with connected devices.
- Compliance check against design drawings and site standards.

6. Standards & Compliance

- IS 694 / IS 1554 – Electrical wiring standards.
- IEC 60227 / IEC 60332 – Cables and fire safety.
- IS/IEC standards for HDMI, LAN, fibre, and AV cabling.
- RoHS and CE compliance for all electronic components.

7. Deliverables

- Installed, tested, and commissioned electrical and data cabling network.
- As-built drawings and schematics.
- Test reports and compliance certificates.
- Operation and maintenance documentation.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** covering cabling, terminations, and accessories.
- Post-warranty support: troubleshooting, repairs, or modifications as required.

6.5 Content for Display

Content Research, Development & Production Services for Galleries

1. General Description

The work involves the **end-to-end development of interpretive content** for the galleries, including **research, scripting, translations, design, and media production**, to deliver a cohesive, authentic, and visitor-friendly narrative experience. The agency shall coordinate closely with **VOCPA (or their nominated representatives)** throughout the process to ensure historical accuracy, cultural sensitivity, and thematic alignment.

2. Scope of Work

a) Research & Framework

- Conduct in-depth **historical and thematic research** relevant to the gallery content.
- Develop **narrative frameworks, storylines, and timelines**, aligned with curatorial objectives.
- Curatorial discussions and validation with VOCPA representatives.

b) Content Creation

- Prepare **interpretive texts** for panels, captions, labels, and narratives.
- Write **scripts for audio-visuals, films, and interactives**.
- Ensure content is **visitor-centric, accessible, and engaging**.

c) Language Services

- **Translation** of all approved content into **Hindi, English, and Tamil**.
- **Proofreading and editing** by professional linguists to ensure accuracy and consistency.

d) Design & Visualization

- Create **infographics, maps, diagrams, and illustrations** to enhance interpretation.
- Develop **digital visualizations and interactive mock-ups** for content presentation.

e) Media Production

- Produce **short films, audio-visuals, animations, voiceovers, and digital interactive content**.
- All media to be **museum-grade quality** with licensed professional narration, music, and effects.

f) Integration & Formatting

- Deliver **final content packages** in both **print-ready and digital formats**.
- Content prepared for **integration with display panels, AV systems, and interactive technology**.

g) Approvals & Deliverables

- Submit **draft content** for review and approvals at each stage.
- Incorporate feedback and finalize all content.
- Deliver **master files (editable + final formats)** for all textual, graphic, and media content.

h) Rights & Licenses

- All content, media, and visuals to be **original and copyright-cleared**.
- Agency to provide **full transfer of rights, licenses, and clearances** to the client.

3. Execution Methodology

13. **Inception Meeting** with VOCPA for project orientation.
14. **Research & Draft Narrative** preparation with references and citations.
15. **Content Development** for text, graphics, and media in iterative stages.
16. **Stakeholder Review Workshops** for validation and approvals.
17. **Media Production & Formatting** in compliance with gallery specifications.
18. **Final Submission & Handover** of content package with documentation.

4. Testing & Quality Assurance

- Proofreading and language checks by certified linguists.
- Validation of **historical accuracy** through references and expert review.
- Compliance with **museum communication standards** (clarity, readability, accessibility).
- Trial integration of media content with target hardware/software.

5. Codes & Standard Compliance

- **UNESCO/ICOM museum communication guidelines** for interpretive content.
- **ISO 17100** for translation quality management.
- **ISO/IEC 27001** for digital content handling & licensing.
- **Broadcast/Media Standards** for AV production quality.

6. Deliverables

- Narrative framework, scripts, and content documentation.
- Text panels, captions, labels, and storylines in approved languages.

- Infographics, maps, diagrams, and illustrations in digital + print-ready formats.
- Audio-visual films, animations, and interactives with voiceovers.
- Final approved content in both **editable (source) and finalized formats**.
- Licensing documents, copyright clearance certificates, and transfer of rights.

7. Warranty & Post-Warranty Support

- **Warranty: 2 Years** – Free rectification of errors in content, translations, or formatting.
- **Post-Warranty Services:** Paid support for content updates, reformatting, and additional translations as required.

6.6 Sound

Immersive Professional-Grade Sound System

1. General Description

Supply, installation, testing, and commissioning of a **professional-grade immersive sound system** from leading international brands, designed to enhance visitor engagement through **interactive installations and spatial audio experiences**. The system shall deliver **high-quality, multi-channel immersive sound** with seamless integration into the overall AV and interactive environment.

2. Scope of Work

- Supply and installation of full-range loudspeakers, satellite speakers, and subwoofers as per acoustic design.
- Supply, installation, and programming of amplifiers and DSPs for system tuning and immersive audio mapping.
- Integration with central control systems for content triggering and synchronization with interactive media.
- Provision of all cabling, connectors, racks, mounts, and accessories.
- Supply of licensed immersive audio management software.
- Testing, calibration, and commissioning of the complete system.

3. Technical Specifications

a) Speakers

- **Full-range loudspeakers** with frequency response suitable for clear dialogue, effects, and music playback.
- **Satellite speakers** for distributed immersive soundscapes.
- **Subwoofers** for extended low-frequency performance.
- Wide dispersion and high SPL capability for even coverage.
- Mounting brackets/rigging as per site requirements.

b) Amplifiers & Processors (DSP)

- Digital signal processors with capabilities for **EQ, delay, crossover, audio routing, and immersive audio mapping**.

- Multi-channel amplifiers with sufficient power rating for connected speakers.
- Built-in protection for overcurrent, overheating, and short-circuit.

c) Control & Integration

- Central audio control system with **content triggering, scheduling, and synchronization** with visual/interactive systems.
- Integration with show control or AV control system for automation.

d) Cabling & Accessories

- High-quality audio cabling (shielded as required).
- Professional-grade connectors (Neutrik or equivalent).
- Equipment racks with cooling, mounts, and cable management accessories.

e) Software

- Licensed immersive audio playback and management software.
- Features: channel mapping, real-time control, and synchronization with projection/interactive systems.

f) Approved Makes

- **Bose / JBL / Yamaha / Harman / d&b audiotechnik / equivalent international make.**

4. Execution Methodology

- Acoustic assessment of site and speaker layout design.
- Installation of loudspeakers, subwoofers, and satellite units with mounts.
- Rack integration of amplifiers, DSPs, and control units.
- Software installation and configuration.
- Audio calibration for **balanced coverage, immersive spatial effects, and clarity.**
- Testing and commissioning with client representatives.

5. Testing & Quality Assurance

- Measurement of **SPL, frequency response, and coverage uniformity.**
- System tuning using real-time analyzers.
- Functional testing of immersive playback with synchronized visuals/interactive content.
- Verification of safety standards, cabling integrity, and redundancy checks.

6. Standards & Compliance

- **IEC 60268** – Sound system equipment.
- **ISO 3382** – Acoustics measurement for performance spaces.
- IEC 60268-5– Loudspeaker specifications.
- CE / RoHS certified equipment.

7. Deliverables

- Fully functional immersive audio system with installed hardware and configured software.
- As-built wiring diagrams, equipment layout drawings, and configuration documentation.
- Training for operators on system usage and basic troubleshooting.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** on all supplied equipment, including amplifiers, DSPs, and speakers.
- Post-warranty services: Calibration, software updates, and extended support.

6.7 Software / Application

Supplementary Technical Requirement – Functional Completeness

The contractor shall provide **all necessary technological equipment, software, applications, accessories, special effects, or any other mechanisms** required to ensure the **complete functionality and intended operation** of the system, installation, or exhibit.

This includes, but is not limited to:

- **Hardware components:** Sensors, controllers, displays, processing units, AV/IT devices, and interactive peripherals.
- **Software & Applications:** Licensed software, content management systems, interactive applications, drivers, and control interfaces.
- **Accessories & Cabling:** Power and data cables, adapters, connectors, mounting hardware, and protective components.
- **Special Effects / Mechanisms:** Lighting effects, projection mapping, actuators, haptic or motion feedback devices, and any additional mechanisms required to achieve the intended experience.
- **Integration & Commissioning:** Full integration of all components with seamless operation, testing, calibration, and handover.

All supplied items shall comply with relevant IS/IEC standards, safety regulations, and manufacturer guidelines, ensuring the system is fully operational, reliable, and visitor-ready. All necessary technology equipment, licensed software, applications, accessories, special effects, and any other mechanisms required to ensure full functionality, seamless operation, and integration of the system shall be included in the scope of supply.

7. PART 7: VOC & SWADESHI STEAM CO. MARITIME RESISTANCE & REVOLUTION

7.1 Projector

1-Chip DLP Laser Phosphor Multimedia Projection System

1. General Description

Supply, installation, testing, and commissioning of a **high-performance 1-chip DLP laser**

phosphor multimedia projector suitable for **museum, gallery, or auditorium use**. The system shall provide **high brightness, WUXGA resolution, long operational life, and seamless integration** with AV and interactive systems.

2. Scope of Work

- Supply and installation of the projector with **mounting brackets and structural supports**.
- Integration with media servers, AV controllers, and display systems.
- Provision of **all necessary cabling, adapters, and accessories** for complete operational setup.
- Calibration of brightness, focus, zoom, and alignment for optimal projection.
- Testing, commissioning, and handover to client with full documentation.

3. Technical Specifications

a) Light Source

- Laser Phosphor technology with **minimum 20,000 hours life**.

b) Brightness

- 6,500 – 7,000 ANSI lumens suitable for large projection surfaces.

c) Resolution & Image Quality

- Native Resolution: 1920 × 1200 (WUXGA)
- Contrast Ratio: 10,000:1
- Lens: Manual or motorized zoom and focus adjustment
- Supplied with **long-throw zoom lens** appropriate for site requirements

d) Connectivity

- HDMI inputs
- HDBaseT input
- USB ports for media or control

e) Mounting & Accessories

- Projector mounting bracket with structural support
- All necessary cabling, adapters, and installation accessories

f) Approved Makes

- **Christie / Barco / Digital Projection**

4. Execution Methodology

- Site survey to determine projector placement and throw distance.
- Installation of mounting brackets and structural supports.
- Mounting of projector and lens installation.
- Connection to power, data, and media sources.
- Calibration of brightness, focus, zoom, and alignment.
- Functional testing and commissioning of projection system.

5. Testing & Quality Assurance

- Verification of image brightness, resolution, and contrast.
- Lens zoom and focus functionality check.
- Connectivity testing: HDMI, HDBaseT, USB inputs.

- Long-term operational test for stability and image quality.
- Compliance with IS/IEC electrical safety standards.

6. Standards & Compliance

- IEC 60950 / IEC 62368-1 – Electrical safety for IT/AV equipment
- RoHS & CE compliance
- Laser safety standards for Class 1 or as applicable

7. Deliverables

- Fully installed, tested, and commissioned projector system
- Projector mounting brackets and structural supports
- Cabling, adapters, and installation accessories
- As-built drawings, calibration reports, and operational manuals

8. Warranty & Post-Completion Support

- **Warranty: 2 years** covering projector, light source, and accessories
- Post-warranty support for servicing, lamp replacement, or calibration

7.2 Media Server

Professional-Grade Display Media Server / Workstation

1. General Description

Supply, installation, testing, and commissioning of a **high-performance display media server / workstation** capable of **4K content playback, synchronized multi-display output, and real-time content capture**. The system shall support interactive installations, projection mapping, and advanced media display applications.

2. Scope of Work

- Supply of **rack-mountable workstation** with specified hardware and software.
- Integration with multiple display systems, lighting controllers, and media playback infrastructure.
- Installation, configuration, and testing for **multi-display synchronization, real-time capture, and Art-Net integration**.
- Provision of all necessary cabling, adapters, mounts, and accessories.
- Documentation, calibration, and handover to client.

3. Technical Specifications

a) Processor & Form Factor

- Intel® Core i9, 10th Gen or higher.
- Rack-mountable workstation suitable for AV/IT infrastructure.

b) Memory & Storage

- 32 GB DDR4 RAM minimum.
- Storage: 1 TB SSD for OS and applications; 2 TB HDD for content storage.

c) Graphics & Display Outputs

- NVIDIA Quadro 8 GB or equivalent GPU.
- 3 × DisplayPort outputs, 4K-ready.
- Support for multi-display synchronization and high-fidelity rendering.

d) Operating System

- Windows 10 Pro 64-bit or higher (licensed).

e) Features

- Genlock and Framelock for synchronized display outputs.
- Art-Net Ethernet in/out for integration with lighting and show control systems.
- Real-time content capture capability.
- Support for 4K content playback, projection mapping, and interactive applications.

f) Approved Makes

- Dell / HP / ASUS

4. Execution Methodology

- Site survey to determine rack space, power, and network connectivity.
- Installation of workstation in server racks with proper mounting and cable management.
- Configuration of OS, GPU drivers, and playback software.
- Integration with display screens, lighting, and control systems.
- Testing for multi-display synchronization, real-time capture, and Art-Net integration.

5. Testing & Quality Assurance

- Verification of multi-display output and synchronization.
- Real-time content capture testing.
- Art-Net input/output functional test.
- Stress testing under continuous 4K playback.
- Compliance with IS/IEC standards for electrical and network safety.

6. Standards & Compliance

- IEC/IS electrical safety standards.
- RoHS and CE compliance for all hardware components.
- Rack-mount standards for AV/IT equipment.

7. Deliverables

- Fully installed and commissioned media server/workstation.
- Connected and tested with displays and interactive systems.
- Cable management, documentation, as-built drawings, and operational manuals.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** covering workstation hardware, GPU, storage, and accessories.
- Post-warranty support for software updates, troubleshooting, and hardware replacement.

7.3 Mapping Software

3D Projection Mapping Software & Playback Control System

1. General Description

Supply, installation, testing, and commissioning of a **3D projection mapping software and playback control system** capable of managing, scheduling, and controlling media servers for **projection mapping and immersive experiences**. The system shall provide **real-time content management, multi-server synchronization, and automated playback** functionality.

2. Scope of Work

- Supply of **licensed 3D projection mapping software** and playback control system.
- Integration with specified **media servers, displays, and interactive installations**.
- Installation, configuration, and calibration for seamless content playback.
- Training of client personnel for operational use and content management.
- Testing and commissioning of the complete system to ensure full functionality.
- Provision of all consumables, incidentals, cables, adapters, and hardware required for full system operation.

3. System Requirements & Features

a) Software & Playback Control

- Direct control of inputs and media timelines.
- Multi-display and multi-server synchronized playback.
- Real-time editing, layering, and content management tools.
- Scheduling features for automated playback.
- Option for external control via hardware controllers or automation units.
- Compatibility with the project-specified media servers.
- Licensed software with **perpetual or long-term license transfer** to the client.

b) Approved Makes

- **Dataton (Watchout) / Coolux (Pandas) / Pixera** or equivalent.

c) Integration & Accessories

- Playback controller, cabling, adapters, and hardware for integration.
- All consumables and accessories necessary for fully functional system.

4. Execution Methodology

- Review and survey of site for media server and display integration.
- Installation of playback control system and software on specified servers.
- Configuration for multi-display and multi-server synchronized playback.
- Real-time testing, calibration, and validation of projection mapping content.
- Training for client staff on operational and content management procedures.
- Final commissioning and handover with documentation.

5. Testing & Quality Assurance

- Verification of multi-server synchronization and playback stability.

- Testing of automated playback, scheduling, and content layering functions.
- Functional integration with all media servers and displays.
- Compliance with IS/IEC standards for electrical and operational safety.

6. Standards & Compliance

- Licensed software and hardware compliant with **international IP and copyright standards**.
- Electrical safety compliance as per IS/IEC standards.
- Fire-retardant and safety-compliant mounting and cabling materials.

7. Deliverables

- Fully installed and commissioned 3D projection mapping and playback control system.
- Licensed software with documentation and operational manuals.
- Training materials and records of training provided.
- Integration with media servers, displays, and interactive installations.

8. Warranty & Post-Completion Support

- **Warranty: 3 years** covering software, playback controller, and integration hardware.
- Post-warranty support for updates, troubleshooting, and reconfiguration.

7.4 Accessories

HDMI HD Base T Extender (Tx–Rx Pair) System with Accessories

1. General Description

This specification covers the **supply, laying, installation, testing, and commissioning of 8 (eight) HDMI HDBaseT Extender units (Transmitter–Receiver pairs)**, complete with CAT6 cabling, networking accessories, and racks for integration. The system shall be capable of extending **HDMI signals up to 100 m over Cat 5e/6/6a cabling** with full HDCP compliance, ensuring seamless integration with AV systems and projection/display infrastructure.

2. Scope of Work with Technical Specifications

2.1 HDMI HDBaseT Extenders (Tx–Rx Pair)

- Quantity: **8 pairs (Tx + Rx)**.
- Signal Extension: Up to 100 m over a single Cat 5e/6/6a cable.
- Video Standards: HDMI (3D, Deep Color, 4K UHD).
- Compliance: HDCP 2.2 or higher.
- EDID: Advanced EDID pass-through/management for optimal signal recognition.
- Local HDMI Output: At transmitter end for monitoring.
- Control Pass-through: IR, RS-232 & Ethernet pass-through support.
- Functionality: Plug-and-play, CEC compliant.

- Build: Professional-grade, 24/7 operation capable.

2.2 Cabling & Networking Accessories

- **Cables:** Certified CAT6 UTP/STP cables (lengths as per site requirement).
- **Patch Panels:** Fully loaded patch panels for HDMI-over-CAT cabling.
- **Network Switch:** Managed/Unmanaged Gigabit network switch as per integration design.
- **Racks:** Standard AV/network rack with accessories, grounding, and dressing.
- **Connectors:** High-quality HDMI connectors, RJ45 jacks, adaptors, and patch cords.
- **Cable Management:** Proper routing, dressing, and labeling for serviceability.

2.3 Approved Makes

- **ATEN / Kramer / D-Link / Netrack / Comrack** or **equivalent international standard make** (subject to prior approval).

3. Execution Methodology

1. **Site Preparation:** Verification of conduit/rack spaces, distances, and environmental suitability.
2. **Cabling & Termination:** Laying of CAT6 cables in conduits/trays with labeling and termination at both ends.
3. **Installation:** Mounting of extenders (Tx–Rx), racks, patch panels, and network switches.
4. **Integration:** Interfacing extenders with projectors, displays, media servers, and control systems.
5. **Testing & Commissioning:** End-to-end testing of HDMI signals, EDID handshake, IR/RS-232/Ethernet pass-through, and monitoring outputs.

4. Testing & Quality Assurance

- **Signal Integrity Test:** Verification of 4K UHD signals over 100 m without loss or artifacts.
- **HDCP Compliance:** Validation with encrypted content.
- **Latency & Synchronization:** Testing for low-latency transmission suitable for interactive AV systems.
- **Control Signal Verification:** Confirm IR, RS-232 & Ethernet pass-through functionality.
- **Endurance Test:** Minimum 8-hour continuous operation test for stability.

5. Codes & Standards Compliance

- **HDBaseT Alliance Compliance** for extenders.
- **TIA/EIA-568-C** standards for CAT6 cabling.
- **IEC/IS standards** for electrical installation, safety, and grounding.
- **CE / FCC / RoHS** certification for active devices.

6. Scope of Supply / Deliverables

1. 8 Nos. HDMI HDBaseT Extender Tx–Rx pairs.

2. Certified CAT6 cabling with terminations.
3. Patch panels, connectors, adaptors, and patch cords.
4. Network switch and accessories.
5. Network/AV rack with cable management and grounding.
6. Installation, integration, testing & commissioning services.
7. OEM user manuals and documentation.
8. Warranty certificates (minimum 3 years).

The quoted rate shall be **inclusive of all equipment, cabling, accessories, racks, installation, testing, commissioning, consumables, incidentals, taxes, duties, and warranties**, delivering the HDMI extension system fully functional in all respects.

7.5 Installation & Integration

Electrical & Data Cabling for Projection and Technology Equipment

1. General Description

Supply, laying, fixing, testing, and commissioning of **all wiring and associated items** required to connect power and data from the **Distribution Board (DB)** to respective digital projection and interactive technology equipment. The system shall ensure **reliable power delivery, signal integrity, and seamless operation** of all connected devices.

2. Scope of Work

- Supply, laying, and fixing of **electrical cabling** from DB to equipment locations.
- Supply, laying, and termination of **signal/data cabling** for HDMI, LAN, fibre, and other AV/IT connections.
- Provision of **all accessories**, racks, patch panels, cable management, and mounting hardware.
- Integration, mapping, and calibration of all power and signal connections for seamless operation of projectors, displays, and interactive systems.
- Testing, commissioning, and documentation of the complete cabling infrastructure.

3. Technical Specifications

a) Electrical Cabling

- Copper FRLS/FRLSH cables of suitable sizes for power distribution.
- Conduits, trays, raceways, and protective accessories.
- Junction boxes, terminations, and proper earthing.

b) Signal/Data Cabling

- HDMI, LAN (Cat6/Cat6a), fibre optic, and other AV/IT cables.
- Connectors, patch cords, adaptors, and patch panels as required.
- Structured cabling to maintain signal integrity and minimize interference.

c) Accessories & Integration

- Racks, cable trays, mounting hardware, and power distribution units (PDUs).
- Cable dressing and management for clean and safe installation.
- Integration with control systems and technology equipment for proper mapping and signal routing.

4. Execution Methodology

- Site survey to determine optimal cable routes and mounting points.
- Laying and fixing of electrical and data cables according to site conditions.
- Termination, dressing, and labeling of all cables.
- Integration with connected equipment and testing of signal/power continuity.
- Calibration and verification of signal quality and functionality.

