



कामराजार पोर्ट लिमिटेड

## **KAMARAJAR PORT LIMITED**

*(A Company of Chennai Port Authority, Ministry of Ports, Shipping & Waterways, Govt. of India)*

### **TENDER FOR SUPPLY, INSTALLATION, UPGRADATION, COMMISSIONING AND OPERATION & MAINTENANCE OF CONTINUOUS AMBIENT AIR QUALITY MONITORING STATIONS AT KAMARAJAR PORT LIMITED, CHENNAI, TAMIL NADU**

टेंडर नं./Tender No.

**KPL/MS/HSE/ENV/CAAQMS/2025**

केवल **GeM** खरीद पोर्टल के माध्यम से/Through GeM procurement portal only

तकनीकी-वाणिज्यिक बोली/**TECHNO-COMMERCIAL BID**

**General Manager (Marine Services),  
Kamarajar Port Limited, Chennai-120.  
Email: gm-ms@kplmail.in**

**विषयसूची/TABLE OF CONTENTS**

<b>SECTION NO.</b>	<b>CONTENTS</b>	<b>PAGE NO.</b>
<b>SECTIONS</b>		
1	NOTICE INVITING TENDERS (NIT)	3
2	INSTRUCTIONS TO THE BIDDERS	5
3	PRE-QUALIFICATION CRITERIA	13
4	GENERAL CONDITIONS OF CONTRACT	15
5	SPECIAL CONDITIONS OF CONTRACT	19
6	SCOPE OF WORK	25
7	TECHNICAL SPECIFICATIONS	35
8	BILL OF QUANTITIES-PRICE BID FORMAT	56
<b>ANNEXURES</b>		
1	ANNEXURE-1 INFORMATION OF BIDDERS	58
2	ANNEXURE-2 FORMAT OF BID SUBMISSION	59
3	ANNEXURE-3 FIRM'S FINANCIAL DATA	61
4	ANNEXURE-4 WORKS EXECUTED DURING LAST SEVEN YEARS	62
5	ANNEXURE-5 FORMAT OF PERFORMANCE SECURITY	65
6	ANNEXURE-6 BID SECURITY DECLARATION	66
7	ANNEXURE-7 FORMAT OF INTEGRITY PACT	67
8	ANNEXURE-8 FORMAT OF AGREEMENT	76
<b>APPENDICES</b>		
1	APPENDIX 1 - TENTATIVE LOCATIONS PROPOSED FOR CAAQMSS AND DISPLAY BOARDS	79
2	APPENDIX 2 - STANDARD FORMAT FOR 24-HOURS AIR QUALITY DATA SUBMISSION	80
3	APPENDIX 3 - STANDARD FORMAT FOR MONTHLY AIR QUALITY DATA SUBMISSION	81
4	APPENDIX 4 - TYPICAL LAYOUT OF CAAQMS (CPCB NORMS)	82

**अनुभाग/SECTION-1**  
**निविदा आमंत्रण सूचना/NOTICE INVITING TENDER**

**प्रतियोगी बोली लगाना/COMPETITIVE BIDDING**

कामराजर पोर्ट लिमिटेड (कपीएल) "कामराजर पोर्ट लिमिटेड, चृष्टी, तमिलनाडु में सतत परिवहनी वायु गुणवत्ता निगरानी स्टेशनों की आपूर्ति, स्थापना, उन्नयन, कमीशनिंग और संचालन एवं रखरखाव" कार्य क्षेत्रों (तकनीकी वाणिज्यिक) आमंत्रित की हैं। Kamarajar Port Limited (KPL) invites bids (techno commercial) for the work "Supply, Installation, Upgradation, Commissioning and Operation & Maintenance of Continuous Ambient Air Quality Monitoring Stations at Kamarajar Port Limited, Chennai, Tamil Nadu"

इच्छुक बोलीदाता अधिक जानकारी और बोलियाप्तज्ञमा करने के लिए [www.gem.gov.in](http://www.gem.gov.in) पर सरकारी ई-मार्केट प्लेस (GeM) पर जा सकते हैं। निविदा दस्तावेज बद्वरगाह की वेबसाइट [www.ennoreport.gov.in](http://www.ennoreport.gov.in) पर भी उपलब्ध है। The intended bidders may visit Government e-Market Place (GeM) at [www.gem.gov.in](http://www.gem.gov.in) for further details. The tender document is also available in Port's website [www.ennoreport.gov.in](http://www.ennoreport.gov.in).

**चयन प्रक्रिया की अनुसूची/SCHEDULE OF SELECTION PROCESS**

Name of work	:	कामराजर पोर्ट लिमिटेड (कपीएल) "कामराजर पोर्ट लिमिटेड, चृष्टी, तमिलनाडु में सतत परिवहनी वायु गुणवत्ता निगरानी स्टेशनों की आपूर्ति, स्थापना, उन्नयन, कमीशनिंग और संचालन एवं रखरखाव" कार्य क्षेत्रों (तकनीकी वाणिज्यिक) आमंत्रित की हैं। Kamarajar Port Limited (KPL) invites bids (techno commercial) for the work "Supply, Installation, Upgradation, Commissioning and Operation & Maintenance of Continuous Ambient Air Quality Monitoring Stations at Kamarajar Port Limited, Chennai, Tamil Nadu".
Period of work	:	स्थापना एवं कमीशनिंग की तिथि से 05 वर्ष/ 05 years from the date of installation & commissioning
Estimated cost for two years	:	रु.7,37,18,518/- (सात करोड़ सैंतीस लाख अठारह हजार पाँच सौ अठारह रुपया मात्र) (जीएसटी को छोड़कर)/ Rs.7,37,18,518/- (Rupees Seven Crore Thirty Seven Lakh Eighteen Thousand Five Hundred and Eighteen only) (Excl. GST).
Earnest Money Deposit (EMD)	:	रु.14,74,370/- (चौदह लाख चौहत्तर हजार तीन सौ सत्तर रुपया मात्र)/Rs.14,74,370/- (Rupees Fourteen Lakh Seventy Four Thousand Three Hundred and Seventy only).