5. Testing & Quality Assurance

- Continuity and insulation resistance testing of electrical cables.
- Verification of signal integrity for HDMI, LAN, and fibre connections.
- Functional testing of all integrated systems with connected devices.
- Compliance check against design drawings and site standards.

6. Standards & Compliance

- IS 694 / IS 1554 – Electrical wiring standards.
- IEC 60227 / IEC 60332 – Cables and fire safety.
- IS/IEC standards for HDMI, LAN, fibre, and AV cabling.
- RoHS and CE compliance for all electronic components.

7. Deliverables

- Installed, tested, and commissioned electrical and data cabling network.
- As-built drawings and schematics.
- Test reports and compliance certificates.
- Operation and maintenance documentation.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** covering cabling, terminations, and accessories.
- Post-warranty support: troubleshooting, repairs, or modifications as required.

7.6 Content

Projection Film Development and Production (Approx. 5–7 Minutes)

1. General Description

Carrying out **end-to-end services** for the **development and production of a projection film** of approximately 5–7 minutes duration, to be projected on the **replica Port**, highlighting its **architectural, functional, and aesthetic details**. The project includes concept development, content creation, audio-visual production, integration, and delivery in projection-ready formats.

2. Scope of Work

a) Concept & Script

- Research and analysis of historical, architectural, and thematic aspects of the replica Port.

- Preparation of storyline, narrative framework, and script aligned with the interpretive theme.
- Presentation for approvals at draft and final stages.

b) Visual Content Creation

- Development of mixed media content:
 - Infographics, illustrations, 2D animation/motion graphics.
 - 3D animation wherever required for realism and immersion.
- Alignment of visual content with narrative and projection requirements.

c) Audio Design

- Professional sound design including:
 - Background music/score.
 - Synchronised audio effects for immersive experience.

d) Voiceover

- Recording of **professional voiceover** in Hindi, English, and Tamil.
- Integration of voiceover with visual content and timeline.

e) Integration & Optimization

- Editing, layering, and formatting of content for **projection mapping**.
- Optimization for resolution, color, and brightness as per site/projector requirements.

f) Deliverables

- Final approved film delivered in digital formats:
 - Master files.
 - Projection-ready formats compatible with playback systems.

g) Rights & Licenses

- All intellectual property rights, licenses, and usage rights to be **transferred fully to the client**.
- Clearances for all third-party content, if used.

3. Execution Methodology

7. Research & script development with client/VOCPA consultations.
8. Visual concept development and preliminary animations.
9. Audio design and voiceover recording in specified languages.
10. Content integration, editing, and optimization for projection.
11. Internal review and client approval at draft and final stages.
12. Final delivery in specified digital formats.

4. Quality Assurance

- Storyline consistency with historical and thematic accuracy.
- Visual and audio quality aligned to **projection standards**.
- Multi-language voiceover clarity and synchronization.
- Compatibility testing with projection system and playback devices.

5. Standards & Compliance

- Content shall conform to copyright, IP, and licensing standards.
- Audio and video production to adhere to **industry best practices**.

-
- Projection formats optimized for **standard AV playback systems**.

6. Deliverables

- Concept and script document (approved by client).
- Mixed media visual content (2D/3D animations, illustrations, infographics).
- Audio files including background score, effects, and multi-language voiceover.
- Fully integrated and formatted projection-ready film.
- Master files and playback-ready digital formats.

7. Warranty & Post-Completion Support

- Support for **minor edits, formatting adjustments, and projection optimization** for up to 3 months post-delivery.
- Transfer of all rights and licenses to client ensures long-term usability.

7.7 Replica

Providing and Installing VOC Model at 1:20 Scale in Model Pit

1. General Description

This specification covers the **supply, installation, testing, and commissioning (SITC)** of a **VOC model at 1:20 scale**, installed within a **1000 mm high model pit**. The model shall be fabricated using **heavy-duty FRP (Fiber Reinforced Plastic)** with a thickness of **450 mm**, detailed to accurately represent the original design.

The system shall be structurally supported on a **Galvanized Iron (G.I.) frame** made of angle sections and pipes, ensuring long-term stability and durability. The model shall be finished with high-quality weather-resistant paint to achieve a **shiny, museum-grade finish**.

2. Scope of Work with Technical Specifications

2.1 Model Construction

- **Material:** Heavy-duty FRP (Fiber Reinforced Plastic), minimum 450 mm thickness.
- **Scale:** 1:20 (as per approved design/drawing).
- **Detailing:** Accurate replication of forms, proportions, and features based on provided reference presentations/drawings.
- **Color & Finish:** Custom color finish as per approval; painted using **Duco or polyurethane weather coat**, with shiny, smooth surface.

2.2 Framework & Support

- **Frame:** G.I. (Galvanized Iron) angle and pipe structure for reinforcement.
- **Design:** Frame engineered to ensure stability, load-bearing strength, and alignment of model.
- **Installation:** Model secured inside a **1000 mm high pit**, with necessary anchoring and supports.

2.3 Painting & Finishing

- **Paint Type:** Duco paint / Polyurethane weather coat.
- **Finish:** Glossy, smooth, weather-resistant, and durable.
- **Application:** Multiple coats with surface preparation to achieve uniformity and longevity.

2.4 Prototyping / Mock-up

- A **sample section** of the FRP model (including detailing, surface texture, and paint finish) shall be prepared by the contractor and submitted for **client approval** prior to commencing full-scale fabrication.
- The **mock-up shall demonstrate:** material thickness, reinforcement quality, surface detailing, and final paint/finish.
- Only after **formal approval** of the mock-up shall the vendor proceed with complete fabrication.

3. Execution Methodology

1. **Design Review:** Detailed drawings, references, and scale calculations submitted for approval before fabrication.
2. **Mock-up Stage:** Fabrication of sample section for inspection and approval.
3. **Fabrication:** FRP model construction with integrated G.I. framework.
4. **Surface Treatment:** Sanding, priming, and painting with approved coating system.
5. **Installation:** Placement and secure fixing in 1000 mm high pit with structural alignment checks.
6. **Finishing:** Touch-up, polishing, and surface protection treatment.

4. Testing & Quality Assurance

- **Material Testing:** Verification of FRP thickness, durability, and weather resistance.
- **Structural Testing:** Load-bearing and stability check of G.I. frame.
- **Surface Quality Check:** Smoothness, gloss level, and uniform finish inspection.
- **Mock-up Approval:** Client sign-off on prototype before full fabrication.
- **Final Inspection:** Joint approval with client after installation.

5. Codes & Standards Compliance

- FRP material to conform to **IS 6746** or equivalent international standards.
- G.I. frame fabrication to comply with **IS 2062 / IS 277** (structural steel and galvanization).
- Painting and coating to conform to **IS 2932 / IS 13213** or equivalent for protective finishes.

6. Scope of Supply / Deliverables

1. 1:20 scale VOC model, fabricated in FRP (450 mm thickness).
2. G.I. angle and pipe frame for reinforcement.
3. Duco/polyurethane weather-coat painted finish.
4. Installation inside 1000 mm high pit with anchoring supports.
5. **Mock-up sample section** for client approval prior to fabrication.
6. All consumables, incidentals, fasteners, adhesives, and protective coatings.

7. Final cleaning, touch-ups, and handover in complete functional condition.

7. IPR & Archival Clause

- All **designs, drawings, 3D models, digital references, and fabrication documents** created for the VOC model shall be the **intellectual property of VOCPA**.
- The vendor shall provide a complete **archival package**, including digital CAD/3D files, shop drawings, material data sheets, and paint references, at the time of handover.
- VOCPA shall retain full rights for **future reproduction, repairs, scaling, or adaptation** of the model without restriction.
- The vendor shall ensure that no third-party copyright or ownership claim exists over the content, design, or references used.

8. Commercial Conditions

- The rate shall be **inclusive of all design, prototyping, fabrication, painting, installation, consumables, incidentals, manpower, taxes, duties, and warranties**, ensuring delivery of the model complete in all respects.

7.8 Sound

Immersive Professional-Grade Sound System

1. General Description

Supply, installation, testing, and commissioning of a **professional-grade immersive sound system** from leading international brands, designed to enhance visitor engagement through **interactive installations and spatial audio experiences**. The system shall deliver **high-quality, multi-channel immersive sound** with seamless integration into the overall AV and interactive environment.

2. Scope of Work

- Supply and installation of full-range loudspeakers, satellite speakers, and subwoofers as per acoustic design.
- Supply, installation, and programming of amplifiers and DSPs for system tuning and immersive audio mapping.
- Integration with central control systems for content triggering and synchronization with interactive media.
- Provision of all cabling, connectors, racks, mounts, and accessories.
- Supply of licensed immersive audio management software.
- Testing, calibration, and commissioning of the complete system.

3. Technical Specifications

a) Speakers

- **Full-range loudspeakers** with frequency response suitable for clear dialogue, effects, and music playback.

-
- **Satellite speakers** for distributed immersive soundscapes.
 - **Subwoofers** for extended low-frequency performance.
 - Wide dispersion and high SPL capability for even coverage.
 - Mounting brackets/rigging as per site requirements.
- b) Amplifiers & Processors (DSP)**
- Digital signal processors with capabilities for **EQ, delay, crossover, audio routing, and immersive audio mapping**.
 - Multi-channel amplifiers with sufficient power rating for connected speakers.
 - Built-in protection for overcurrent, overheating, and short-circuit.
- c) Control & Integration**
- Central audio control system with **content triggering, scheduling, and synchronization** with visual/interactive systems.
 - Integration with show control or AV control system for automation.
- d) Cabling & Accessories**
- High-quality audio cabling (shielded as required).
 - Professional-grade connectors (Neutrik or equivalent).
 - Equipment racks with cooling, mounts, and cable management accessories.
- e) Software**
- Licensed immersive audio playback and management software.
 - Features: channel mapping, real-time control, and synchronization with projection/interactive systems.
- f) Approved Makes**
- **Bose / JBL / Yamaha / Harman / d&b audiotechnik / equivalent international make.**

4. Execution Methodology

- Acoustic assessment of site and speaker layout design.
- Installation of loudspeakers, subwoofers, and satellite units with mounts.
- Rack integration of amplifiers, DSPs, and control units.
- Software installation and configuration.
- Audio calibration for **balanced coverage, immersive spatial effects, and clarity**.
- Testing and commissioning with client representatives.

5. Testing & Quality Assurance

- Measurement of **SPL, frequency response, and coverage uniformity**.
- System tuning using real-time analyzers.
- Functional testing of immersive playback with synchronized visuals/interactive content.
- Verification of safety standards, cabling integrity, and redundancy checks.

6. Standards & Compliance

- **IEC 60268** – Sound system equipment.
- **ISO 3382** – Acoustics measurement for performance spaces.
- IEC 60268-5– Loudspeaker specifications.

- CE / RoHS certified equipment.

7. Deliverables

- Fully functional immersive audio system with installed hardware and configured software.
- As-built wiring diagrams, equipment layout drawings, and configuration documentation.
- Training for operators on system usage and basic troubleshooting.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** on all supplied equipment, including amplifiers, DSPs, and speakers.
- Post-warranty services: Calibration, software updates, and extended support.

8. PART 8: IMMERSIVE ROOM CUM AUDITORIUM

8.1 Projector

1-Chip DLP Laser Phosphor Multimedia Projection System

1. General Description

Supply, installation, testing, and commissioning of a **high-performance 1-chip DLP laser phosphor multimedia projector** suitable for **museum, gallery, or auditorium use**. The system shall provide **high brightness, WUXGA resolution, long operational life, and seamless integration** with AV and interactive systems.

2. Scope of Work

- Supply and installation of the projector with **mounting brackets and structural supports**.
- Integration with media servers, AV controllers, and display systems.
- Provision of **all necessary cabling, adapters, and accessories** for complete operational setup.
- Calibration of brightness, focus, zoom, and alignment for optimal projection.
- Testing, commissioning, and handover to client with full documentation.

3. Technical Specifications

a) Light Source

- Laser Phosphor technology with **minimum 20,000 hours life**.

b) Brightness

- 6,500 – 7,000 ANSI lumens suitable for large projection surfaces.

c) Resolution & Image Quality

- Native Resolution: 1920 × 1200 (WUXGA)
- Contrast Ratio: 10,000:1
- Lens: Manual or motorized zoom and focus adjustment

- Supplied with **long-throw zoom lens** appropriate for site requirements

d) Connectivity

- HDMI inputs
- HDBaseT input
- USB ports for media or control

e) Mounting & Accessories

- Projector mounting bracket with structural support
- All necessary cabling, adapters, and installation accessories

f) Approved Makes

- **Christie / Barco / Digital Projection**

4. Execution Methodology

- Site survey to determine projector placement and throw distance.
- Installation of mounting brackets and structural supports.
- Mounting of projector and lens installation.
- Connection to power, data, and media sources.
- Calibration of brightness, focus, zoom, and alignment.
- Functional testing and commissioning of projection system.

5. Testing & Quality Assurance

- Verification of image brightness, resolution, and contrast.
- Lens zoom and focus functionality check.
- Connectivity testing: HDMI, HDBaseT, USB inputs.
- Long-term operational test for stability and image quality.
- Compliance with IS/IEC electrical safety standards.

6. Standards & Compliance

- IEC 60950 / IEC 62368-1 – Electrical safety for IT/AV equipment
- RoHS & CE compliance
- Laser safety standards for Class 1 or as applicable

7. Deliverables

- Fully installed, tested, and commissioned projector system
- Projector mounting brackets and structural supports
- Cabling, adapters, and installation accessories
- As-built drawings, calibration reports, and operational manuals

8. Warranty & Post-Completion Support

- **Warranty: 3 years** covering projector, light source, and accessories
- Post-warranty support for servicing, lamp replacement, or calibration

8.2 Media Server

Professional-Grade Display Media Server / Workstation

1. General Description

Supply, installation, testing, and commissioning of a **high-performance display media server / workstation** capable of **4K content playback, synchronized multi-display output, and real-time content capture**. The system shall support interactive installations, projection mapping, and advanced media display applications.

2. Scope of Work

- Supply of **rack-mountable workstation** with specified hardware and software.
- Integration with multiple display systems, lighting controllers, and media playback infrastructure.
- Installation, configuration, and testing for **multi-display synchronization, real-time capture, and Art-Net integration**.
- Provision of all necessary cabling, adapters, mounts, and accessories.
- Documentation, calibration, and handover to client.

3. Technical Specifications

a) Processor & Form Factor

- Intel® Core i9, 10th Gen or higher.
- Rack-mountable workstation suitable for AV/IT infrastructure.

b) Memory & Storage

- 32 GB DDR4 RAM minimum.
- Storage: 1 TB SSD for OS and applications; 2 TB HDD for content storage.

c) Graphics & Display Outputs

- NVIDIA Quadro 8 GB or equivalent GPU.
- 3 × DisplayPort outputs, 4K-ready.
- Support for multi-display synchronization and high-fidelity rendering.

d) Operating System

- Windows 10 Pro 64-bit or higher (licensed).

e) Features

- Genlock and Framelock for synchronized display outputs.
- Art-Net Ethernet in/out for integration with lighting and show control systems.
- Real-time content capture capability.
- Support for 4K content playback, projection mapping, and interactive applications.

f) Approved Makes

- **Dell / HP / ASUS**

4. Execution Methodology

- Site survey to determine rack space, power, and network connectivity.
- Installation of workstation in server racks with proper mounting and cable management.
- Configuration of OS, GPU drivers, and playback software.
- Integration with display screens, lighting, and control systems.
- Testing for multi-display synchronization, real-time capture, and Art-Net integration.

5. Testing & Quality Assurance

- Verification of multi-display output and synchronization.
- Real-time content capture testing.
- Art-Net input/output functional test.
- Stress testing under continuous 4K playback.
- Compliance with IS/IEC standards for electrical and network safety.

6. Standards & Compliance

- IEC/IS electrical safety standards.
- RoHS and CE compliance for all hardware components.
- Rack-mount standards for AV/IT equipment.

7. Deliverables

- Fully installed and commissioned media server/workstation.
- Connected and tested with displays and interactive systems.
- Cable management, documentation, as-built drawings, and operational manuals.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** covering workstation hardware, GPU, storage, and accessories.
- Post-warranty support for software updates, troubleshooting, and hardware replacement.

8.3 Mapping Software

3D Projection Mapping Software & Playback Control System

1. General Description

Supply, installation, testing, and commissioning of a **3D projection mapping software and playback control system** capable of managing, scheduling, and controlling media servers for **projection mapping and immersive experiences**. The system shall provide **real-time content management, multi-server synchronization, and automated playback** functionality.

2. Scope of Work

- Supply of **licensed 3D projection mapping software** and playback control system.
- Integration with specified **media servers, displays, and interactive installations**.
- Installation, configuration, and calibration for seamless content playback.
- Training of client personnel for operational use and content management.
- Testing and commissioning of the complete system to ensure full functionality.
- Provision of all consumables, incidentals, cables, adapters, and hardware required for full system operation.

3. System Requirements & Features

a) Software & Playback Control

- Direct control of inputs and media timelines.

- Multi-display and multi-server synchronized playback.
- Real-time editing, layering, and content management tools.
- Scheduling features for automated playback.
- Option for external control via hardware controllers or automation units.
- Compatibility with the project-specified media servers.
- Licensed software with **perpetual or long-term license transfer** to the client.

b) Approved Makes

- **Dataton (Watchout) / Coolux (Pandas) / Pixera** or equivalent.

c) Integration & Accessories

- Playback controller, cabling, adapters, and hardware for integration.
- All consumables and accessories necessary for fully functional system.

4. Execution Methodology

- Review and survey of site for media server and display integration.
- Installation of playback control system and software on specified servers.
- Configuration for multi-display and multi-server synchronized playback.
- Real-time testing, calibration, and validation of projection mapping content.
- Training for client staff on operational and content management procedures.
- Final commissioning and handover with documentation.

5. Testing & Quality Assurance

- Verification of multi-server synchronization and playback stability.
- Testing of automated playback, scheduling, and content layering functions.
- Functional integration with all media servers and displays.
- Compliance with IS/IEC standards for electrical and operational safety.

6. Standards & Compliance

- Licensed software and hardware compliant with **international IP and copyright standards**.
- Electrical safety compliance as per IS/IEC standards.
- Fire-retardant and safety-compliant mounting and cabling materials.

7. Deliverables

- Fully installed and commissioned 3D projection mapping and playback control system.
- Licensed software with documentation and operational manuals.
- Training materials and records of training provided.
- Integration with media servers, displays, and interactive installations.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** covering software, playback controller, and integration hardware.
- Post-warranty support for updates, troubleshooting, and reconfiguration.

8.4 Accessories

HDMI HD Base T Extender (Tx–Rx Pair) System with Accessories

1. General Description

This specification covers the **supply, laying, installation, testing, and commissioning of 8 (eight) HDMI HDBaseT Extender units (Transmitter–Receiver pairs)**, complete with CAT6 cabling, networking accessories, and racks for integration. The system shall be capable of extending **HDMI signals up to 100 m over Cat 5e/6/6a cabling** with full HDCP compliance, ensuring seamless integration with AV systems and projection/display infrastructure.

2. Scope of Work with Technical Specifications

2.1 HDMI HDBaseT Extenders (Tx–Rx Pair)

- Quantity: **8 pairs (Tx + Rx)**.
- Signal Extension: Up to 100 m over a single Cat 5e/6/6a cable.
- Video Standards: HDMI (3D, Deep Color, 4K UHD).
- Compliance: HDCP 2.2 or higher.
- EDID: Advanced EDID pass-through/management for optimal signal recognition.
- Local HDMI Output: At transmitter end for monitoring.
- Control Pass-through: IR, RS-232 & Ethernet pass-through support.
- Functionality: Plug-and-play, CEC compliant.
- Build: Professional-grade, 24/7 operation capable.

2.2 Cabling & Networking Accessories

- **Cables:** Certified CAT6 UTP/STP cables (lengths as per site requirement).
- **Patch Panels:** Fully loaded patch panels for HDMI-over-CAT cabling.
- **Network Switch:** Managed/Unmanaged Gigabit network switch as per integration design.
- **Racks:** Standard AV/network rack with accessories, grounding, and dressing.
- **Connectors:** High-quality HDMI connectors, RJ45 jacks, adaptors, and patch cords.
- **Cable Management:** Proper routing, dressing, and labeling for serviceability.

2.3 Approved Makes

- **ATEN / Kramer / D-Link / Netrack / Comrack or equivalent international standard make** (subject to prior approval).

3. Execution Methodology

1. **Site Preparation:** Verification of conduit/rack spaces, distances, and environmental suitability.
2. **Cabling & Termination:** Laying of CAT6 cables in conduits/trays with labeling and termination at both ends.
3. **Installation:** Mounting of extenders (Tx–Rx), racks, patch panels, and network switches.

4.Integration: Interfacing extenders with projectors, displays, media servers, and control systems.

5.Testing & Commissioning: End-to-end testing of HDMI signals, EDID handshake, IR/RS-232/Ethernet pass-through, and monitoring outputs.

4. Testing & Quality Assurance

- **Signal Integrity Test:** Verification of 4K UHD signals over 100 m without loss or artifacts.
- **HDCP Compliance:** Validation with encrypted content.
- **Latency & Synchronization:** Testing for low-latency transmission suitable for interactive AV systems.
- **Control Signal Verification:** Confirm IR, RS-232 & Ethernet pass-through functionality.
- **Endurance Test:** Minimum 8-hour continuous operation test for stability.

5. Codes & Standards Compliance

- **HDBaseT Alliance Compliance** for extenders.
- **TIA/EIA-568-C** standards for CAT6 cabling.
- **IEC/IS standards** for electrical installation, safety, and grounding.
- **CE / FCC / RoHS** certification for active devices.

6. Scope of Supply / Deliverables

1. 8 Nos. HDMI HDBaseT Extender Tx–Rx pairs.
2. Certified CAT6 cabling with terminations.
3. Patch panels, connectors, adaptors, and patch cords.
4. Network switch and accessories.
5. Network/AV rack with cable management and grounding.
6. Installation, integration, testing & commissioning services.
7. OEM user manuals and documentation.
8. Warranty certificates (minimum 3 years).

The quoted rate shall be **inclusive of all equipment, cabling, accessories, racks, installation, testing, commissioning, consumables, incidentals, taxes, duties, and warranties**, delivering the HDMI extension system fully functional in all respects.

8.5 Installation & Integration

Electrical & Data Cabling for Projection and Technology Equipment

1. General Description

Supply, laying, fixing, testing, and commissioning of **all wiring and associated items** required to connect power and data from the **Distribution Board (DB)** to respective digital projection and interactive technology equipment. The system shall ensure **reliable power delivery, signal integrity, and seamless operation** of all connected devices.

2. Scope of Work

- Supply, laying, and fixing of **electrical cabling** from DB to equipment locations.
- Supply, laying, and termination of **signal/data cabling** for HDMI, LAN, fibre, and other AV/IT connections.
- Provision of **all accessories**, racks, patch panels, cable management, and mounting hardware.
- Integration, mapping, and calibration of all power and signal connections for seamless operation of projectors, displays, and interactive systems.
- Testing, commissioning, and documentation of the complete cabling infrastructure.

3. Technical Specifications

a) Electrical Cabling

- Copper FRLS/FRLSH cables of suitable sizes for power distribution.
- Conduits, trays, raceways, and protective accessories.
- Junction boxes, terminations, and proper earthing.

b) Signal/Data Cabling

- HDMI, LAN (Cat6/Cat6a), fibre optic, and other AV/IT cables.
- Connectors, patch cords, adaptors, and patch panels as required.
- Structured cabling to maintain signal integrity and minimize interference.

c) Accessories & Integration

- Racks, cable trays, mounting hardware, and power distribution units (PDUs).
- Cable dressing and management for clean and safe installation.
- Integration with control systems and technology equipment for proper mapping and signal routing.

4. Execution Methodology

- Site survey to determine optimal cable routes and mounting points.
- Laying and fixing of electrical and data cables according to site conditions.
- Termination, dressing, and labeling of all cables.
- Integration with connected equipment and testing of signal/power continuity.
- Calibration and verification of signal quality and functionality.

5. Testing & Quality Assurance

- Continuity and insulation resistance testing of electrical cables.
- Verification of signal integrity for HDMI, LAN, and fibre connections.
- Functional testing of all integrated systems with connected devices.
- Compliance check against design drawings and site standards.

6. Standards & Compliance

- IS 694 / IS 1554 – Electrical wiring standards.
- IEC 60227 / IEC 60332 – Cables and fire safety.
- IS/IEC standards for HDMI, LAN, fibre, and AV cabling.
- RoHS and CE compliance for all electronic components.

7. Deliverables

- Installed, tested, and commissioned electrical and data cabling network.
- As-built drawings and schematics.
- Test reports and compliance certificates.
- Operation and maintenance documentation.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** covering cabling, terminations, and accessories.
- Post-warranty support: troubleshooting, repairs, or modifications as required.

8.6 Content

Projection Film Development and Production (Approx. 5–7 Minutes)

1. General Description

Carrying out **end-to-end services** for the **development and production of a projection film** of approximately 5–7 minutes duration, to be projected on the **replica Port**, highlighting its **architectural, functional, and aesthetic details**. The project includes concept development, content creation, audio-visual production, integration, and delivery in projection-ready formats.

2. Scope of Work

a) Concept & Script

- Research and analysis of historical, architectural, and thematic aspects of the replica Port.
- Preparation of storyline, narrative framework, and script aligned with the interpretive theme.
- Presentation for approvals at draft and final stages.

b) Visual Content Creation

- Development of mixed media content:
 - Infographics, illustrations, 2D animation/motion graphics.
 - 3D animation wherever required for realism and immersion.
- Alignment of visual content with narrative and projection requirements.

c) Audio Design

- Professional sound design including:
 - Background music/score.
 - Synchronised audio effects for immersive experience.

d) Voiceover

- Recording of **professional voiceover** in Hindi, English, and Tamil.
- Integration of voiceover with visual content and timeline.

e) Integration & Optimization

- Editing, layering, and formatting of content for **projection mapping**.
- Optimization for resolution, color, and brightness as per site/projector requirements.

f) Deliverables

- Final approved film delivered in digital formats:

- Master files.
- Projection-ready formats compatible with playback systems.

g) Rights & Licenses

- All intellectual property rights, licenses, and usage rights to be **transferred fully to the client**.
- Clearances for all third-party content, if used.

3. Execution Methodology

1. Research & script development with client/VOCPA consultations.
2. Visual concept development and preliminary animations.
3. Audio design and voiceover recording in specified languages.
4. Content integration, editing, and optimization for projection.
5. Internal review and client approval at draft and final stages.
6. Final delivery in specified digital formats.

4. Quality Assurance

- Storyline consistency with historical and thematic accuracy.
- Visual and audio quality aligned to **projection standards**.
- Multi-language voiceover clarity and synchronization.
- Compatibility testing with projection system and playback devices.

5. Standards & Compliance

- Content shall conform to copyright, IP, and licensing standards.
- Audio and video production to adhere to **industry best practices**.
- Projection formats optimized for **standard AV playback systems**.

6. Deliverables

- Concept and script document (approved by client).
- Mixed media visual content (2D/3D animations, illustrations, infographics).
- Audio files including background score, effects, and multi-language voiceover.
- Fully integrated and formatted projection-ready film.
- Master files and playback-ready digital formats.

7. Warranty & Post-Completion Support

- Support for **minor edits, formatting adjustments, and projection optimization** for up to 3 months post-delivery.
- Transfer of all rights and licenses to client ensures long-term usability.

8.7 Sound

Immersive Professional-Grade Sound System

1. General Description

Supply, installation, testing, and commissioning of a **professional-grade immersive sound system** from leading international brands, designed to enhance visitor engagement through

interactive installations and spatial audio experiences. The system shall deliver **high-quality, multi-channel immersive sound** with seamless integration into the overall AV and interactive environment.

2. Scope of Work

- Supply and installation of full-range loudspeakers, satellite speakers, and subwoofers as per acoustic design.
- Supply, installation, and programming of amplifiers and DSPs for system tuning and immersive audio mapping.
- Integration with central control systems for content triggering and synchronization with interactive media.
- Provision of all cabling, connectors, racks, mounts, and accessories.
- Supply of licensed immersive audio management software.
- Testing, calibration, and commissioning of the complete system.

3. Technical Specifications

a) Speakers

- **Full-range loudspeakers** with frequency response suitable for clear dialogue, effects, and music playback.
- **Satellite speakers** for distributed immersive soundscapes.
- **Subwoofers** for extended low-frequency performance.
- Wide dispersion and high SPL capability for even coverage.
- Mounting brackets/rigging as per site requirements.

b) Amplifiers & Processors (DSP)

- Digital signal processors with capabilities for **EQ, delay, crossover, audio routing, and immersive audio mapping**.
- Multi-channel amplifiers with sufficient power rating for connected speakers.
- Built-in protection for overcurrent, overheating, and short-circuit.

c) Control & Integration

- Central audio control system with **content triggering, scheduling, and synchronization** with visual/interactive systems.
- Integration with show control or AV control system for automation.

d) Cabling & Accessories

- High-quality audio cabling (shielded as required).
- Professional-grade connectors (Neutrik or equivalent).
- Equipment racks with cooling, mounts, and cable management accessories.

e) Software

- Licensed immersive audio playback and management software.
- Features: channel mapping, real-time control, and synchronization with projection/interactive systems.

f) Approved Makes

- **Bose / JBL / Yamaha / Harman / d&b audiotechnik / equivalent international make.**

4. Execution Methodology

- Acoustic assessment of site and speaker layout design.
- Installation of loudspeakers, subwoofers, and satellite units with mounts.
- Rack integration of amplifiers, DSPs, and control units.
- Software installation and configuration.
- Audio calibration for **balanced coverage, immersive spatial effects, and clarity**.
- Testing and commissioning with client representatives.

5. Testing & Quality Assurance

- Measurement of **SPL, frequency response, and coverage uniformity**.
- System tuning using real-time analyzers.
- Functional testing of immersive playback with synchronized visuals/interactive content.
- Verification of safety standards, cabling integrity, and redundancy checks.

6. Standards & Compliance

- **IEC 60268** – Sound system equipment.
- **ISO 3382** – Acoustics measurement for performance spaces.
- IEC 60268-5– Loudspeaker specifications.
- CE / RoHS certified equipment.

7. Deliverables

- Fully functional immersive audio system with installed hardware and configured software.
- As-built wiring diagrams, equipment layout drawings, and configuration documentation.
- Training for operators on system usage and basic troubleshooting.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** on all supplied equipment, including amplifiers, DSPs, and speakers.
- Post-warranty services: Calibration, software updates, and extended support.

8.8 Dry Wall Treatment

Supply & Fixing of Double Layer Sound Dampener System

1. General Description

Supply, installation, testing, and commissioning of a **double-layer sound dampening system** comprising compressed wood-cement composite boards and dampener sheets, mounted on MS framing and FR wooden studs. The system is designed to provide acoustic isolation with certified performance, ensuring compliance with relevant IS/ISO standards.

2. Scope of Work & Technical Specifications

Panel System

- **Panel Size:** 1218 × 1218 mm.
- **Construction:**
 - 10 mm compressed wood cement composite board (density ~1250 kg/m³).
 - 2 mm dampener sheet bonded to the composite panel.
- **Performance:** Minimum Sound Transmission Class (STC) = 37 as per IS:9901 (Part-3)–1981 and ISO:140 (Part-3)–1995.

Framing & Studs

- **MS Framing:** Provided by the client, to serve as primary structural support.
- **Wooden Studs:** Fire- and termite-resistant hardwood studs, section size 47 × 47 mm, placed at **600 × 600 mm c/c**.

Infill

- **Acoustic Insulation:** 50 mm thick, 1000 GSM density absorbent wool, tested as per ASTM D 635–1991 and IS 15061–2002 (fire-retardant grade).

Fixing & Sealing

- Panels shall be mechanically screwed to the wooden studs.
- All joints and gaps shall be sealed with **special acoustic sealant** to maintain continuity of the sound barrier.

Surface Finish

- The exposed surface of the sound dampener panels shall be finished as per design intent, which may include:
 - **Paint finish** (PU/Duco/Emulsion).
 - **Laminate cladding**.
 - **Fabric stretch panels**.
- Final finish type, color, and texture to be approved by the client/consultant.

3. Execution Methodology

1. **Preparation:** Verify framing alignment and stud placement.
2. **Fixing:** Securely screw double-layer panels onto studs with proper spacing.
3. **Infill:** Place acoustic absorbent wool in cavity before fixing panels.
4. **Sealing:** Apply acoustic sealant at panel joints and periphery.
5. **Finishing:** Apply approved finish (paint/laminate/fabric) for desired aesthetic and functional outcome.

4. Testing & Quality Assurance

- Conformance of materials with IS/ISO standards.
- On-site inspection for proper sealing and joint treatment.
- Random sample verification of absorbent wool density and fire resistance.
- Measurement of installed acoustic barrier to verify compliance with STC requirements.

5. Codes & Standards Compliance

- IS:9901 (Part-3)–1981 (Sound insulation).
- ISO:140 (Part-3)–1995 (Laboratory measurement of airborne sound insulation).
- ASTM D 635–1991 (Fire test of materials).

- IS 15061–2002 (Acoustic absorbent materials).

6. Scope of Supply / Deliverables

- Double-layer sound dampener panels (compressed wood-cement composite + dampener sheet).
- Fire- and termite-resistant hardwood studs (47 × 47 mm).
- Acoustic absorbent wool (50 mm thick, 1000 GSM, fire-retardant).
- Acoustic sealant and fixing accessories.
- Final **surface finish** (paint/laminate/fabric cladding) as per approved design.
- Installation, testing, sealing, and commissioning to deliver complete functional acoustic barrier.
- Compliance certificates for STC and fire-retardant performance.

8.9 Ceiling Treatment

1. General Description

Supply, installation, testing, and commissioning of ‘**APHONY FIBRETTE**’ acoustic tiles made of wood fibre cement composites, designed for high acoustic absorption, fire safety, thermal resistance, and long service life. The system shall be installed on a **G.I. stud framework** with acoustic infill, ensuring compliance with international and Indian standards.

2. Scope of Work & Technical Specifications

Acoustic Tiles

- **Material:** Wood fibre 1 mm width cement composites (non-magnesite).
- **Thickness:** 15 mm.
- **Tile Size Options:** 600 × 600 mm / 600 × 1200 mm.
- **Colours:** To be selected by Architect / Person-in-charge.
- **Density:** 400 Kg/m³.
- **Noise Absorption:** NRC = 1 (as per ISO:354–1985 and ASTM C423–90a).
- **Fire Ratings:**
 - ASTM D-876 compliance.
 - Fire Class-1 as per BS 476 (Parts 5 & 6).
 - Class P – not easily ignitable as per BS 476 Part-5.
 - Class 1 surface spread of flame as per BS 476 Part-7.
- **Weather Resistance:** IS 3308 compliance.
- **Thermal Insulation:** IS 3346–1980 compliance.
- **Humidity Resistance:** Withstands 90% RH at 60°C (140°F) for 15 days with no deterioration.
- **Other Properties:**
 - Conforms to EN 13168–2001.
 - RoHS compliant.
 - Anti-bacterial tested as per JIS Z2801–2010.

G.I. Framework

- **Stud Spacing:** 600 × 600 mm c/c.
- **Stud Dimensions:** 2400 mm × 50 mm, web thickness 0.5 mm, flanges 15 mm & 50 mm.
- **Finish:** Fully knurled for strength, hot-dipped galvanized with **120 GSM zinc coating**.
- **Performance:** Designed for acoustic vibration management and long service life.

Acoustic Infill

- **Type:** Himalayan Acoustics absorbent wool.
- **Thickness & Density:** 50 mm thick, 1000 GSM.
- **Fire Retardancy & Insulation Standards:**
 - ASTM D 635–1991 (Fire retardant).
 - IS 15061–2002 (Acoustic insulation).

Installation & Sealing

- Tiles shall be fixed on G.I. studs mechanically with approved fasteners.
- All cut-outs, periphery, and joints shall be sealed to prevent acoustic leakage.
- The system shall maintain alignment, tightness, and uniform surface finish.

3. Execution Methodology

1. **Preparation:** Verification of site conditions, framework alignment, and marking.
2. **Framework Installation:** Fixing of G.I. studs at 600 × 600 mm spacing.
3. **Infill Placement:** Installation of 50 mm thick, 1000 GSM absorbent wool.
4. **Tile Fixing:** Mounting of APHONY FIBRETTE tiles on framework with proper joint treatment.
5. **Sealing & Finishing:** Application of acoustic sealant at edges; surface finish as per approved colour/design.

4. Testing & Quality Assurance

- Material certificates confirming NRC, fire ratings, humidity resistance, and antibacterial properties.
- Random sampling of absorbent wool for density and fire compliance.
- On-site checks for alignment, sealing, and structural integrity.
- Acoustic performance validation (spot checks for NRC compliance if required).

5. Codes & Standards Compliance

- ISO 354–1985 (Acoustic absorption measurement).
- ASTM C423–90a (Sound absorption).
- BS 476 Parts 5, 6 & 7 (Fire ratings).
- IS 3308 (Weather resistance).
- IS 3346–1980 (Thermal insulation).
- ASTM D 635–1991 (Fire retardancy of absorbent wool).
- IS 15061–2002 (Insulation standards).
- EN 13168–2001 (Wood wool cement boards).
- JIS Z2801–2010 (Anti-bacterial testing).

6. Scope of Supply / Deliverables

- APHONY FIBRETTE acoustic tiles (15 mm thick, in approved size and colour).
- G.I. studs (hot-dipped galvanized, 120 GSM).
- Himalayan Acoustics absorbent wool (50 mm thick, 1000 GSM, fire-retardant).
- Acoustic sealant and fixing accessories.
- Complete installation, sealing, and commissioning.
- Test certificates for NRC, fire performance, RoHS compliance, and antibacterial properties.

8.10 Acoustic Door

Supply & Fixing of Acoustic Door

1. General Description

Supply, installation, testing, and commissioning of **55 mm thick Acoustic Door** with an STC rating of up to **59.6 @ 100 Hz**, designed for high-performance sound insulation, fire safety, and long-term durability. The door shall be factory-fabricated, filled with multilayer acoustic materials, and finished with teak/engineered wood frame and high-quality teak ply finish.

2. Technical Specifications

Acoustic Performance

- **STC Rating:** Up to 59.6 @ 100 Hz.
- **Test Standards:** ISO 140 / ASTM E90 / ASTM E413 compliant.

Door Leaf Construction (55 mm total thickness)

- **Core Layers (acoustic infill):**
 - 2 layers of **8 mm Waterproof Acoustic Ply** with dampener sheet.
 - 2 layers of **10 mm thick absorbent wool (300 GSM)**.
 - **Sound Dampener Panel (12 mm × 1218 × 1218 mm)** consisting of:
 - 10 mm compressed wood cement composites (density: 1250 Kg/m³).
 - 2 mm dampener sheet.
 - STC = 37 (as per ISO 140 (Part-III)–1995).
- **Outer Finish:**
 - **4 mm Teak Ply** on both interior and exterior surfaces.
 - Properly polished/laminated finish as per Architect's approval.

Door Frame

- **Material:** Teak wood or engineered wood.
- **Frame Design:**
 - Four-side frame; or
 - Three-side frame with drop seal at the bottom (as per site requirement).
- **Sealing:** Perimeter sealing strips to eliminate sound leakage.

Hardware & Fittings

- **Hinges:** High load-bearing stainless steel/engineered hinges suitable for acoustic doors.
- **Drop Seal:** Automatic acoustic drop seal at bottom (if three-side frame).
- **Locks/Handles:** Heavy-duty mortise lockset with handle set, finished in SS/brass.

Fire Rating

- Door and frame tested for fire performance in accordance with:
 - IS: 3614 (Part-II).
 - BS: 476 (Part 20 & 22).

3. Installation Requirements

- Acoustic doors shall be installed on site by experienced personnel ensuring airtight sealing.
- All joints, frame-to-wall interfaces, and drop seals shall be checked for sound leakage.
- Finishing to be carried out without compromising acoustic performance.

4. Testing & Quality Assurance

- Manufacturer's test certificate for STC rating and fire compliance.
- Verification of installation alignment and seal integrity.
- Functional test of hinges, locks, and drop seals for smooth operation.

5. Deliverables

- Acoustic Door (55 mm thick, as specified).
- Teak/Engineered Wood frame with required sealing.
- Drop seal (if applicable).
- High load-bearing hinges and lockset with accessories.
- All consumables, adhesives, screws, and finishing materials.
- Warranty and compliance certificates.

8.11 Projection Paint

Supply & Application of Plastic Projection Finish Paint

1. General Description

Supply, preparation, and application of **Plastic Projection Finish Paint** on walls, columns, and ceilings to achieve a **matte finish with high-gain projection quality**. The finish shall be smooth, evenly spread, and suitable for high-quality projection surfaces.

2. Scope of Work & Technical Specification

Surface Preparation

- Scraping and cleaning of existing surface to remove dirt, grease, or loose material.
- Levelling of uneven areas with approved putty/filler.
- Sanding and smoothening to obtain a uniform base for painting.

Primer & Undercoat

- Application of **one coat of primer** (Asian Paints / Nerolac / Berger or equivalent approved make).
- Ensuring proper curing time and coverage.

Finish Paint Application

- Application of **minimum 3 coats** of plastic projection finish paint.
- Finish: **Matte finish, high-gain quality** (to minimize hotspotting and ensure uniform projection).
- Method: Roller finish (to avoid brush marks or unevenness).
- Coverage: Sufficient coats to achieve an **evenly spread, streak-free projection surface**.

Materials & Approved Makes

- Primer: Asian / Nerolac / Berger (or equivalent, as approved by Engineer-in-Charge).
- Projection Finish Paint: Approved make, shade, and quality for high-definition projection.

3. Installation Methodology

- Mock-up sample panel (minimum 1 m × 1 m) to be prepared for approval before final execution.
- Each coat shall be allowed to dry completely before the next is applied.
- Edges, corners, and joints to be smoothly finished without visible overlaps.

4. Testing & Quality Assurance

- Uniformity of finish and shade to be visually checked under projection conditions.
- Even light reflection (no glare, streaks, or patchiness).
- Manufacturer's data sheet for paint product to be submitted for approval.

5. Deliverables

- Primer coat.
- Minimum 3 coats of plastic projection finish paint (approved shade & make).
- Surface preparation (scraping, levelling, putty, sanding).
- Labour, consumables, and tools.
- Final projection-quality wall/ceiling finish with warranty against peeling, cracking, or unevenness.

9. PART-9 : LIGHTHOUSE

9.1 Display:

Free Standing Floor Mounted Showcase

1. General Description

Supply, installation, testing, and commissioning of a **free-standing floor mounted museum-grade showcase** of size up to **4800 (L) × 1200 (W) × 2400 (H) mm**, designed for display of artifacts. The showcase shall be aesthetically designed, structurally stable, and equipped with all accessories, systems, and finishes to deliver a fully functional solution.

2. Scope of Work & Technical Specification

Structure & Frame

- Showcase base supported on a **metal pedestal**, fabricated from powder-coated mild steel (MS) / stainless steel (SS) with corrosion-resistant treatment.
- Structural design to ensure stability, durability, and safe loading capacity.
- Finish and color of pedestal as per approved design intent.

Glazing & Panels

- Toughened/laminated security glass panels (minimum 8–10 mm thick, depending on design).
- Low-reflective, UV-filter glass to ensure visibility and artifact protection.
- Concealed fixing/hanging systems for a seamless aesthetic.

Access & Security

- Lockable access through hinged/ sliding glass panels.
- High-quality locks (cam locks or equivalent) for security.
- Provision for concealed hinges and tamper-proof access.

Lighting & Electrical

- Integrated lighting system (LED spotlights/strip lights as per design).
- Electrical wiring concealed within pedestal/frame.
- Electrical fittings compliant with IS/IEC standards for safety.

Environmental Controls (if specified/required)

- Provision for passive humidity control materials (silica gel chamber or equivalent).
- Ventilation slots/filters for dust control (if required).

Finishes

- All visible metal parts: Powder-coated / epoxy-painted in approved color.
- Internal base: High-pressure laminate (HPL) / PU paint finish of approved shade.
- Showcase design to ensure dust-proofing and minimal maintenance.

Accessories

- Fixtures, fittings, and hardware (stainless steel or anodized aluminum).
- Bolting/hanging systems for artifact support inside the showcase.
- All mechanical/electrical mechanisms required for full functionality.

3. Installation Methodology

- Fabrication as per approved shop drawings and prototype.
- Trial assembly and prototyping prior to site installation for client approval.
- On-site assembly with proper alignment, sealing, and finishing.
- Electrical and mechanical integration to be tested before handover.

4. Testing & Quality Assurance

- Showcase stability and structural safety check.

- Alignment and finishing quality check.
- Functionality testing of lighting, electrical, and locking systems.
- Verification of dust-proofing and sealing performance.

5. Deliverables

- Free standing floor-mounted showcase of size up to 4800 × 1200 × 2400 mm.
- Complete with pedestal, glazing, hardware, lighting, and accessories.
- Prototyping, fixtures, fittings, consumables, and installation.
- Inclusive of taxes, duties, testing, commissioning, warranties, and manuals

9.2 **Fiber Reinforced Plastic (F.R.P) Replica of Lighthouse:**

FRP Circular Replica Models of Lighthouse (Period 03 – City Timeline)

1. General Description

Providing, fabrication, installation, testing and commissioning of circular replica models of Lighthouse (Period 03 of City Timeline), made of Fiberglass Reinforced Plastic (FRP), of varying sizes up to 500 mm – 2000 mm diameter and thickness ranging from 2400 mm. The models shall replicate the finish, color, motifs, and relief details of the original design featuring the Lighthouse, with a surface finish prepared to allow high-quality projection/projection mapping as per approvals.

2. Scope of Work & Technical Specification

2.1 Scope of Work

- Design and preparation of shop drawings for the replica model.
- Fabrication of the lighthouse replica in FRP with proper reinforcement and structural stability.
- Surface treatment, finishing, and painting with UV-resistant polyurethane paints.
- Transportation of the fabricated model to site.
- Erection, alignment, and permanent fixing of the model at designated location with suitable foundation/anchoring arrangement.
- Touch-up, cleaning, and final handover.

2.2 Technical Specifications

- **Material:** FRP of minimum 4–6 mm thickness (outer shell) reinforced with glass fiber and polyester resin; internal frame of MS/Aluminum for rigidity.
- **Height & Dimensions:** As per approved drawing (scaled replica).
- **Finish:** Smooth external finish with automotive-grade PU paint, color as per original lighthouse scheme.
- **Foundation/Fixing:** Bolted/welded base frame anchored to RCC/structural steel pedestal with suitable fasteners and epoxy grout.

- **Durability:** Weatherproof, corrosion resistant, UV stabilized, resistant to moisture and saline atmosphere (if coastal).
- **Maintenance:** Easy-to-clean smooth surfaces, long-lasting paint system.

3. Execution Methodology

1. **Design & Approval** – Preparation of design drawings and obtaining client approval.
2. **Fabrication** – Mould preparation, FRP layup, curing, trimming, and demoulding. Internal framing installed to withstand load and wind pressure.
3. **Surface Preparation** – Sanding, putty application, priming, and finishing with PU paints.
4. **Transportation** – Safe transport to site with protective packaging.
5. **Foundation & Fixing** – Construction of RCC base (if required), placement of anchor bolts, positioning and alignment of model, grouting and fastening.
6. **Final Finishing** – Joint sealing, final touch-up painting, and polishing.
7. **Handover** – Inspection with client/engineer-in-charge, rectification of snags, and final acceptance.

4. Testing & Quality Assurance

- **Material Testing:** FRP resin and glass fiber to conform to IS/ASTM standards.
- **Thickness Check:** Random thickness measurement of FRP shell.
- **Surface Finish Inspection:** No visible cracks, bubbles, or pinholes.
- **Paint Quality:** Cross-cut adhesion test, gloss and color shade matching.
- **Structural Stability:** Verification of frame and anchoring.
- **Final Inspection:** Joint inspection with client before handover.

5. Codes & Standards Compliance

The work shall comply with the latest revisions of:

- IS 6746: Glass Fibre Reinforced Plastics
- ASTM D256: Standard Test Method for Impact Resistance of Plastics
- ASTM D790: Flexural Properties of Plastics
- IS 2933: General purpose paints
- IS 875 (Part 3): Wind Loads (for stability considerations)
- Manufacturer's technical data sheets for resin, paint, and fasteners.

6. Scope of Supply / Deliverables

- **Complete FRP replica model of lighthouse** (as per approved design).
- **Internal frame and fixing hardware.**
- **Protective coatings and paint system.**
- **Foundation bolts, anchoring arrangement, and epoxy grout.**
- **Shop drawings and as-built drawings.**
- **Material test certificates for FRP and paints.**
- **Inspection & quality assurance reports.**

-
- O&M manual for maintenance and cleaning.

9.3 55" Display:

55" Professional-Grade 4K UHD Display

1. General Description

Supply, installation, testing, and commissioning of a **55" diagonal professional-grade display** suitable for continuous **24/7 operation**, with **4K UHD resolution**, robust build quality, and advanced features for reliable usage in gallery/museum/AV integration environments.

2. Technical Specifications

Display Panel

- Type: Edge LED BLU
- Resolution: 3840 × 2160 (4K UHD)
- Pixel Pitch: 0.315 × 0.315 mm
- Active Display Area: 1209.6 mm (H) × 680.4 mm (V)
- Brightness (Typ.): 500 nits
- Contrast Ratio: 4000:1
- Viewing Angle (H/V): 178° / 178°
- Response Time (G-to-G): 8 ms (Typ.)
- Display Colors: 16.7 million
- Color Gamut: 92% (DCI-P3, CIE 1976)
- Surface Treatment: 25% haze (without glass)
- Operation: 24/7 continuous

Special Features – Hardware

- Temperature sensor
- Pivot display mode
- Clock battery with 168 hrs clock keeping
- Built-in 10W × 2 channel speakers
- Video wall daisy chain support (HDCP2.2: 4EA, HDCP1.4: 7EA)
- IP5x rating (dust protection)
- Integrated Wi-Fi & Bluetooth connectivity

Special Features – Software

- Auto source switching & recovery
- LFD Home UI
- Button lock & hot key option
- Plug & Play initial setup

Accessories & Integration

- Supply of all necessary **cables, connectors, adaptors, mounting hardware, and power accessories** for complete installation.
- Display to be integrated with control systems, projection, and AV network as per site requirement.

3. Execution Methodology

1. Delivery and site verification.
2. Mounting using approved brackets/stands.
3. Electrical & signal connectivity.
4. Configuration of settings (brightness, source switching, networking).
5. Testing of **display quality, color calibration, and 24/7 operation capability**.
6. Handover with documentation and training.

4. Testing & Quality Assurance

- Display calibration tests (color accuracy, brightness, contrast).
- Burn-in and endurance testing for 24/7 operation.
- Network, daisy-chain, and source-switching functionality tests.
- Compliance with **OEM performance standards** and tender specifications.

5. Codes & Standard Compliance

- IEC 62368-1 (Audio/Video equipment safety).
- ISO 9241 (Ergonomics of display use).
- RoHS & CE compliance.
- IP5x certification for dust resistance.

6. Deliverables

- One **55” professional-grade 4K display** with accessories.
- All **mounting hardware, adaptors, and cabling**.
- OEM installation & operation manuals.
- Test certificates and commissioning report.

7. Approved Makes

- Samsung
- Christie
- Equivalent subject to approval

8. Warranty & Post-Warranty Services

- **Warranty: 2 Years** – Comprehensive coverage for panel, electronics, and accessories.
- **Post-Warranty Services:** OEM/authorized service support with AMC options for extended coverage.

9.4 Mini PC for Info Kiosk:

Mini PC Controller for Kiosk

1. General Description

Supply, installation, testing, and commissioning of a **Mini PC Controller for Kiosk**, compact in design, suitable for continuous operation, and capable of handling interactive kiosk applications with high reliability and performance.

2. Technical Specifications

- **Processor:** Intel Core i7, latest generation or higher.
- **Memory (RAM):** 16 GB DDR4.
- **Storage:** 1 TB SSD (NVMe preferred).
- **Operating System:** Windows 10 Pro 64-bit, genuine licensed version.
- **Form Factor:** Compact Mini PC (Intel NUC or equivalent).
- **Connectivity:** HDMI, USB (multiple ports), LAN, Wi-Fi, Bluetooth.
- **Accessories:**
 - Wireless Keyboard & Mouse (OEM-approved).
 - HDMI cable.
 - Power adaptor with surge protection.
 - All required connectors and adaptors.

3. Execution Methodology

1. Delivery and site readiness verification.
2. Installation in kiosk enclosure with secure fixing.
3. Connection to display, input devices, and power supply.
4. OS activation, driver installation, and configuration.
5. Testing of performance, connectivity, and kiosk integration.

4. Testing & Quality Assurance

- Verification of hardware specifications.
- Benchmarking and system stress test for stability.
- OS activation and license validation.
- Functional testing with kiosk application.
- Burn-in test for 24/7 operation reliability.

5. Codes & Standard Compliance

- IEC 60950 / IEC 62368-1 (Safety of IT equipment).
- RoHS & CE compliance.
- Energy Star certified hardware.
- BIS certification where applicable.

6. Deliverables

- Mini PC Controller with licensed OS.
- Wireless Keyboard & Mouse.
- HDMI cable, power adaptor, and required connectors.
- Installation and configuration documentation.
- OEM warranty cards and license certificates.

7. Approved Makes

- Intel
- Dell
- HP
- ASUS

8. Warranty & Post-Warranty Services

- **Warranty: 2 Years** – Comprehensive onsite support for hardware and licensed OS.
- **Post-Warranty Services:** OEM-authorized AMC support for hardware upgrades, replacements, and extended maintenance.

9.5 Installation & Integration:

Electrical & Data Cabling for Projection and Technology Equipment

1. General Description

Supply, laying, fixing, testing, and commissioning of **all wiring and associated items** required to connect power and data from the **Distribution Board (DB)** to respective digital projection and interactive technology equipment. The system shall ensure **reliable power delivery, signal integrity, and seamless operation** of all connected devices.

2. Scope of Work

- Supply, laying, and fixing of **electrical cabling** from DB to equipment locations.
- Supply, laying, and termination of **signal/data cabling** for HDMI, LAN, fibre, and other AV/IT connections.
- Provision of **all accessories**, racks, patch panels, cable management, and mounting hardware.
- Integration, mapping, and calibration of all power and signal connections for seamless operation of projectors, displays, and interactive systems.
- Testing, commissioning, and documentation of the complete cabling infrastructure.

3. Technical Specifications

a) Electrical Cabling

- Copper FRLS/FRLSH cables of suitable sizes for power distribution.
- Conduits, trays, raceways, and protective accessories.
- Junction boxes, terminations, and proper earthing.

b) Signal/Data Cabling

- HDMI, LAN (Cat6/Cat6a), fibre optic, and other AV/IT cables.
- Connectors, patch cords, adaptors, and patch panels as required.
- Structured cabling to maintain signal integrity and minimize interference.

c) Accessories & Integration

- Racks, cable trays, mounting hardware, and power distribution units (PDUs).
- Cable dressing and management for clean and safe installation.
- Integration with control systems and technology equipment for proper mapping and signal routing.

4. Execution Methodology

- Site survey to determine optimal cable routes and mounting points.
- Laying and fixing of electrical and data cables according to site conditions.
- Termination, dressing, and labeling of all cables.
- Integration with connected equipment and testing of signal/power continuity.

-
- Calibration and verification of signal quality and functionality.

5. Testing & Quality Assurance

- Continuity and insulation resistance testing of electrical cables.
- Verification of signal integrity for HDMI, LAN, and fibre connections.
- Functional testing of all integrated systems with connected devices.
- Compliance check against design drawings and site standards.

6. Standards & Compliance

- IS 694 / IS 1554 – Electrical wiring standards.
- IEC 60227 / IEC 60332 – Cables and fire safety.
- IS/IEC standards for HDMI, LAN, fibre, and AV cabling.
- RoHS and CE compliance for all electronic components.

7. Deliverables

- Installed, tested, and commissioned electrical and data cabling network.
- As-built drawings and schematics.
- Test reports and compliance certificates.
- Operation and maintenance documentation.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** covering cabling, terminations, and accessories.
- Post-warranty support: troubleshooting, repairs, or modifications as required.

9.6 Content for Display:

Content Research, Development & Production Services for Galleries

1. General Description

The work involves the **end-to-end development of interpretive content** for the galleries, including **research, scripting, translations, design, and media production**, to deliver a cohesive, authentic, and visitor-friendly narrative experience. The agency shall coordinate closely with **VOCPA (or their nominated representatives)** throughout the process to ensure historical accuracy, cultural sensitivity, and thematic alignment.

2. Scope of Work

a) Research & Framework

- Conduct in-depth **historical and thematic research** relevant to the gallery content.
- Develop **narrative frameworks, storylines, and timelines**, aligned with curatorial objectives.
- Curatorial discussions and validation with VOCPA representatives.

b) Content Creation

- Prepare **interpretive texts** for panels, captions, labels, and narratives.
- Write **scripts for audio-visuals, films, and interactives**.

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- Ensure content is **visitor-centric, accessible, and engaging**.
 - c) Language Services**
 - **Translation** of all approved content into **Hindi, English, and Tamil**.
 - **Proofreading and editing** by professional linguists to ensure accuracy and consistency.
 - d) Design & Visualization**
 - Create **infographics, maps, diagrams, and illustrations** to enhance interpretation.
 - Develop **digital visualizations and interactive mock-ups** for content presentation.
 - e) Media Production**
 - Produce **short films, audio-visuels, animations, voiceovers, and digital interactive content**.
 - All media to be **museum-grade quality** with licensed professional narration, music, and effects.
 - f) Integration & Formatting**
 - Deliver **final content packages** in both **print-ready and digital formats**.
 - Content prepared for **integration with display panels, AV systems, and interactive technology**.
 - g) Approvals & Deliverables**
 - Submit **draft content** for review and approvals at each stage.
 - Incorporate feedback and finalize all content.
 - Deliver **master files (editable + final formats)** for all textual, graphic, and media content.
 - h) Rights & Licenses**
 - All content, media, and visuals to be **original and copyright-cleared**.
 - Agency to provide **full transfer of rights, licenses, and clearances** to the client.

3. Execution Methodology

1. **Inception Meeting** with VOCPA for project orientation.
2. **Research & Draft Narrative** preparation with references and citations.
3. **Content Development** for text, graphics, and media in iterative stages.
4. **Stakeholder Review Workshops** for validation and approvals.
5. **Media Production & Formatting** in compliance with gallery specifications.
6. **Final Submission & Handover** of content package with documentation.

4. Testing & Quality Assurance

- Proofreading and language checks by certified linguists.
- Validation of **historical accuracy** through references and expert review.
- Compliance with **museum communication standards** (clarity, readability, accessibility).
- Trial integration of media content with target hardware/software.

5. Codes & Standard Compliance

- **UNESCO/ICOM museum communication guidelines** for interpretive content.
- **ISO 17100** for translation quality management.

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- **ISO/IEC 27001** for digital content handling & licensing.
 - **Broadcast/Media Standards** for AV production quality.

6. Deliverables

- Narrative framework, scripts, and content documentation.
- Text panels, captions, labels, and storylines in approved languages.
- Infographics, maps, diagrams, and illustrations in digital + print-ready formats.
- Audio-visual films, animations, and interactives with voiceovers.
- Final approved content in both **editable (source) and finalized formats**.
- Licensing documents, copyright clearance certificates, and transfer of rights.

7. Warranty & Post-Warranty Support

- **Warranty: 2 Years** – Free rectification of errors in content, translations, or formatting.
- **Post-Warranty Services:** Paid support for content updates, reformatting, and additional translations as required.

9.7 Software / Application:

Supplementary Technical Requirement – Functional Completeness

The contractor shall provide **all necessary technological equipment, software, applications, accessories, special effects, or any other mechanisms** required to ensure the **complete functionality and intended operation** of the system, installation, or exhibit.

This includes, but is not limited to:

- **Hardware components:** Sensors, controllers, displays, processing units, AV/IT devices, and interactive peripherals.
- **Software & Applications:** Licensed software, content management systems, interactive applications, drivers, and control interfaces.
- **Accessories & Cabling:** Power and data cables, adapters, connectors, mounting hardware, and protective components.
- **Special Effects / Mechanisms:** Lighting effects, projection mapping, actuators, haptic or motion feedback devices, and any additional mechanisms required to achieve the intended experience.
- **Integration & Commissioning:** Full integration of all components with seamless operation, testing, calibration, and handover.

All supplied items shall comply with relevant IS/IEC standards, safety regulations, and manufacturer guidelines, ensuring the system is fully operational, reliable, and visitor-ready. All necessary technology equipment, licensed software, applications, accessories, special effects, and any other mechanisms required to ensure full functionality, seamless operation, and integration of the system shall be included in the scope of supply.

10. PART-10 : MODERN SHIPPING

10.1 Projector:

1-Chip DLP Laser Phosphor Multimedia Projection System

1. General Description

Supply, installation, testing, and commissioning of a **high-performance 1-chip DLP laser phosphor multimedia projector** suitable for **museum, gallery, or auditorium use**. The system shall provide **high brightness, WUXGA resolution, long operational life, and seamless integration** with AV and interactive systems.

2. Scope of Work

- Supply and installation of the projector with **mounting brackets and structural supports**.
- Integration with media servers, AV controllers, and display systems.
- Provision of **all necessary cabling, adapters, and accessories** for complete operational setup.
- Calibration of brightness, focus, zoom, and alignment for optimal projection.
- Testing, commissioning, and handover to client with full documentation.

3. Technical Specifications

a) Light Source

- Laser Phosphor technology with **minimum 20,000 hours life**.

b) Brightness

- 6,500 – 7,000 ANSI lumens suitable for large projection surfaces.

c) Resolution & Image Quality

- Native Resolution: 1920 × 1200 (WUXGA)
- Contrast Ratio: 10,000:1
- Lens: Manual or motorized zoom and focus adjustment
- Supplied with **long-throw zoom lens** appropriate for site requirements

d) Connectivity

- HDMI inputs
- HDBaseT input
- USB ports for media or control

e) Mounting & Accessories

- Projector mounting bracket with structural support
- All necessary cabling, adapters, and installation accessories

f) Approved Makes

- **Christie / Barco / Digital Projection**

4. Execution Methodology

- Site survey to determine projector placement and throw distance.
- Installation of mounting brackets and structural supports.

- Mounting of projector and lens installation.
- Connection to power, data, and media sources.
- Calibration of brightness, focus, zoom, and alignment.
- Functional testing and commissioning of projection system.

5. Testing & Quality Assurance

- Verification of image brightness, resolution, and contrast.
- Lens zoom and focus functionality check.
- Connectivity testing: HDMI, HDBaseT, USB inputs.
- Long-term operational test for stability and image quality.
- Compliance with IS/IEC electrical safety standards.

6. Standards & Compliance

- IEC 60950 / IEC 62368-1 – Electrical safety for IT/AV equipment
- RoHS & CE compliance
- Laser safety standards for Class 1 or as applicable

7. Deliverables

- Fully installed, tested, and commissioned projector system
- Projector mounting brackets and structural supports
- Cabling, adapters, and installation accessories
- As-built drawings, calibration reports, and operational manuals

8. Warranty & Post-Completion Support

- **Warranty: 2 years** covering projector, light source, and accessories
- Post-warranty support for servicing, lamp replacement, or calibration

10.2 Media Server :

Professional-Grade Display Media Server / Workstation

1. General Description

Supply, installation, testing, and commissioning of a **high-performance display media server / workstation** capable of **4K content playback, synchronized multi-display output, and real-time content capture**. The system shall support interactive installations, projection mapping, and advanced media display applications.

2. Scope of Work

- Supply of **rack-mountable workstation** with specified hardware and software.
- Integration with multiple display systems, lighting controllers, and media playback infrastructure.
- Installation, configuration, and testing for **multi-display synchronization, real-time capture, and Art-Net integration**.
- Provision of all necessary cabling, adapters, mounts, and accessories.
- Documentation, calibration, and handover to client.

3. Technical Specifications

a) Processor & Form Factor

- Intel® Core i9, 10th Gen or higher.
- Rack-mountable workstation suitable for AV/IT infrastructure.

b) Memory & Storage

- 32 GB DDR4 RAM minimum.
- Storage: 1 TB SSD for OS and applications; 2 TB HDD for content storage.

c) Graphics & Display Outputs

- NVIDIA Quadro 8 GB or equivalent GPU.
- 3 × DisplayPort outputs, 4K-ready.
- Support for multi-display synchronization and high-fidelity rendering.

d) Operating System

- Windows 10 Pro 64-bit or higher (licensed).

e) Features

- Genlock and Framelock for synchronized display outputs.
- Art-Net Ethernet in/out for integration with lighting and show control systems.
- Real-time content capture capability.
- Support for 4K content playback, projection mapping, and interactive applications.

f) Approved Makes

- Dell / HP / ASUS

4. Execution Methodology

- Site survey to determine rack space, power, and network connectivity.
- Installation of workstation in server racks with proper mounting and cable management.
- Configuration of OS, GPU drivers, and playback software.
- Integration with display screens, lighting, and control systems.
- Testing for multi-display synchronization, real-time capture, and Art-Net integration.

5. Testing & Quality Assurance

- Verification of multi-display output and synchronization.
- Real-time content capture testing.
- Art-Net input/output functional test.
- Stress testing under continuous 4K playback.
- Compliance with IS/IEC standards for electrical and network safety.

6. Standards & Compliance

- IEC/IS electrical safety standards.
- RoHS and CE compliance for all hardware components.
- Rack-mount standards for AV/IT equipment.

7. Deliverables

- Fully installed and commissioned media server/workstation.

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- Connected and tested with displays and interactive systems.
 - Cable management, documentation, as-built drawings, and operational manuals.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** covering workstation hardware, GPU, storage, and accessories.
- Post-warranty support for software updates, troubleshooting, and hardware replacement.

10.3 Mapping Software :

3D Projection Mapping Software & Playback Control System

1. General Description

Supply, installation, testing, and commissioning of a **3D projection mapping software and playback control system** capable of managing, scheduling, and controlling media servers for **projection mapping and immersive experiences**. The system shall provide **real-time content management, multi-server synchronization, and automated playback** functionality.

2. Scope of Work

- Supply of **licensed 3D projection mapping software** and playback control system.
- Integration with specified **media servers, displays, and interactive installations**.
- Installation, configuration, and calibration for seamless content playback.
- Training of client personnel for operational use and content management.
- Testing and commissioning of the complete system to ensure full functionality.
- Provision of all consumables, incidentals, cables, adapters, and hardware required for full system operation.

3. System Requirements & Features

a) Software & Playback Control

- Direct control of inputs and media timelines.
- Multi-display and multi-server synchronized playback.
- Real-time editing, layering, and content management tools.
- Scheduling features for automated playback.
- Option for external control via hardware controllers or automation units.
- Compatibility with the project-specified media servers.
- Licensed software with **perpetual or long-term license transfer** to the client.

b) Approved Makes

- **Dataton (Watchout) / Coolux (Pandas) / Pixera** or equivalent.

c) Integration & Accessories

- Playback controller, cabling, adapters, and hardware for integration.
- All consumables and accessories necessary for fully functional system.

4. Execution Methodology

- Review and survey of site for media server and display integration.

- Installation of playback control system and software on specified servers.
- Configuration for multi-display and multi-server synchronized playback.
- Real-time testing, calibration, and validation of projection mapping content.
- Training for client staff on operational and content management procedures.
- Final commissioning and handover with documentation.

5. Testing & Quality Assurance

- Verification of multi-server synchronization and playback stability.
- Testing of automated playback, scheduling, and content layering functions.
- Functional integration with all media servers and displays.
- Compliance with IS/IEC standards for electrical and operational safety.

6. Standards & Compliance

- Licensed software and hardware compliant with **international IP and copyright standards**.
- Electrical safety compliance as per IS/IEC standards.
- Fire-retardant and safety-compliant mounting and cabling materials.

7. Deliverables

- Fully installed and commissioned 3D projection mapping and playback control system.
- Licensed software with documentation and operational manuals.
- Training materials and records of training provided.
- Integration with media servers, displays, and interactive installations.

8. Warranty & Post-Completion Support

- **Warranty: 3 years** covering software, playback controller, and integration hardware.
- Post-warranty support for updates, troubleshooting, and reconfiguration.

10.4 Accessories :

HDMI HD Base T Extender (Tx–Rx Pair) System with Accessories

1. General Description

This specification covers the **supply, laying, installation, testing, and commissioning of 8 (eight) HDMI HDBaseT Extender units (Transmitter–Receiver pairs)**, complete with CAT6 cabling, networking accessories, and racks for integration. The system shall be capable of extending **HDMI signals up to 100 m over Cat 5e/6/6a cabling** with full HDCP compliance, ensuring seamless integration with AV systems and projection/display infrastructure.

2. Scope of Work with Technical Specifications

2.1 HDMI HDBaseT Extenders (Tx–Rx Pair)

- Quantity: **8 pairs (Tx + Rx)**.

- Signal Extension: Up to 100 m over a single Cat 5e/6/6a cable.
- Video Standards: HDMI (3D, Deep Color, 4K UHD).
- Compliance: HDCP 2.2 or higher.
- EDID: Advanced EDID pass-through/management for optimal signal recognition.
- Local HDMI Output: At transmitter end for monitoring.
- Control Pass-through: IR, RS-232 & Ethernet pass-through support.
- Functionality: Plug-and-play, CEC compliant.
- Build: Professional-grade, 24/7 operation capable.

2.2 Cabling & Networking Accessories

- **Cables:** Certified CAT6 UTP/STP cables (lengths as per site requirement).
- **Patch Panels:** Fully loaded patch panels for HDMI-over-CAT cabling.
- **Network Switch:** Managed/Unmanaged Gigabit network switch as per integration design.
- **Racks:** Standard AV/network rack with accessories, grounding, and dressing.
- **Connectors:** High-quality HDMI connectors, RJ45 jacks, adaptors, and patch cords.
- **Cable Management:** Proper routing, dressing, and labeling for serviceability.

2.3 Approved Makes

- **ATEN / Kramer / D-Link / Netrack / Comrack** or **equivalent international standard make** (subject to prior approval).

3. Execution Methodology

1. **Site Preparation:** Verification of conduit/rack spaces, distances, and environmental suitability.
2. **Cabling & Termination:** Laying of CAT6 cables in conduits/trays with labeling and termination at both ends.
3. **Installation:** Mounting of extenders (Tx–Rx), racks, patch panels, and network switches.
4. **Integration:** Interfacing extenders with projectors, displays, media servers, and control systems.
5. **Testing & Commissioning:** End-to-end testing of HDMI signals, EDID handshake, IR/RS-232/Ethernet pass-through, and monitoring outputs.

4. Testing & Quality Assurance

- **Signal Integrity Test:** Verification of 4K UHD signals over 100 m without loss or artifacts.
- **HDCP Compliance:** Validation with encrypted content.
- **Latency & Synchronization:** Testing for low-latency transmission suitable for interactive AV systems.
- **Control Signal Verification:** Confirm IR, RS-232 & Ethernet pass-through functionality.
- **Endurance Test:** Minimum 8-hour continuous operation test for stability.

5. Codes & Standards Compliance

- **HDBaseT Alliance Compliance** for extenders.
- **TIA/EIA-568-C** standards for CAT6 cabling.
- **IEC/IS standards** for electrical installation, safety, and grounding.
- **CE / FCC / RoHS** certification for active devices.

6. Scope of Supply / Deliverables

1. 8 Nos. HDMI HDBaseT Extender Tx–Rx pairs.
2. Certified CAT6 cabling with terminations.
3. Patch panels, connectors, adaptors, and patch cords.
4. Network switch and accessories.
5. Network/AV rack with cable management and grounding.
6. Installation, integration, testing & commissioning services.
7. OEM user manuals and documentation.
8. Warranty certificates (minimum 3 years).

The quoted rate shall be **inclusive of all equipment, cabling, accessories, racks, installation, testing, commissioning, consumables, incidentals, taxes, duties, and warranties**, delivering the HDMI extension system fully functional in all respects.

10.5 Installation & Integration:

Electrical & Data Cabling for Projection and Technology Equipment

1. General Description

Supply, laying, fixing, testing, and commissioning of **all wiring and associated items** required to connect power and data from the **Distribution Board (DB)** to respective digital projection and interactive technology equipment. The system shall ensure **reliable power delivery, signal integrity, and seamless operation** of all connected devices.

2. Scope of Work

- Supply, laying, and fixing of **electrical cabling** from DB to equipment locations.
- Supply, laying, and termination of **signal/data cabling** for HDMI, LAN, fibre, and other AV/IT connections.
- Provision of **all accessories**, racks, patch panels, cable management, and mounting hardware.
- Integration, mapping, and calibration of all power and signal connections for seamless operation of projectors, displays, and interactive systems.
- Testing, commissioning, and documentation of the complete cabling infrastructure.

3. Technical Specifications

a) Electrical Cabling

- Copper FRLS/FRLSH cables of suitable sizes for power distribution.
- Conduits, trays, raceways, and protective accessories.
- Junction boxes, terminations, and proper earthing.

b) Signal/Data Cabling

- HDMI, LAN (Cat6/Cat6a), fibre optic, and other AV/IT cables.
- Connectors, patch cords, adaptors, and patch panels as required.
- Structured cabling to maintain signal integrity and minimize interference.

c) Accessories & Integration

- Racks, cable trays, mounting hardware, and power distribution units (PDUs).
- Cable dressing and management for clean and safe installation.
- Integration with control systems and technology equipment for proper mapping and signal routing.

4. Execution Methodology

- Site survey to determine optimal cable routes and mounting points.
- Laying and fixing of electrical and data cables according to site conditions.
- Termination, dressing, and labeling of all cables.
- Integration with connected equipment and testing of signal/power continuity.
- Calibration and verification of signal quality and functionality.

5. Testing & Quality Assurance

- Continuity and insulation resistance testing of electrical cables.
- Verification of signal integrity for HDMI, LAN, and fibre connections.
- Functional testing of all integrated systems with connected devices.
- Compliance check against design drawings and site standards.

6. Standards & Compliance

- IS 694 / IS 1554 – Electrical wiring standards.
- IEC 60227 / IEC 60332 – Cables and fire safety.
- IS/IEC standards for HDMI, LAN, fibre, and AV cabling.
- RoHS and CE compliance for all electronic components.

7. Deliverables

- Installed, tested, and commissioned electrical and data cabling network.
- As-built drawings and schematics.
- Test reports and compliance certificates.
- Operation and maintenance documentation.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** covering cabling, terminations, and accessories.
- Post-warranty support: troubleshooting, repairs, or modifications as required.

10.6 Content :

Projection Film Development and Production (Approx. 5–7 Minutes)

1. General Description

Carrying out **end-to-end services** for the **development and production of a projection film** of approximately 5–7 minutes duration, to be projected on the **replica Port**, highlighting its **architectural, functional, and aesthetic details**. The project includes concept development, content creation, audio-visual production, integration, and delivery in projection-ready formats.

2. Scope of Work

a) Concept & Script

- Research and analysis of historical, architectural, and thematic aspects of the replica Port.
- Preparation of storyline, narrative framework, and script aligned with the interpretive theme.
- Presentation for approvals at draft and final stages.

b) Visual Content Creation

- Development of mixed media content:
 - Infographics, illustrations, 2D animation/motion graphics.
 - 3D animation wherever required for realism and immersion.
- Alignment of visual content with narrative and projection requirements.

c) Audio Design

- Professional sound design including:
 - Background music/score.
 - Synchronised audio effects for immersive experience.

d) Voiceover

- Recording of **professional voiceover** in Hindi, English, and Tamil.
- Integration of voiceover with visual content and timeline.

e) Integration & Optimization

- Editing, layering, and formatting of content for **projection mapping**.
- Optimization for resolution, color, and brightness as per site/projector requirements.

f) Deliverables

- Final approved film delivered in digital formats:
 - Master files.
 - Projection-ready formats compatible with playback systems.

g) Rights & Licenses

- All intellectual property rights, licenses, and usage rights to be **transferred fully to the client**.
- Clearances for all third-party content, if used.

3. Execution Methodology

1. Research & script development with client/VOCPA consultations.
2. Visual concept development and preliminary animations.
3. Audio design and voiceover recording in specified languages.
4. Content integration, editing, and optimization for projection.
5. Internal review and client approval at draft and final stages.
6. Final delivery in specified digital formats.

4. Quality Assurance

- Storyline consistency with historical and thematic accuracy.
- Visual and audio quality aligned to **projection standards**.
- Multi-language voiceover clarity and synchronization.
- Compatibility testing with projection system and playback devices.

5. Standards & Compliance

- Content shall conform to copyright, IP, and licensing standards.
- Audio and video production to adhere to **industry best practices**.
- Projection formats optimized for **standard AV playback systems**.

6. Deliverables

- Concept and script document (approved by client).
- Mixed media visual content (2D/3D animations, illustrations, infographics).
- Audio files including background score, effects, and multi-language voiceover.
- Fully integrated and formatted projection-ready film.
- Master files and playback-ready digital formats.

7. Warranty & Post-Completion Support

- Support for **minor edits, formatting adjustments, and projection optimization** for up to 3 months post-delivery.
- Transfer of all rights and licenses to client ensures long-term usability.

10.7 Sound :

Immersive Professional-Grade Sound System

1. General Description

Supply, installation, testing, and commissioning of a **professional-grade immersive sound system** from leading international brands, designed to enhance visitor engagement through **interactive installations and spatial audio experiences**. The system shall deliver **high-quality, multi-channel immersive sound** with seamless integration into the overall AV and interactive environment.

2. Scope of Work

- Supply and installation of full-range loudspeakers, satellite speakers, and subwoofers as per acoustic design.
- Supply, installation, and programming of amplifiers and DSPs for system tuning and immersive audio mapping.
- Integration with central control systems for content triggering and synchronization with interactive media.
- Provision of all cabling, connectors, racks, mounts, and accessories.
- Supply of licensed immersive audio management software.
- Testing, calibration, and commissioning of the complete system.

3. Technical Specifications

a) Speakers

- **Full-range loudspeakers** with frequency response suitable for clear dialogue, effects, and music playback.
- **Satellite speakers** for distributed immersive soundscapes.
- **Subwoofers** for extended low-frequency performance.
- Wide dispersion and high SPL capability for even coverage.
- Mounting brackets/rigging as per site requirements.

b) Amplifiers & Processors (DSP)

- Digital signal processors with capabilities for **EQ, delay, crossover, audio routing, and immersive audio mapping**.
- Multi-channel amplifiers with sufficient power rating for connected speakers.
- Built-in protection for overcurrent, overheating, and short-circuit.

c) Control & Integration

- Central audio control system with **content triggering, scheduling, and synchronization** with visual/interactive systems.
- Integration with show control or AV control system for automation.

d) Cabling & Accessories

- High-quality audio cabling (shielded as required).
- Professional-grade connectors (Neutrik or equivalent).
- Equipment racks with cooling, mounts, and cable management accessories.

e) Software

- Licensed immersive audio playback and management software.
- Features: channel mapping, real-time control, and synchronization with projection/interactive systems.

f) Approved Makes

- **Bose / JBL / Yamaha / Harman / d&b audiotechnik / equivalent international make.**

4. Execution Methodology

- Acoustic assessment of site and speaker layout design.
- Installation of loudspeakers, subwoofers, and satellite units with mounts.
- Rack integration of amplifiers, DSPs, and control units.
- Software installation and configuration.
- Audio calibration for **balanced coverage, immersive spatial effects, and clarity**.
- Testing and commissioning with client representatives.

5. Testing & Quality Assurance

- Measurement of **SPL, frequency response, and coverage uniformity**.
- System tuning using real-time analyzers.
- Functional testing of immersive playback with synchronized visuals/interactive content.
- Verification of safety standards, cabling integrity, and redundancy checks.

6. Standards & Compliance

- **IEC 60268** – Sound system equipment.
- **ISO 3382** – Acoustics measurement for performance spaces.
- IEC 60268-5– Loudspeaker specifications.
- CE / RoHS certified equipment.

7. Deliverables

- Fully functional immersive audio system with installed hardware and configured software.
- As-built wiring diagrams, equipment layout drawings, and configuration documentation.
- Training for operators on system usage and basic troubleshooting.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** on all supplied equipment, including amplifiers, DSPs, and speakers.
- Post-warranty services: Calibration, software updates, and extended support.

10.8 Display:

Stretch Fabric Partitions (Backlit)

General Description

Supply, installation, testing, and commissioning (S.I.T.C.) of **Backlit Stretch Fabric Partitions** (Silicon Edge Graphics – SEG system), designed to provide an organic, edgeless visual experience. The partitions shall be fabricated with **FR-rated polyester fabric** and mounted on customized **metal frameworks** to form required shapes, complete with integrated **LED backlighting** and **programmable automation features**.

Scope of Work & Technical Specifications

1. Fabric & Printing

- Fabric: High-quality **polyester fabric (150–300 gsm)**, flame-retardant (FR-rated).
- Printing: **UV-printed**, seamless finish, with edgeless/frameless appearance.
- System: Silicon Edge Graphics (SEG) for frameless tensioning.
- Approved Makes: **Barrisol / LG / Dinolax / equivalent**.

2. Framework

- Custom-designed **powder-coated metal frame structure**.
- Shaped to organic forms as per design intent.
- Supporting **flexi-ply backing** where necessary.

3. Lighting

- Integrated **LED backlighting system**, evenly distributed.
- Lighting control with **programmable automation** (dimming, color change as per design).

4. Accessories & Hardware

- All required **profiles, tensioning systems, mounting hardware, power supplies, controllers, wiring, and terminations.**
- Structural framework and finishing for seamless installation.

5. Integration

- Automation-ready system integrated with central lighting control.
- Provision for **future scalability** in lighting presets and effects.

Execution Methodology

1. **Fabrication & Pre-assembly** – Factory-level cutting, printing, and preparation of fabric panels and frames.
2. **Framework Installation** – Erection of metal frame and flexi-ply backing shaped to design.
3. **Fabric Mounting** – SEG system installation with proper tensioning to ensure smooth finish.
4. **Lighting Setup** – Mounting of LEDs, power supplies, controllers, and automation links.
5. **Integration & Testing** – Calibration of lighting controls, dimming, and automation programming.

Testing & Quality Assurance

- Verification of **fabric finish, color accuracy, and seamlessness.**
- Testing of **LED uniformity** (no dark patches or hotspots).
- Automation features checked for **dimming, programmable lighting scenes, and responsiveness.**
- Fire-retardancy compliance certificates for fabric.

Codes & Standards Compliance

- Electrical components: **IS/IEC standards** for safety and performance.
- Fabric: **FR-rated as per international norms** (ASTM/EN/BS standards).
- Installation and cabling: Conforming to **IS/IEC 60364** standards.

The rate shall be inclusive of all materials, fabric, printing, framework, lighting, controllers, accessories, installation, testing, commissioning, consumables, incidentals, taxes, duties, and warranties to deliver a **fully functional backlit fabric partition system** in organic forms.

11. PART-11 : Indian Coast Guard

11.1 Projector:

1-Chip DLP Laser Phosphor Multimedia Projection System

1. General Description

Supply, installation, testing, and commissioning of a **high-performance 1-chip DLP laser**

phosphor multimedia projector suitable for **museum, gallery, or auditorium use**. The system shall provide **high brightness, WUXGA resolution, long operational life, and seamless integration** with AV and interactive systems.

2. Scope of Work

- Supply and installation of the projector with **mounting brackets and structural supports**.
- Integration with media servers, AV controllers, and display systems.
- Provision of **all necessary cabling, adapters, and accessories** for complete operational setup.
- Calibration of brightness, focus, zoom, and alignment for optimal projection.
- Testing, commissioning, and handover to client with full documentation.

3. Technical Specifications

a) Light Source

- Laser Phosphor technology with **minimum 20,000 hours life**.

b) Brightness

- 6,500 – 7,000 ANSI lumens suitable for large projection surfaces.

c) Resolution & Image Quality

- Native Resolution: 1920 × 1200 (WUXGA)
- Contrast Ratio: 10,000:1
- Lens: Manual or motorized zoom and focus adjustment
- Supplied with **long-throw zoom lens** appropriate for site requirements

d) Connectivity

- HDMI inputs
- HDBaseT input
- USB ports for media or control

e) Mounting & Accessories

- Projector mounting bracket with structural support
- All necessary cabling, adapters, and installation accessories

f) Approved Makes

- **Christie / Barco / Digital Projection**

4. Execution Methodology

- Site survey to determine projector placement and throw distance.
- Installation of mounting brackets and structural supports.
- Mounting of projector and lens installation.
- Connection to power, data, and media sources.
- Calibration of brightness, focus, zoom, and alignment.
- Functional testing and commissioning of projection system.

5. Testing & Quality Assurance

- Verification of image brightness, resolution, and contrast.
- Lens zoom and focus functionality check.
- Connectivity testing: HDMI, HDBaseT, USB inputs.

- Long-term operational test for stability and image quality.
- Compliance with IS/IEC electrical safety standards.

6. Standards & Compliance

- IEC 60950 / IEC 62368-1 – Electrical safety for IT/AV equipment
- RoHS & CE compliance
- Laser safety standards for Class 1 or as applicable

7. Deliverables

- Fully installed, tested, and commissioned projector system
- Projector mounting brackets and structural supports
- Cabling, adapters, and installation accessories
- As-built drawings, calibration reports, and operational manuals

8. Warranty & Post-Completion Support

- **Warranty: 2 years** covering projector, light source, and accessories
- Post-warranty support for servicing, lamp replacement, or calibration

11.2 Media Server:

Professional-Grade Display Media Server / Workstation

1. General Description

Supply, installation, testing, and commissioning of a **high-performance display media server / workstation** capable of **4K content playback, synchronized multi-display output, and real-time content capture**. The system shall support interactive installations, projection mapping, and advanced media display applications.

2. Scope of Work

- Supply of **rack-mountable workstation** with specified hardware and software.
- Integration with multiple display systems, lighting controllers, and media playback infrastructure.
- Installation, configuration, and testing for **multi-display synchronization, real-time capture, and Art-Net integration**.
- Provision of all necessary cabling, adapters, mounts, and accessories.
- Documentation, calibration, and handover to client.

3. Technical Specifications

a) Processor & Form Factor

- Intel® Core i9, 10th Gen or higher.
- Rack-mountable workstation suitable for AV/IT infrastructure.

b) Memory & Storage

- 32 GB DDR4 RAM minimum.
- Storage: 1 TB SSD for OS and applications; 2 TB HDD for content storage.

c) Graphics & Display Outputs

- NVIDIA Quadro 8 GB or equivalent GPU.
- 3 × DisplayPort outputs, 4K-ready.
- Support for multi-display synchronization and high-fidelity rendering.

d) Operating System

- Windows 10 Pro 64-bit or higher (licensed).

e) Features

- Genlock and Framelock for synchronized display outputs.
- Art-Net Ethernet in/out for integration with lighting and show control systems.
- Real-time content capture capability.
- Support for 4K content playback, projection mapping, and interactive applications.

f) Approved Makes

- Dell / HP / ASUS

4. Execution Methodology

- Site survey to determine rack space, power, and network connectivity.
- Installation of workstation in server racks with proper mounting and cable management.
- Configuration of OS, GPU drivers, and playback software.
- Integration with display screens, lighting, and control systems.
- Testing for multi-display synchronization, real-time capture, and Art-Net integration.

5. Testing & Quality Assurance

- Verification of multi-display output and synchronization.
- Real-time content capture testing.
- Art-Net input/output functional test.
- Stress testing under continuous 4K playback.
- Compliance with IS/IEC standards for electrical and network safety.

6. Standards & Compliance

- IEC/IS electrical safety standards.
- RoHS and CE compliance for all hardware components.
- Rack-mount standards for AV/IT equipment.

7. Deliverables

- Fully installed and commissioned media server/workstation.
- Connected and tested with displays and interactive systems.
- Cable management, documentation, as-built drawings, and operational manuals.

8. Warranty & Post-Completion Support

- **Warranty: 3 years** covering workstation hardware, GPU, storage, and accessories.
- Post-warranty support for software updates, troubleshooting, and hardware replacement.

11.3 Mapping Software:

3D Projection Mapping Software & Playback Control System

1. General Description

Supply, installation, testing, and commissioning of a **3D projection mapping software and playback control system** capable of managing, scheduling, and controlling media servers for **projection mapping and immersive experiences**. The system shall provide **real-time content management, multi-server synchronization, and automated playback** functionality.

2. Scope of Work

- Supply of **licensed 3D projection mapping software** and playback control system.
- Integration with specified **media servers, displays, and interactive installations**.
- Installation, configuration, and calibration for seamless content playback.
- Training of client personnel for operational use and content management.
- Testing and commissioning of the complete system to ensure full functionality.
- Provision of all consumables, incidentals, cables, adapters, and hardware required for full system operation.

3. System Requirements & Features

a) Software & Playback Control

- Direct control of inputs and media timelines.
- Multi-display and multi-server synchronized playback.
- Real-time editing, layering, and content management tools.
- Scheduling features for automated playback.
- Option for external control via hardware controllers or automation units.
- Compatibility with the project-specified media servers.
- Licensed software with **perpetual or long-term license transfer** to the client.

b) Approved Makes

- **Dataton (Watchout) / Coolux (Pandas) / Pixera** or equivalent.

c) Integration & Accessories

- Playback controller, cabling, adapters, and hardware for integration.
- All consumables and accessories necessary for fully functional system.

4. Execution Methodology

- Review and survey of site for media server and display integration.
- Installation of playback control system and software on specified servers.
- Configuration for multi-display and multi-server synchronized playback.
- Real-time testing, calibration, and validation of projection mapping content.
- Training for client staff on operational and content management procedures.
- Final commissioning and handover with documentation.

5. Testing & Quality Assurance

- Verification of multi-server synchronization and playback stability.
- Testing of automated playback, scheduling, and content layering functions.
- Functional integration with all media servers and displays.
- Compliance with IS/IEC standards for electrical and operational safety.

6. Standards & Compliance

- Licensed software and hardware compliant with **international IP and copyright standards**.
- Electrical safety compliance as per IS/IEC standards.
- Fire-retardant and safety-compliant mounting and cabling materials.

7. Deliverables

- Fully installed and commissioned 3D projection mapping and playback control system.
- Licensed software with documentation and operational manuals.
- Training materials and records of training provided.
- Integration with media servers, displays, and interactive installations.

8. Warranty & Post-Completion Support

Warranty: 2 years covering software, playback controller, and integration hardware.

- Post-warranty support for updates, troubleshooting, and reconfiguration.

11.4 Accessories :

HDMI HD Base T Extender (Tx–Rx Pair) System with Accessories

1. General Description

This specification covers the **supply, laying, installation, testing, and commissioning of 8 (eight) HDMI HDBaseT Extender units (Transmitter–Receiver pairs)**, complete with CAT6 cabling, networking accessories, and racks for integration. The system shall be capable of extending **HDMI signals up to 100 m over Cat 5e/6/6a cabling** with full HDCP compliance, ensuring seamless integration with AV systems and projection/display infrastructure.

2. Scope of Work with Technical Specifications

2.1 HDMI HDBaseT Extenders (Tx–Rx Pair)

- Quantity: **8 pairs (Tx + Rx)**.
- Signal Extension: Up to 100 m over a single Cat 5e/6/6a cable.
- Video Standards: HDMI (3D, Deep Color, 4K UHD).
- Compliance: HDCP 2.2 or higher.
- EDID: Advanced EDID pass-through/management for optimal signal recognition.
- Local HDMI Output: At transmitter end for monitoring.
- Control Pass-through: IR, RS-232 & Ethernet pass-through support.

- Functionality: Plug-and-play, CEC compliant.
- Build: Professional-grade, 24/7 operation capable.

2.2 Cabling & Networking Accessories

- **Cables:** Certified CAT6 UTP/STP cables (lengths as per site requirement).
- **Patch Panels:** Fully loaded patch panels for HDMI-over-CAT cabling.
- **Network Switch:** Managed/Unmanaged Gigabit network switch as per integration design.
- **Racks:** Standard AV/network rack with accessories, grounding, and dressing.
- **Connectors:** High-quality HDMI connectors, RJ45 jacks, adaptors, and patch cords.
- **Cable Management:** Proper routing, dressing, and labeling for serviceability.

2.3 Approved Makes

- **ATEN / Kramer / D-Link / Netrack / Comrack** or **equivalent international standard make** (subject to prior approval).

3. Execution Methodology

1. **Site Preparation:** Verification of conduit/rack spaces, distances, and environmental suitability.
2. **Cabling & Termination:** Laying of CAT6 cables in conduits/trays with labeling and termination at both ends.
3. **Installation:** Mounting of extenders (Tx–Rx), racks, patch panels, and network switches.
4. **Integration:** Interfacing extenders with projectors, displays, media servers, and control systems.
5. **Testing & Commissioning:** End-to-end testing of HDMI signals, EDID handshake, IR/RS-232/Ethernet pass-through, and monitoring outputs.

4. Testing & Quality Assurance

- **Signal Integrity Test:** Verification of 4K UHD signals over 100 m without loss or artifacts.
- **HDCP Compliance:** Validation with encrypted content.
- **Latency & Synchronization:** Testing for low-latency transmission suitable for interactive AV systems.
- **Control Signal Verification:** Confirm IR, RS-232 & Ethernet pass-through functionality.
- **Endurance Test:** Minimum 8-hour continuous operation test for stability.

5. Codes & Standards Compliance

- **HDBaseT Alliance Compliance** for extenders.
- **TIA/EIA-568-C** standards for CAT6 cabling.
- **IEC/IS standards** for electrical installation, safety, and grounding.
- **CE / FCC / RoHS** certification for active devices.

6. Scope of Supply / Deliverables

1. 8 Nos. HDMI HDBaseT Extender Tx–Rx pairs.
2. Certified CAT6 cabling with terminations.
3. Patch panels, connectors, adaptors, and patch cords.
4. Network switch and accessories.
5. Network/AV rack with cable management and grounding.
6. Installation, integration, testing & commissioning services.
7. OEM user manuals and documentation.
8. Warranty certificates (minimum 2 years).

The quoted rate shall be **inclusive of all equipment, cabling, accessories, racks, installation, testing, commissioning, consumables, incidentals, taxes, duties, and warranties**, delivering the HDMI extension system fully functional in all respects.

11.5 Installation & Integration:

Electrical & Data Cabling for Projection and Technology Equipment

1. General Description

Supply, laying, fixing, testing, and commissioning of **all wiring and associated items** required to connect power and data from the **Distribution Board (DB)** to respective digital projection and interactive technology equipment. The system shall ensure **reliable power delivery, signal integrity, and seamless operation** of all connected devices.

2. Scope of Work

- Supply, laying, and fixing of **electrical cabling** from DB to equipment locations.
- Supply, laying, and termination of **signal/data cabling** for HDMI, LAN, fibre, and other AV/IT connections.
- Provision of **all accessories**, racks, patch panels, cable management, and mounting hardware.
- Integration, mapping, and calibration of all power and signal connections for seamless operation of projectors, displays, and interactive systems.
- Testing, commissioning, and documentation of the complete cabling infrastructure.

3. Technical Specifications

a) Electrical Cabling

- Copper FRLS/FRLSH cables of suitable sizes for power distribution.
- Conduits, trays, raceways, and protective accessories.
- Junction boxes, terminations, and proper earthing.

b) Signal/Data Cabling

- HDMI, LAN (Cat6/Cat6a), fibre optic, and other AV/IT cables.
- Connectors, patch cords, adaptors, and patch panels as required.
- Structured cabling to maintain signal integrity and minimize interference.

c) Accessories & Integration

- Racks, cable trays, mounting hardware, and power distribution units (PDUs).
- Cable dressing and management for clean and safe installation.
- Integration with control systems and technology equipment for proper mapping and signal routing.

4. Execution Methodology

- Site survey to determine optimal cable routes and mounting points.
- Laying and fixing of electrical and data cables according to site conditions.
- Termination, dressing, and labeling of all cables.
- Integration with connected equipment and testing of signal/power continuity.
- Calibration and verification of signal quality and functionality.

5. Testing & Quality Assurance

- Continuity and insulation resistance testing of electrical cables.
- Verification of signal integrity for HDMI, LAN, and fibre connections.
- Functional testing of all integrated systems with connected devices.
- Compliance check against design drawings and site standards.

6. Standards & Compliance

- IS 694 / IS 1554 – Electrical wiring standards.
- IEC 60227 / IEC 60332 – Cables and fire safety.
- IS/IEC standards for HDMI, LAN, fibre, and AV cabling.
- RoHS and CE compliance for all electronic components.

7. Deliverables

- Installed, tested, and commissioned electrical and data cabling network.
- As-built drawings and schematics.
- Test reports and compliance certificates.
- Operation and maintenance documentation.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** covering cabling, terminations, and accessories.
- Post-warranty support: troubleshooting, repairs, or modifications as required.

11.6 Content:

Projection Film Development and Production (Approx. 5–7 Minutes)

1. General Description

Carrying out **end-to-end services** for the **development and production of a projection film** of approximately 5–7 minutes duration, to be projected on the **replica Port**, highlighting its **architectural, functional, and aesthetic details**. The project includes concept development, content creation, audio-visual production, integration, and delivery in projection-ready formats.

2. Scope of Work

a) Concept & Script

- Research and analysis of historical, architectural, and thematic aspects of the replica Port.
- Preparation of storyline, narrative framework, and script aligned with the interpretive theme.
- Presentation for approvals at draft and final stages.

b) Visual Content Creation

- Development of mixed media content:
 - Infographics, illustrations, 2D animation/motion graphics.
 - 3D animation wherever required for realism and immersion.
- Alignment of visual content with narrative and projection requirements.

c) Audio Design

- Professional sound design including:
 - Background music/score.
 - Synchronised audio effects for immersive experience.

d) Voiceover

- Recording of **professional voiceover** in Hindi, English, and Tamil.
- Integration of voiceover with visual content and timeline.

e) Integration & Optimization

- Editing, layering, and formatting of content for **projection mapping**.
- Optimization for resolution, color, and brightness as per site/projector requirements.

f) Deliverables

- Final approved film delivered in digital formats:
 - Master files.
 - Projection-ready formats compatible with playback systems.

g) Rights & Licenses

- All intellectual property rights, licenses, and usage rights to be **transferred fully to the client**.
- Clearances for all third-party content, if used.

3. Execution Methodology

1. Research & script development with client/VOCPA consultations.
2. Visual concept development and preliminary animations.
3. Audio design and voiceover recording in specified languages.
4. Content integration, editing, and optimization for projection.
5. Internal review and client approval at draft and final stages.
6. Final delivery in specified digital formats.

4. Quality Assurance

- Storyline consistency with historical and thematic accuracy.
- Visual and audio quality aligned to **projection standards**.
- Multi-language voiceover clarity and synchronization.
- Compatibility testing with projection system and playback devices.

5. Standards & Compliance

- Content shall conform to copyright, IP, and licensing standards.
- Audio and video production to adhere to **industry best practices**.
- Projection formats optimized for **standard AV playback systems**.

6. Deliverables

- Concept and script document (approved by client).
- Mixed media visual content (2D/3D animations, illustrations, infographics).
- Audio files including background score, effects, and multi-language voiceover.
- Fully integrated and formatted projection-ready film.
- Master files and playback-ready digital formats.

7. Warranty & Post-Completion Support

- Support for **minor edits, formatting adjustments, and projection optimization** for up to 3 months post-delivery.
- Transfer of all rights and licenses to client ensures long-term usability.

11.7 Sound :

Immersive Professional-Grade Sound System

1. General Description

Supply, installation, testing, and commissioning of a **professional-grade immersive sound system** from leading international brands, designed to enhance visitor engagement through **interactive installations and spatial audio experiences**. The system shall deliver **high-quality, multi-channel immersive sound** with seamless integration into the overall AV and interactive environment.

2. Scope of Work

- Supply and installation of full-range loudspeakers, satellite speakers, and subwoofers as per acoustic design.
- Supply, installation, and programming of amplifiers and DSPs for system tuning and immersive audio mapping.
- Integration with central control systems for content triggering and synchronization with interactive media.
- Provision of all cabling, connectors, racks, mounts, and accessories.
- Supply of licensed immersive audio management software.
- Testing, calibration, and commissioning of the complete system.

3. Technical Specifications

a) Speakers

- **Full-range loudspeakers** with frequency response suitable for clear dialogue, effects, and music playback.
- **Satellite speakers** for distributed immersive soundscapes.

- **Subwoofers** for extended low-frequency performance.
- Wide dispersion and high SPL capability for even coverage.
- Mounting brackets/rigging as per site requirements.

b) Amplifiers & Processors (DSP)

- Digital signal processors with capabilities for **EQ, delay, crossover, audio routing, and immersive audio mapping**.
- Multi-channel amplifiers with sufficient power rating for connected speakers.
- Built-in protection for overcurrent, overheating, and short-circuit.

c) Control & Integration

- Central audio control system with **content triggering, scheduling, and synchronization** with visual/interactive systems.
- Integration with show control or AV control system for automation.

d) Cabling & Accessories

- High-quality audio cabling (shielded as required).
- Professional-grade connectors (Neutrik or equivalent).
- Equipment racks with cooling, mounts, and cable management accessories.

e) Software

- Licensed immersive audio playback and management software.
- Features: channel mapping, real-time control, and synchronization with projection/interactive systems.

f) Approved Makes

- **Bose / JBL / Yamaha / Harman / d&b audiotechnik / equivalent international make.**

4. Execution Methodology

- Acoustic assessment of site and speaker layout design.
- Installation of loudspeakers, subwoofers, and satellite units with mounts.
- Rack integration of amplifiers, DSPs, and control units.
- Software installation and configuration.
- Audio calibration for **balanced coverage, immersive spatial effects, and clarity**.
- Testing and commissioning with client representatives.

5. Testing & Quality Assurance

- Measurement of **SPL, frequency response, and coverage uniformity**.
- System tuning using real-time analyzers.
- Functional testing of immersive playback with synchronized visuals/interactive content.
- Verification of safety standards, cabling integrity, and redundancy checks.

6. Standards & Compliance

- **IEC 60268** – Sound system equipment.
- **ISO 3382** – Acoustics measurement for performance spaces.
- IEC 60268-5– Loudspeaker specifications.
- CE / RoHS certified equipment.

7. Deliverables

- Fully functional immersive audio system with installed hardware and configured software.
- As-built wiring diagrams, equipment layout drawings, and configuration documentation.
- Training for operators on system usage and basic troubleshooting.

8. Warranty & Post-Completion Support

- **Warranty: 2 years** on all supplied equipment, including amplifiers, DSPs, and speakers.
- Post-warranty services: Calibration, software updates, and extended support.

11.8 Display :

Stretch Fabric Partitions (Backlit)

General Description

Supply, installation, testing, and commissioning (S.I.T.C.) of **Backlit Stretch Fabric Partitions** (Silicon Edge Graphics – SEG system), designed to provide an organic, edgeless visual experience. The partitions shall be fabricated with **FR-rated polyester fabric** and mounted on customized **metal frameworks** to form required shapes, complete with integrated **LED backlighting** and **programmable automation features**.

Scope of Work & Technical Specifications

1. Fabric & Printing

- Fabric: High-quality **polyester fabric (150–300 gsm)**, flame-retardant (FR-rated).
- Printing: **UV-printed**, seamless finish, with edgeless/frameless appearance.
- System: Silicon Edge Graphics (SEG) for frameless tensioning.
- Approved Makes: **Barrisol / LG / Dinolax / equivalent**.

2. Framework

- Custom-designed **powder-coated metal frame structure**.
- Shaped to organic forms as per design intent.
- Supporting **flexi-ply backing** where necessary.

3. Lighting

- Integrated **LED backlighting system**, evenly distributed.
- Lighting control with **programmable automation** (dimming, color change as per design).

4. Accessories & Hardware

- All required **profiles, tensioning systems, mounting hardware, power supplies, controllers, wiring, and terminations**.
- Structural framework and finishing for seamless installation.

5. Integration

- Automation-ready system integrated with central lighting control.

-
- Provision for **future scalability** in lighting presets and effects.

Execution Methodology

1. **Fabrication & Pre-assembly** – Factory-level cutting, printing, and preparation of fabric panels and frames.
2. **Framework Installation** – Erection of metal frame and flexi-ply backing shaped to design.
3. **Fabric Mounting** – SEG system installation with proper tensioning to ensure smooth finish.
4. **Lighting Setup** – Mounting of LEDs, power supplies, controllers, and automation links.
5. **Integration & Testing** – Calibration of lighting controls, dimming, and automation programming.

Testing & Quality Assurance

- Verification of **fabric finish, color accuracy, and seamlessness**.
- Testing of **LED uniformity** (no dark patches or hotspots).
- Automation features checked for **dimming, programmable lighting scenes, and responsiveness**.
- Fire-retardancy compliance certificates for fabric.

Codes & Standards Compliance

- Electrical components: **IS/IEC standards** for safety and performance.
- Fabric: **FR-rated as per international norms** (ASTM/EN/BS standards).
- Installation and cabling: Conforming to **IS/IEC 60364** standards.

The rate shall be inclusive of all materials, fabric, printing, framework, lighting, controllers, accessories, installation, testing, commissioning, consumables, incidentals, taxes, duties, and warranties to deliver a **fully functional backlit fabric partition system** in organic forms.

11.9 Interactive:

General Description

Supply, installation, testing, and commissioning of a **75” professional-grade UHD display with AI-enabled camera system**, designed for conferencing, interactive sessions, collaboration, and content display. The system shall include a high-resolution UHD screen, intelligent AI-based camera features, integrated audio, interactive touch functionality (where required), and full connectivity for seamless collaboration.

Scope of Work & Technical Specifications

1. **Display Unit**
 - Screen Size: 75” UHD (3840 × 2160), LED panel.
 - Brightness: Minimum 400 nits.

-
- Surface: Anti-glare finish for visibility under ambient lighting.
 - Operation: Professional-grade design for extended/continuous use.
 - 2. **Smart Features**
 - Built-in OS with support for **Wi-Fi, LAN, HDMI, USB, and Bluetooth.**
 - Screen mirroring, casting, and collaboration-ready.
 - Plug-and-play compatibility with conferencing and presentation software.
 - 3. **Camera (Integrated or External, AI-enabled)**
 - AI capabilities including **auto-framing, speaker tracking, face recognition, and intelligent adjustments.**
 - Wide-angle lens to cover conference/interaction areas effectively.
 - High-quality video suitable for professional conferencing platforms (Zoom, Teams, WebEx, etc.).
 - 4. **Audio System**
 - Integrated stereo speakers.
 - Noise suppression and echo cancellation for clear communication.
 - 5. **Interactive/Touch Feature (Optional)**
 - Multi-touch (minimum 10-point) functionality with precision writing/drawing capability.
 - Compatible with collaboration apps (whiteboarding, annotation, screen sharing).
 - Stylus-enabled for enhanced interaction.
 - 6. **Accessories & Installation**
 - Wall-mount or floor-stand mounting kit (as per site requirements).
 - All necessary cabling, adaptors, connectors, and power supply units.
 - System setup, integration, and testing for conferencing and interactive use.
 - 7. **Approved Makes**
 - **Samsung / LG / Sony / equivalent international brand.**

Execution Methodology

- Delivery of equipment to site with OEM certification.
- Installation of screen, camera, and accessories on wall/floor stand.
- Configuration of AI features and integration with conferencing platforms.
- Setup and calibration of touch/interactive features (if opted).
- Demonstration and handover after successful testing and commissioning.

Testing & Quality Assurance

- All parameters (resolution, brightness, audio clarity, AI features, touch responsiveness) to be tested in real-time conferencing and collaboration conditions.
- Verification of connectivity across **HDMI, LAN, Wi-Fi, and Bluetooth.**
- Validation of AI camera functions including **auto-framing, speaker tracking, and face detection.**
- Compliance testing with IS/IEC standards for safety and performance.

Warranty

-
- **2-year comprehensive onsite warranty** (minimum) covering parts, service, and labor.

11.10 Software/ Application

Supplementary Technical Requirement – Functional Completeness

The contractor shall provide **all necessary technological equipment, software, applications, accessories, special effects, or any other mechanisms** required to ensure the **complete functionality and intended operation** of the system, installation, or exhibit.

This includes, but is not limited to:

- **Hardware components:** Sensors, controllers, displays, processing units, AV/IT devices, and interactive peripherals.
- **Software & Applications:** Licensed software, content management systems, interactive applications, drivers, and control interfaces.
- **Accessories & Cabling:** Power and data cables, adapters, connectors, mounting hardware, and protective components.
- **Special Effects / Mechanisms:** Lighting effects, projection mapping, actuators, haptic or motion feedback devices, and any additional mechanisms required to achieve the intended experience.
- **Integration & Commissioning:** Full integration of all components with seamless operation, testing, calibration, and handover.

All supplied items shall comply with relevant IS/IEC standards, safety regulations, and manufacturer guidelines, ensuring the system is fully operational, reliable, and visitor-ready. All necessary technology equipment, licensed software, applications, accessories, special effects, and any other mechanisms required to ensure full functionality, seamless operation, and integration of the system shall be included in the scope of supply.

12. **PART-12 : General Items**

12.1 Electricals :

Uninterruptible Power Supply (UPS) System – 120 kVA

General Description:

Supply, installation, testing, and commissioning (S.I.T.C.) of a natural/forced air-cooled, online modular UPS system of **120 kVA capacity for providing backup for 10 hours**, designed for continuous and reliable operation in critical environments such as projection, digital display, and immersive technology applications. The system shall ensure seamless power backup, high efficiency, and safe operation with modular expandability and

redundancy features.

Technical Specifications:

- **Configuration:** Modular UPS, suitable to operate in Hot Standby, Parallel, or Stand-alone modes.
- **Technology:** Advanced IGBT-based rectifier and inverter technology with high efficiency and low harmonic distortion.
- **Bypass:** Static bypass switch for uninterrupted power transfer.
- **Operating Conditions:** Capable of working at ambient temperature up to 45°C and relative humidity up to 95%.
- **Battery Bank:** Complete VRLA/SMF type battery bank with appropriate capacity for specified backup time, installed with rack, cabling, connectors, and protections.
- **Cooling:** Natural/forced air cooling with intelligent thermal management.
- **Monitoring:** Digital display with status, alarms, logging, and communication ports (SNMP/Modbus).
- **Safety & Compliance:** Conforming to relevant IEC/IS standards for performance and safety.

Turnkey Scope:

The scope shall be **inclusive of all necessary technical equipment, software, applications, accessories, safety features, protections, and any other mechanisms required** to make the UPS system fully functional, integrated, and operational as per the design intent and directions of the Departmental officers.

Approved Makes: APC / Vertiv (Emerson) / Eaton / Delta / Numeric / equivalent.

NB:

Technical Specification

1. The equipment and material for this turnkey work with associate system (typical) shall include all requirements including development of site, all arrangements such as Civil works, structural works, Mechanical works, Electrical, wiring, lighting, Electronic equipment's, testing equipment's, instrumentation, etc as per the scope of work, technical specifications, terms and conditions of the contract to bring the Museum sparkling.
2. If any other materials required excess/ new/ additional for the successful completion of the project shall be arranged by contractor without any price implication to VOCPA. Bill of Materials and Billing Schedule as per Bidder's design during the time of bidding which shall be finalized after issuance of Work Order.
3. It may be noted that the detailed scope & specifications of each and every component of individual system/equipment may not be possible. Hence bidder is totally responsible for the Concept, detailed design, engineering, supply all the materials and commissioning the complete system to the satisfaction of the VOCPA.

4. All the accessories, spares, items, electrical works, lighting, electronic equipment's, instrumentation, miscellaneous items etc., shall be supplied, installed and commissioned as per site requirement.
5. All electrical equipment like cables, switch, MCB, ELCB, RCCB, extenders, lights, sensors etc, installed shall be having relevant IS standards BIS certifications. Electrical wiring works to be carried out by Electrical licensed holder approved by Govt. Necessary earthing for all the electrical terminations in the museum to be provided as per relevant IS standards.

Scope of Work

6. A Maritime Heritage Museum serves as a vital institution for showcasing and celebrating a nation's rich maritime history. As coastal communities evolve and traditional seafaring knowledge fades, there is a need to collect, document, and share the stories, tools, vessels, and cultural practices that have shaped maritime life in line with the objectives of Maritime India Vision (MIV) 2030 & MAKV 2047, to promote maritime tourism, a significant engine for economic growth and employment generation.
7. The proposed VOC Maritime Heritage Museum is being developed in a immense way and the project envisions the creation of a world-class museum that will be accessible to general public, showcasing Tamil Nadu's Rich Maritime history through multi-dimensional cultural experiences.
8. It may be noted that the detailed scope & specifications of each and every component of individual system/equipment may not be possible. Hence bidder is totally responsible for the Concept, data collection, Authentication of data, formatting data, detailed design, engineering, supply all the materials and commissioning the complete system to the satisfaction of the VOCPA.
9. Detailed operational flow chart of the working of the Zones to be provided.
10. Protocol for the visitors/ technicians entering the galleries /zones to be prepared and get approved by VOCPA.
11. Necessary warning signs for the visitors to be displayed in the museum as per relevant standards.
12. Preparation of Information catalogues for the visitor is in the scope of contractor. To be finalized and approved by VOCPA.

13. Software licenses to be purchased in the name of VOC Port and details of its validity to be given.
14. Warranty certificates of the equipment issued by the OEM to be submitted on completion of the work.
15. On completion of the work the original video audio finalized for the zone in museum to be provided in two soft formats (External hard disk). All background picture representation in the zones to be provided in the soft formats (External hard disk).
16. On completion of the work, Training for the Port officials to be provided on operation, trouble shooting of the equipment's in Zones.
17. A detailed list of the equipment installed to be submitted with OEM/supplier name /helpline no for contact on post warranty support etc.,.
18. All the time cleanliness in the museum to be adhered, No hanging of electrical communication wires may be visible properly arranged tagged with HFFR (Halogen Free Flame Retardant) cable organizer to organize cables.

Scope of work During Comprehensive Guarantee Period of 2 years

19. A detailed schedule for the maintenance during the Warranty period is provided by the contractor on completion of the work.
20. During the Warranty period the Contractor shall depute the necessary manpower required for the maintenance of the Museum including all zones. Upkeep of necessary spares, consumables during the warranty period is in the scope of contractor.
21. All the time cleanliness in the museum to be adhered, No hanging of electrical communication wires may be visible properly arranged tagged.

Scope of work During Comprehensive O & M of 3years on completion Comprehensive Guarantee Period of 2 years

22. A detailed schedule for the maintenance during the O&M period is provided by the contractor on completion of the warranty period.
23. During the O&M period the Contractor shall depute the necessary manpower required for the maintenance of the Museum including all zones. Upkeep of necessary spares, consumables during the O & M period is in the scope of contractor.

24. All the time cleanliness in the museum to be adhered, No hanging of electrical communication wires may be visible properly arranged tagged.

Handing over on completion.

25. After completion of the O & M period the entire museum and the zones shall be handed over to Port in operational condition. During handing over any rectification works found by Port, to be carried out by the contractor. A detailed list of the equipment installed to be submitted. A handing over a training on operation to be arranged. Manual for the trouble shooting of the equipment in the museum to be provided.

SECTION VII

SAFETY NORMS & EMS REQUIREMENTS

7.1 SAFETY CLAUSE:

- 7.1.1 The contractor should take all precautionary measures in order to ensure the protection of his own personnel moving about or working on the VOCPA premises and should conform to the rules and regulations of the VOCPA.
- 7.1.2 The Contractor should abide by all VOCPA regulations in force from time to time and ensure that the same are followed by his representatives, agents or sub- contractors, or workmen.
- 7.1.3 The contractor should ensure that unauthorized, careless, or inadvertent operation of installed equipment which may result in an accident to staff and/or damage to equipment, does not occur.

7.2 EMS REQUIREMENTS:

- 7.2.1 The contractor shall ensure that all his workmen wear PPEs commensurate with the severity of work.
- 7.2.2 The contractor shall ensure industrial safety methods in executing his work at VOCPA.
- 7.2.3 The contractor shall ensure that all wastes generated by his activities/work are moved to the respective dumpsites or taken for re-cycling at VOCPA.
- 7.2.4 The contractor has to give prior information on whether any hazardous chemical is used in his work and if so, the operational control to be exercised.
- 7.2.5 The contractor has to ensure that all his material handling equipment / transport Vehicles are emission tested.
- 7.2.6 The contractor has to ensure that his activities are in tune with the VOCPA EMS Policy (to be incorporated as part of the Contract)
- 7.2.7 The contractor's staff must be aware of the contents of MSDS in respect of chemicals / materials (if any).
- 7.2.8 The contractors' staff shall be competent to operate emergency appliances like fire extinguishers.

7.3 Hazardous Substances and Hazardous Site Conditions

- 7.3.1 Contractor shall not, nor shall it permit any other Person to bring any Hazardous Substances on the Site, other than Hazardous Substances to be used by Contractor or any Subcontractor in a manner that:
 - 7.3.1.1 does not violate any Applicable Laws, or Permits; and
 - 7.3.1.2 is consistent in quantity and with Good Solar Industry Practices for operating and maintaining solar energy conversion plants, such as motor fuels, solvents and lubricants (collectively, "Permissible Materials").
- 7.3.2 Contractor shall bear all responsibility and liability for:
 - a) any Hazardous Substances that are not Permissible Materials belonging to the Contractor or present on site; or
 - b) the handling of, or failure to handle, Permissible Materials in violation of Applicable Laws or otherwise in any manner that constitutes negligence or willful misconduct by Contractor or any

Subcontractor.

- c) Contractor shall use Hazardous Substances in performance of the Services in accordance with the Performance Standards, Applicable Laws and Good Solar Industry Practices and shall not:
- d) utilize, or permit or cause any Subcontractor to utilize, on the Site such Hazardous Substances as are prohibited under Applicable Law from being used in India; or
- e) import or use at the Site such Hazardous Substances as are prohibited under Applicable Law

NB: The section may be read in conjunction with related clauses of General Condition of Contract, Special Condition of Contract and Scope of Work.

SECTION VIII

ANNEXURES AND FORMS

ANNEXURE A

QUALIFICATION AND RESPONSIVENESS INFORMATION: LIST OF DOCUMENTS TO BE ENCLOSED

All bidders shall include the following information with their bids by scanning the relevant documents after being filled, signed with seal and serially numbered by the Bidder. The above shall be uploaded using their user-id and password in the E-tender portal on or before the last date of submission of tender mentioned in the NIT towards Cover A – Techno-commercial bid.

PART I (COVER A) – TECHNO-COMMERCIAL BID

Sl. No	Qualification Documents to be uploaded	Uploaded Page Ref No.
1	Form I – Bid cover letter (as per Section II, clause 2.16.2.(i))	
2	<p>Form II – Transaction details for remittance of Earnest Money Deposit (as per Section II, clause 2.16.2.(ii))</p> <p>Scanned copy of system generated proof towards successful payment of EMD in case of payment through online payment gateway mode in CPP e-tender web Portal OR scanned copy of proof towards successful payment of EMD in the form of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt, Banker's Cheque or Bank Guarantee from any of the Commercial Banks along with filled in Form-IIA OR valid Certificates by MSEs for claiming exemption along with filled in Form-IIB</p>	
3	<p>Form III – Financial capability (as per clause 2.16.2.(iii))</p> <p>Scanned copy of Profit & Loss statements for the last 3(three) years ending 31st March of the previous financial year duly certified by the Chartered Accountant in support of meeting Financial Capability</p>	
4	Form IV Similar Work Experience [as per Section II, clause 2.16.2.(iv)]	

	Scanned copies of work order(s) along with BOQ & respective satisfactory completion(s) / performance certificate(s) certificates in support of meeting Similar Work Experience	
5	<p>Form IV A – Details of TDS certificate (if applicable) (as per Section II, clause (as per Section II, clause 2.16.2.(iv))</p> <p>In case of experience other than Central / State Government / Autonomous bodies / PSEs / PSUs / Public Limited Companies, the bidder has to submit scanned copies of TDS certificate</p>	
6	Scanned copies of (i) EPF registration certificate; (ii) ESI; (iii) Permanent Account Number [PAN]; (iv) Income Tax Return of preceding three years; and (v) GST Registration Certificate (as per Section II, clause 2.16.2.(v))	
7	Form V – Declaration of Authorised Representative (as per Section II, clause 2.16.2.(vi))	
8	Form VI – Schedule of No Deviation (as per Section II, clause 2.16.2.(vii))	
9	Form VII Declaration by the Bidder (as per Section II, clause 2.16.2.(viii))	
10	Form VIII – Bank Mandate Form (as per Section II, clause 2.16.2.(ix))	
11	Form IX -Tender Acceptance letter (as per Section II, clause 2.16.2.(x))	
12	Duly filled in Form-XI – “Local Content declaration & Self Certification” [wherever applicable if specifically asked for in bid document] (as per Section II, clause 2.16.2.(xii))	
13	Form- X - Integrity pact (as per Section II, clause 2.16.2.(xi))	
14	Details of Technical Manpower to be deployed for execution of work [wherever applicable if specifically asked for in bid document] (as per Section II, clause 2.16.2.(xiii))	Not applicable
15	Scanned copy of valid license "ESB/" ESA"/"EA" grade issued by the Licensing Board [wherever applicable if specifically asked for in bid document] (as per Section II, clause 2.16.2.(xiv))	Not applicable

16	The bidder shall submit the technical details and Bouchers of the proposed museum to be deployed along with technical bids along with necessary certifications as per the technical requirement.	
17	FORM-XII - Declaration of Power of Attorney	
18	FORM- XIV - “Evidence towards site visit”	
19	Any other documents which need to be uploaded.	
20	Total number of the pages uploaded by the bidder (mention the page no. starting from to end)	
	1. Starting page no.	
	2. Ending page no.	
	3. Total number of pages	

(Fill the page numbers where the documents have been uploaded in the table provided above)

(Signature of Authorized Person)

Place: Name

Date: Designation

Business Address:

.....

Seal

FORM I

(To be in the Firm's letter head)

Date:.....

BID COVER LETTER

1. Registered Business Name :
2. Registered Business Address :
3. Name, Designation & address of the Contact Person to whom all references shall be made regarding this tender :
4. Telephone / Mobile No. :
5. Fax :
6. E-Mail :

To

The Chief Mechanical Engineer,
Mechanical & Electrical Engineering Department,
V.O.Chidambaranar Port Authority,
Tuticorin – 628 004.

Sir,

1. We hereby apply to be qualified for the tender invited by the V.O.Chidambaranar Port Authority, Tuticorin as a bidder for the work “_____”
2. We hereby give our consent to the Port or its authorized Representative(s) to conduct any investigations to verify the statements, documents and information submitted and to clarify the financial and technical aspects of this application. For this, we hereby authorize (any Public Official, Engineer, Bank, Depository, Manufacturer, Distributor, etc.) or any other person or firm to furnish pertinent information deemed necessary and requested by the Port to verify statements and information provided in this application or regarding our competence and standing.
3. We the undersigned have read and examined in detail the Bid document in respect of work intended and do hereby express our interest to execute the intended work.
4. We certify that goods & services offered shall be of best quality and the manpower who shall be deployed for the work are competent enough and have necessary qualifications for taking up this assignment.
5. The names and positions of persons who may be contacted for further information, if required, are as follows
 - a) For Technical: Shri/Smt (Name, position, Address, contact number and email id)

-
- b) For Financial: Shri/Smt (Name, position, Address, contact number and email id)
- c) For Personnel: Shri/Smt (Name, position, Address, contact number and email id)
6. We declare that the statements made and the information provided in the application are complete, true and correct in every detail.
7. We understand that V.O.Chidambaranar Port Authority reserves the right to reject any application without assigning any reasons.

Thanking you,

Yours faithfully,

(Signature of Authorized Person)

Place:

Name

Date:

Designation

Business Address:

.....

Seal

FORM IIA

(To be in the Firm's letter head)

Date:.....

Transaction details for remittance of Earnest Money Deposit (EMD)

The bidder shall upload system generated proof towards successful payment of EMD along with following filled in form in the bid document as follows

Sl.No	Beneficiary reference No.	Date of Payment	Amount (in INR)	Uploaded page No. reference
1				

(Signature of Authorized Person)

Place:

Name

Date:

Designation

Business Address:

.....

Seal

FORM IIB

(To be in the Firm's letter head)

Date:.....

Exemption of EMD by the Micro and Small Enterprises (MSEs)

The bidder shall upload the requisite certificate of registration under **MSEs** along with following filled in form in the bid document as follows

Sl. No	Name of Enterprise	Udyam Registration Number	Enterprise type	Uploaded page No. reference
1				

(Signature of Authorized Person)

Place:

Name

Date:

Designation

Business Address:

.....

Seal

FORM III

(To be in the Firm's letter head)

Date:.....

FINANCIAL CAPABILITY

The details of Summary of Annual Turnover of the Bidder on the basis of the Audited Balance Sheet for the last three financial years shall be given as under

<i>Sl.No.</i>	<i>Financial year</i>	<i>Total Turnover</i>	<i>Uploaded page no. reference</i>
01	Year 20.... –	Rs.....	
02	Year 20..... –	Rs.....	
03	Year 20..... –	Rs.....	

Note: The Profit & Loss statement and Balance sheet to be uploaded shall be duly certified by the Chartered Accountant.

(Signature of Authorized Person)

Place:

Name

Date:

Designation

Business Address:

.....

Seal

FORM IV

(To be in the Firm's letter head)

Date:.....

SIMILAR WORK EXPERIENCE

The Bidders experience in similar work carried out each in any Central / State Government / Autonomous bodies / PSEs/PSUs / Nationalised Banks / Public Limited or Private Limited Companies, etc., for evaluating the Eligibility Criteria for pre-qualification to be provided using the format as below:

Details of Similar Work Experience

Sl. No	Name of work	Value of work executed (in Rs.)	Work order reference No.	Contract period		Date of completion certificate	Name and address of the Client	Uploaded page no. reference
				Commencement	completion			
1								
2								
3								

Note:

1. The copies of the documents containing above information like work order and completion certificate have to be uploaded duly self-attested.
2. In case of experience other than Central / State Government / Autonomous bodies / PSEs/PSUs/ Public Limited Companies, the bidder has to submit TDS certificate for the past experience to be uploaded, as provided in **Form IV (B)**, only then the experience will be considered.

Yours faithfully,

(Signature of Authorized Person)

Place:

Name

Date:

Designation

Business Address:

.....

Seal

FORM IV(A)

(To be in the Firm's letter head)

Date:.....

DETAILS OF TDS CERTIFICATE

In case of experience other than Central / State Government / Autonomous bodies / PSEs/PSUs/ Nationalized Banks / Public Limited Companies, the bidder has to provide the details of the TDS certificate in the form provided below and shall submit TDS certificate for the past experience to be uploaded, only then the experience will be considered.

Sl. No	Name of work	Value of work executed (in Rs.)	Work order reference No.	TDS Certificate		Name and address of the Client	Uploaded page no. reference
				No.	Amount		
1							

(Signature of Authorized Person)

Place:

Name

Date:

Designation

Business Address:

.....

Seal

FORM V

DECLARATION OF AUTHORISED REPRESENTATIVE

(To be provided in non-judicial stamp paper with denomination not to be lesser than Rs.100/-)

(Separate Forms to be submitted for each Signatory with details of Proprietor or Partner or Managing Director)

I/We, (Name) being the (Partners/Karta/Managing Directors and whole time Director/Members of Managing Committee of Associations/Board of Trustees etc.) of (Name of the Bidder), hereby solemnly affirm and declare that the (Authorised Signatory) is hereby authorized, vide resolution No. (Resolution Number) dated (Resolution Date) (copy submitted herewith), to act as an authorized signatory for the business (Name of the Bidder) for which submission of bid is being filed under the tender. All his actions in relation to this tender will be binding on me/us.

Signature of the person competent to sign

Name:

Description:

Name of the Business Entity:

Acceptance as an Authorized Signatory

I (Authorised Signatory) hereby solemnly accord my acceptance to act as authorized signatory for the above referred business and all my acts shall be binding on the business.

Signature of Authorised Signatory

Name:

Description:

Place:

Date:

Note:

1. For the purpose of this tender and the Agreement, the tender, forms, Agreement and other documents shall be signed only by the persons, who are themselves in a position to undertake the work and possessing all other resources required for the purpose. The tender shall contain the name, residence and place of business of the person or persons submitting the tender and shall be signed by the Bidder with his usual authorized representatives followed by the name and Description of

the person signing the document along with a copy of the partnership deed. A copy of the constitution of the firm with the names and addresses of all the partners shall be furnished.

2. Tender by a corporation shall be signed in the name of the corporation by a duly authorized representative, and a power of attorney in that behalf shall accompany the tender. In the case of company, a copy of the Memorandum and Articles of Association shall be furnished.
3. Tenders may be submitted by agents on behalf of their principals, but in such cases the Board reserves the right to enter into contract with the principals, Director, with the principals and agents jointly as deemed appropriate.

FORM VI

SCHEDULE OF NO DEVIATION

This is with reference to Tender No....., for
“.....”

I/We, (Name of the Bidder / Authorised Representative of the Bidder) of
M/s..... (Name of the organisation), hereby certify that there is no deviation from the
Tender conditions either technical or commercial or tender enquiry and I/We am/are agreeing to all the
terms and conditions mentioned and comprised in relation to the above-mentioned Tender.

Yours faithfully,

(Signature of Authorized Person)

Place:

Name

Date:

Description

Business Address:

.....

Seal

Witness with signature

1) Name & Address

2) Name & Address

.....

.....

.....

.....

.....

.....

FORM VII

DECLARATION BY THE BIDDER

(To be provided in 100 Rs Stamp Paper)

To, The Head of the Department.

I/We M/s. represented by its Proprietor / Managing Partner / Managing Director having its Registered Office at and do declare that I/We have carefully read all the conditions of tender with NIT No....., dated, Basis In(Name Of The Department) Department At V.O.Chidambaranar Port Authority for a period of -----,(including extension if any), if needed and accepts all conditions of the tender including amendments/corrigendum subsequently issued by the tender inviting authority, if any. Further I/we confirm our eligibility for this tender and quoted as per the tender condition and Governing laws of India, in case of typographical error found in submitted documents/affidavits/declarations, in this case we accept all the Terms and conditions of bid documents and hereby confirm as under.

1. I/We have not made any counter conditions stipulation and conditions and I/We agree that in the event of any such counter conditions my/our tender will be summarily rejected and such offer will not be evaluated and considered at all by you.
2. I/We do hereby declare that we have not been blacklisted/ debarred by any Central / State Government / Autonomous bodies / PSEs/PSUs / Nationalised Banks / Public Limited or Private Limited Companies, etc., from taking part in the tendering process.
3. I/We have not made any payment or illegal gratification to any person/authority connected with the tendering process so as to influence the tendering process and have not committed any offence under the Prevention of Corruption Act in connection with the tender.
4. I/We hereby declare that, all information furnished by me/us with this tender is true to best of my/our knowledge, belief and in case, if it is found that, the information furnished is not true or partially true or incorrect, I/We agree that my/our tender shall be summarily rejected without prejudice to the right of the board of Trustees of Port of V.O.Chidambaranar Port Authority to take further action in to the matter.

Witness's

Signature: _____

Name: _____

Address: _____

Tel. No: _____

Mobile no.: _____

Date: _____

Bidder's

Signature: _____

Name: _____

Address: _____

Tel. No: _____

Mobile No: _____

Date: _____

FORM VIII

BANK MANDATE FORM

1. Name of the company :
2. Status :
3. Bank Name, Address & Branch :
4. IFSC Code :
5. MICR Code :
6. Branch Code :
7. Name of the Authorised Person :
8. Signature of the authorised person
as per Bank :
9. E-Mail ID of Authorised Person :
10. Contact No. Landline/Mobile :

Copy of cancelled cheque may be enclosed if Bank signature not obtained.

Name & Seal of the Bank with
Date

FORM IX

TENDER ACCEPTANCE LETTER

(To be printed on company letterhead and filled, signed, and uploaded)

To

The Chief Mechanical Engineer
V.O. Chidambaranar Port Authority
Tuticorin-4

Sir,

Subject: “-----”

Tender reference No. -----

1. I/We have downloaded/obtained the tender document(s) for the above-mentioned tender/work from the website, namely <https://etenders.gov.in/eprocure/app>, as per your advertisement given in the above-mentioned website(s).
2. I/We hereby certify that I/We have read the entire terms and conditions of the tender documents from **Page No. to** (including all documents like annexure(s), schedules(s), etc., which form part of the contract agreement and I /we shall abide hereby and agree the terms /conditions /clauses contained therein.
3. The corrigendum(s) issued from time to time by V.O.Chidambaranar Port Authority for the above subject work has also been taken into consideration while submitting this acceptance letter.
4. I/We hereby unconditionally accept the tender conditions of above-mentioned tender document(s)/ corrigendum (s) in its totality /entirety.
5. I/We do hereby declare that our firms have not been blacklisted/ debarred by any Govt. Department/ Public sector undertaking.
6. I / We certify that all information furnished by me/ us is true & correct and in the event that the information is found to be incorrect/untrue or found violated, then V.O.Chidambaranar Port Authority shall without giving any notice or reason therefore, summarily reject the bid or terminate the contract, without prejudice to any other rights or remedy including the forfeiture of the full earnest money deposit absolutely

Yours faithfully,

(Signature of the bidder with official seal)

Note: If the firm has been blacklisted or 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.

FORM X

Local content Declaration & Self Certification as per the Government of India Order towards Public Procurement (preference to Make in India) vide Letter No. P-45021/2/2017-PP(BE-II), (revised) Dated.16.9.2020)

(To be provided on Rs.100/- non-judicial stamp paper)

I _____ (Name of the Person(s), S/o _____ at _____ (Address), working as _____ (Designation and name of the firm/Company/ partnership/ Joint venture), and I have been authorized to sign the Declaration / Self- Certification on behalf of firm / Company/partnership/ Joint venture do hereby solemnly affirm and declare as under:

That I will agree to abide by the terms and conditions of the policy of Government towards Public Procurement (preference to Make in India) vide Letter No. P- 45021/2/2017-PP(BE-II), (revised) Dated.16.9.2020. That the information furnished hereinafter is correct to be of my knowledge and belief and I undertake to produce relevant records before the procuring entity or any

authority so nominated for the purpose of assessing the Local Content. That the local content for all inputs which constitute the said equipment has been verified by me and I am responsible for the correctness of the claims made therein. That in the event of the domestic value addition of the product mentioned herein is found to be incorrect and not meeting the prescribed value addition norms based on the assessment of an authority so nominated for the purpose of assessing the Local Content, action will be taken against me as per the notification P-45021/2/2017-PP(BE-II), (revised) Dated.16.9.2020.

I agree to maintain the following information in the company's record for a period of 8 years and shall make this available for verification to my statutory authority. The Details of the location(s) at which the local value addition is made

- i. Name and details of the Domestic manufacture
- ii. Date on which this certificate is issued
- iii. Product for which the certificate is produced
- iv. Percentage of local content. (% to be mentioned)

Signed by me at _____ on _____

Authorized signatory

(Name of the Firm entity)

Note: Required particulars are to be filled properly for acceptance.

FORM XI

INTEGRITY PACT

Between

The Board of V.O. Chidambaranar Port Authority, a body corporate under Major Port Authority Act, 2021, represented by its having its office at Administrative building, V.O. Chidambaranar Port Authority, Tuticorin – 628 004 (herein after referred to as the 'Board' which expression shall unless excluded by or repugnant to the subject or context be deemed to include the successor in office) of the one part

And

M/s....., (a partnership firm / proprietorship firm / company registered under the laws of India) having its place of business at represented by its Shri....., s/o..... (Hereinafter referred to as 'Contractor' which expression shall, unless excluded by, or repugnant to the context be deemed to include his heirs, executors, administrators, representatives and assigns or his successors in office) of the other part

PREAMBLE

The Port intends to award, under laid down organizational procedures, contract/s for “-----” vide NIT No-----. The Port values full compliance 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, the Port will appoint an Independent External Monitor (IEM) who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1 – Commitments of the Port:

1. The Port commits itself to take all measures necessary to prevent corruption and to observe the following principles.
 - a) No employee of the Port, 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 Port will, during the tender process treat all Bidder(s) with equity and reason. The Port 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 Port will exclude from the process all known prejudiced persons.

2. If the Port obtains information on the conduct of any of its employees which is a criminal offense under the IPC/PC Act, or if there be a substantive suspicion in this regard, the Port 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) commits themselves 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 Port'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 bids 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 purposes of competition or personal gain, or pass on to others, any information or document provided by the Port 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) 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.
 - e) The Bidder(s)/Contractor(s) who have signed the Integrity Pact shall not approach the Courts while representing the matter to the IEM and shall wait for the decision in this matter.
2. The Bidder(s)/Contractor(s) will not instigate third persons to commit offenses outlined above or be an accessory to such offenses.

Section 3 – Disqualification from tender process and exclusion from future contracts:

1. 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 Port is entitled to disqualify the Bidder(s)/Contractor(s) from the tender process or terminate the Contract, if already signed, for such reasons mentioned above.
2. If the Bidder / Contractor have committed a serious transgression through a violation of **Section 2** such as to put reliability or credibility into question, the Port is entitled to exclude the Bidder / Contractor from participating in future tender processes. The imposition of such duration of exclusion shall be determined based on the severity of the transgression. The severity will be determined by the circumstances of the case, in particular the number of transgressions, the position

of the transgressors within the company hierarchy of the Bidder / Contractor and the amount of the damages. The exclusion may be imposed for a period of minimum 6 months to the maximum of 3 years. In such cases, the decision of the Port shall be final.

Section 4 – Compensation for Damages:

1. If the Port has disqualified the Bidder(s) from the tender process prior to the award of contract according to **Section 3**, the Port is entitled to demand and recover the damages equivalent to 3% of the tender value.
2. If the Port has terminated the contract according to **Section 3**, or if the Port is entitled to terminate the contract according to **Section 3**, the Port shall be entitled to demand and recover from the Contractor liquidated damages amount equivalent to 5% of the contract value.
3. If the Bidder / Contractor can prove that the exclusion of the Bidder / Contractor from the tender process or the termination of the contract has caused no damage or less damage than the amount of the above-mentioned liquidated damages, the Bidder / Contractor has to compensate only to the extent of damages caused due to the act of the Bidder / Contractor. However, if the Port can prove that the amount of the damage caused due to the disqualification of the Bidder / Contractor before the award of contract or after the termination of the contract is higher than the amount of the liquidated damages claimed, the Port is entitled to claim more compensation for the equivalent to the higher amount of damage.

Section 5 – Previous transgression:

1. The Bidder declares that no previous transgressions occurred in the last 3 (three) years with any other Company in any country conforming to the anti-corruption approach or with any Central / State Government / Autonomous bodies / Public Sector Enterprises in 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 the contract, if already awarded, can be terminated for such reason.

Section 6 – Equal treatment of all Bidders/Contractors/Subcontractors:

1. The Bidder(s) / Contractor(s) undertakes(s) to demand from all subcontractors a commitment in conformity with this Integrity Pact and to submit it to the Port before signing of the Contract.
2. The Port will enter into agreements with identical conditions as this one with all Bidders, Contractors and Subcontractors.
3. The Port will disqualify from the tender process all bidders who do not sign this Pact or violate its provisions.

Section 7 – Criminal charges against violating Bidder(s) / Contractor(s) / Subcontractor(s):

If the Port obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Port has substantive suspicion in this regard, the Port will inform the same to the Chief Vigilance Officer.

Section 8 – Independent External Monitor / Monitors:

1. The Port appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.
2. The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. It will be obligatory for him to treat the information and documents of the Bidders/Contractors as confidential. He reports to the Chairman of the Board of the Port.
3. The Bidder(s)/Contractor(s) accepts that the Monitor has the right to access without restriction to all Project documentation of the Port including that provided by the Contractor. The Contractor will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his project documentation. The same is applicable to Subcontractors.
4. The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/Contractor(s)/Subcontractor(s) with confidentiality. The Monitor has also signed on 'Non-Disclosure of Confidential Information' and of 'Absence of Conflict of Interest'. In case of any conflict of interest arising at a later date, the IEM shall inform Chairman of the Port and rescue himself/herself from that case.
5. The Port will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the Port and the Contractor. The parties offer to the Monitor the option to participate in such meetings.
6. As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Chairman of the Port and request the Chairman to discontinue or 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.
7. The Monitor will submit a written report to the Chairman of the Port within 8 to 10 weeks from the date of reference or intimation to him by the Port and, should the occasion arise, submit proposals for correcting problematic situations.
8. If the Monitor has reported to the Chairman of the Port, a substantiated suspicion of an offense under relevant IPC / PC Act or Anti-Corruption Laws of India, and the Chairman of the Port has not, within the reasonable time taken visible action to proceed against such offense or reported it to the Chief Vigilance Officer, the Monitor may also transmit this information directly to the Central Vigilance Commissioner.
9. The word '**Monitor**' would include both singular and plural.

Section 9 – Pact Duration:

This Pact begins when both parties have legally signed it. It expires for the Contractor in 12 months after the last payment under the Contract Agreement, and for all other Bidders in 6 months after

the contract has been awarded. Any violation of the same would entail disqualification of the bidders and exclusion from future business dealings.

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 the Port.

Section 10 – Other provisions:

1. This agreement is subject to Indian Law. Place of performance and jurisdiction is the location of the Office of the Port, i.e. Tuticorin.
2. Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.
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 remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.
5. Issues like Warranty / Guarantee etc., shall be outside the purview of IEMs.
6. In the event of any contradiction between the Integrity Pact and its Annexure, the Clause in the Integrity Pact will prevail.

.....

(For & on behalf of the Port) (For & on behalf of the Bidder/Contractor)

.....

(Office Seal)

.....

(Office Seal)

Place:

Date:

Witness with signature

- | | |
|--|--|
| 1) Name & Address
.....
.....
..... | 2) Name & Address
.....
.....
..... |
|--|--|



CONTRACT AGREEMENT FORM

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(e) Any correspondences and documents exchanged between the Contractor & Board in connection with tender/Contract.

3. The Contractor hereby covenants with the Board to execute, complete and maintain the work till handing over the Board in all respects in in conformity and in all respects with the provisions of this Agreement.
4. The Board hereby covenants to pay the Contractor in consideration of such execution, completion, and maintenance of the work for the “Contract Price” at the time and in the manner prescribed by the Contract.

IN WITNESS WHEREOF the parties here into have set their hands and seals the day and year first written.

The common seal of the Board of V.O. Chidambaranar Port Authority was here into affixed and

The thereof, has set his

Hand in the presence of

V.O. Chidambaranar Port Authority

Signed and sealed by

The Contractor in the presence of

Witness with signature

1) Name & Address

2) Name & Address

.....

.....

.....

.....

.....

.....

ANNEXURE C

FORM OF BANK GUARANTEE

(For Performance Security)

In consideration of the Chairman representing the Board of V.O.Chidambaranar Port (hereinafter called "The Port") having agreed to exempt (hereinafter called "said contractors") from the demand, under the terms and conditions of the contract awarded in No dated made between and for (hereinafter called "said Agreement") of Performance security for the due fulfillment by the said contractor(s) of the terms and conditions contained in the said Agreement, on the production of Bank Guarantee for Rs. _____ (Rupees.....only).

We* (hereinafter referred to as the Bank) at the request of the contractor(s) do hereby undertake to pay to the Port an amount not exceeding Rs. _____ against any loss or damage caused to or suffered or would be caused to or suffered by the Port by reason of any breach by the said contractor (s) of any of the terms and conditions contained in the said Agreement.

We* do hereby undertake to pay the amounts due payable under this Guarantee without any demur, merely on demand from the Port stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Port by reason of any breach by the said contractor(s) of any of the terms and conditions contained in the said Agreement or by reason of the contractor(s) failure by performing the said Agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this Guarantee. However, our liability under this Guarantee shall be restricted to an amount not exceeding Rs.

We undertake to pay to the Port any money so demanded notwithstanding any dispute or disputes raised by the Contractor(s) in any suit or proceedings before any Court or Tribunal relating thereto our liability under this present being absolute and unequivocal.

The payment so made by us under this bond shall be a valid discharge of our liability for payment there under, and the Contractor(s) shall have no claim against us for making such payment.

We* further agree that the Guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Port under or by virtue of the said agreement have been fully paid and its claims satisfied or discharged or till the Engineering Department, V.O.Chidambaranar Port Authority certified that the terms and condition of the said Agreement had been fully and properly carried out by the said contractor's and accordingly discharges this Guarantee. Unless a demand or claim under this Guarantee is made on us in writing within three months from the date of expiry of the validity of the Guarantee period, we shall be discharged from all liability under this Guarantee thereafter provided further that the Bank shall at the request of the Port but at the cost of Contractor(s) renew or extend this Guarantee for such further period or periods as the Port may require.

We * further agree the Port, that the Port shall have the fullest liberty without consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend the time of performance by the said Contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Port against the said Contractor(s) or for any

Forbearance, act or omission on the part of the Port or any indulgence by the Port to the said Contractor(s) or by any such matter or thing whatsoever which under the Law relating to sureties would but for this provision, have

the effect of so relieving us.

This Guarantee will not be discharged due to the charge in the constitution of the Bank or the Contractor(s)

We* lastly undertaken Otto revoke this Guarantee during its currency except with the previous consent of the Port in writing. (Validity/Period should be noted)

This guarantee is valid upto (period) Dated the.....day of 20__for.....**

Indicate here the name of the Bank Indicate here the period or date.

FORM XII

DECLARATION OF POWER OF ATTORNEY

(To be executed before Notary Public on a Non-Judicial Stamp Paper of at least Rs 100)

Dated: _____

POWER OF ATTORNEY

To whomsoever it may concern

Mr. _____ [Name of the Person(s)], residing at _____ [Address of the person(s)], acting as _____ (Designation of the person and name of the firm), and whose signature is attested below, is hereby authorized on behalf of _____ [Name of the Bidder (in case of a consortium, name of the lead member)] to sign the tender [(Tender No.and (Tender subject- “.....”)] and submit the same and is hereby further authorized to provide relevant information/ document and respond to the enquiry's etc. as may be required by V.O Chidambaranar Port Authority (VOCPA) in respect of the tender.

And I/ we hereby agree that all acts, deeds and things lawfully done by our said attorney shall be construed as acts, deeds and things done by us and I/ we undertake to ratify and confirm all and whatsoever that my / our said attorney shall lawfully do or cause to be done for me / us by virtue of the power hereby given.

(Attested signature of Mr. _____)

For _____ (Name of the Bidder / Consortium Members with Seal)

Note –

(In case of Consortium, representative of all members must sign)

FORM XIII

DECLARATION of POWER OF ATTORNEY FOR LEAD MEMBER OF CONSORTIUM

(To be executed before Notary Public on a Non-Judicial Stamp Paper of at least Rs 100)

POWER OF ATTORNEY

Whereas V.O Chidambaranar Port Authority, Thoothukudi (“the Authority”) has invited tenders from interested parties for “.....” (Tender No.....).

Whereas, And (collectively the “Consortium”) being members of the Consortium are interested in bidding for the Tender in accordance with the terms and conditions of the Tender Document and other connected documents in respect of the said tender, and

Whereas it is necessary under the Tender Document for the members of the Consortium to designate one of them as the Lead Member with all necessary power and authority to do for and on behalf of the Consortium, all acts, deeds and things as may be necessary in connection with the Consortium’s bid for the Tender and its execution.

NOW THEREFORE KNOW ALL MEN BY THESE PRESENTS

We, M/s. having our registered office at,
M/s.....

having our registered office at, M/s. having our registered office at

....., and M/s. having our registered office at, [the respective

names and addresses of the registered office] (hereinafter collectively referred to as the “Principals”) do hereby designate, nominate, constitute, appoint and authorize M/s. having its registered office at, being one of the members of the Consortium, as the Lead Member and true and lawful

attorney of the Consortium (hereinafter referred to as the “Attorney”). We hereby irrevocably authorize the Attorney to conduct all business for and on behalf of the Consortium and any one of us during the bidding process and, in the event the Consortium is awarded the Contract, during the execution of the contract, and in this regard, to do on our behalf and on behalf of the Consortium, all or any of such acts, deeds or things as are necessary or required or incidental to the pre-qualification of the Consortium and submission of its bid(s) for the tender, including but not limited to signing and submission of all applications, bids and other documents and writings, participate in Pre Bid and other conferences/meetings, respond to queries, submit information/ documents, sign and execute contracts and undertakings consequent to acceptance of bid(s) of the Consortium and generally to represent the Consortium in all its dealings with the Authority, and/or any other Government Agency or any person, in all matters in connection with or relating to or arising out of the Consortium’s bid(s) for the tender and/or upon award thereof till the Agreement is entered into with the Authority.

AND hereby agree to ratify and confirm and do hereby ratify and confirm all acts, deeds and

things lawfully done or caused to be done by our said Attorney pursuant to and in exercise of the powers conferred by this Power of Attorney and that all acts, deeds and things done by our said Attorney in exercise of the powers hereby conferred shall and shall always be deemed to have been done by us / Consortium.

IN WITNESS HEREOF WE HAVE EXECUTED THIS POWER OF ATTORNEY ON THIS
DAY OF20**

For(Name & Title)

For(Name & Title)

For(Name & Title)

Witnesses:

- 1.
- 2.

.....

(To be executed by all the members of the Consortium)

FORM XIV

Evidence towards site visit

I, Shri _____ authorized representative of M/s..... (authorization letter issued by the firm with my specimen signature and passport size photo and Aadhaar card are enclosed) have visited the site on with VOCPA representative Shri_____(Designation)_____for the work of “Design, Supply, installation, Testing, and commissioning of Museum Galleries for Tamil Nadu Maritime Heritage Museum at VOCPA ” at ‘VOC Port’ and inspected the site and other issues related to tender to my satisfaction.

Seal, Name and Signature of the bidder	Name, designation and signature of..... representative who assisted bidder during site visit	Seal, name and signature of Executive Engineer / MEE Department