Downloading of Tender document.	:	From 02.01.2026 to 30.01.2026
Pre-bid Meeting	:	07.01.2026 @ 1100 Hrs
Due date for Bid submission	:	30.01.2026 @ 1500 Hrs
Opening of Technical proposal	:	30.01.2026 @ 1530 hrs
Bid opening- Price bid (BOQ)	:	बाद में सूचित किया जाएगा/Will be intimated later.
Name and address of the officer issuing and receiving tender	:	<p><b>महाप्रबंधक (समुद्री सेवाएँ), कामराजार पोर्ट लिमिटेड, वल्लूर पोस्ट, चेन्नई - 600120, फैक्स: 044-27950002 ईमेल: <a href="mailto:gm-ms@kplmail.in">gm-ms@kplmail.in</a></b></p> <p><b>General Manager (Marine Services), Kamarajar Port Limited, Vallur Post, Chennai – 600120, Fax: 044-27950002, Email: <a href="mailto:gm-ms@kplmail.in">gm-ms@kplmail.in</a></b></p>

**बोलीदाताओं के लिए निर्देश/INSTRUCTIONS TO BIDDERS**

**2.1 DEFINITIONS**

- a)The terms used in this bidding document shall have the meaning defined here under:
- b)"The **Works**" means Supply, Installation, Upgradation, Commissioning and Operation & maintenance Continuous Marine Water Quality Monitoring Stations (CMWQMS) at the pre-defined locations.
- c)"**Port**" or "**KPL**" means the **Kamarajar Port Limited**, having its Registered Office at, No.17, Jawahar Building, Rajajisalai, Chennai-600001, Tamil Nadu, India and Administrative Office at Vallur Post, Chennai-120 also shall include any person or persons authorized by the Port.
- d)**The Bid**" means the offer or proposal of the Bidder to be submitted for the works in accordance with the stipulations set forth in this Bidding Documents.
- e) "**The Technical Bid**" means the Technical part of the Bid.
- f)"**The Financial Bid**" means the financial part of the Bid.
- g)"**The Bidder**" means either the manufacturer/supplier of the Equipment or his authorized representative who submits the Bid for the Works.
- h)"**The Authorized representative**" means the bidder who has enclosed the manufacturer's authorization as per the format "**Form of letter of authority**" provided herewith with this bid document.
- i)"**The Contractor**" means the Bidder, whose Bid for the Works has been accepted by KPL and includes his personal representatives, successors and authorized assignees.
- j)"**The Manufacturers**" mean the firms, which produces the equipment to be furnished by the Contractor under the Contract with the Port.
- k) "**The Contract**" means the written agreement to be concluded between the Port and the Contractor which includes terms and conditions stipulated on the Bidding Documents and any other descriptions annexed there to which form an integral part of the agreement to be provided by the Port.
- l) "**CAAQMS**" means Continuous Ambient Air Quality Monitoring Station
- m) "**O & M**" means Operation and Maintenance Contract and "**CAMC**" means

Comprehensive Annual Maintenance Contract as specified in this document.

- n) **“The Equipment”** means all kind of materials, machinery, components, apparatus, articles and instruments for the Project to be provided by the Contractor to KPL under the Contract.
- o) **“The Specifications”** means the specifications of the Works to be performed by the Contractor in conformity with those specified in the Technical Specifications of the Bidding Documents, and modifications thereof or additions thereto as may from time to time be made and approved in writing by the Port through the Consultant in case prior to the Contract and agreed upon by both KPL and the Contractor after the Contract.
- p) **“S/W”** means the Scope of Works, **“O&M”** means Operation and Maintenance.
- q) **“The Sites”** means the defined locations of ‘Continuous Ambient Air Quality Monitoring Stations’.
- r) **“The Contract Price”** means the price payable to the contractor under the contract for the proper performance of its contractual obligations.
- s) **“TNPCB”** means Tamilnadu Pollution Control Board.
- t) **“CPCB”** means Central Pollution Control Board.
- u) **“MoEFCC”** means Ministry of Environment, Forests and Climate Change
- v) **“CAC”** means Care Air Centre.
- w) **“GeM”** means Government e-procurement Market place.

## **2.2 BRIEF SCOPE OF THE WORK**

As part of Environmental Compliance, Kamarajar Port Limited (KPL) had procured and installed 03 nos. of Continuous Ambient Air Quality Monitoring Stations (CAAQMS) during the year 2022. The air quality sensors installed are of ACOEM Make BAM 1100 (PM10 & PM2.5), along with sensor racks capable of accommodating additional sensors, housed in Stainless Steel Central Pollution Control Board (CPCB)-approved shelters. The system is functioning satisfactorily, and the monitoring data is being synchronized with the servers of Tamil Nadu Pollution Control Board (TNPCB) and CPCB. In line with the directions of Ministry of Ports, Shipping & Waters vide its Harit Sagar guidelines Major ports are required to install CAAQMS, prescribed certain critical parameters to be monitored which are essential for monitoring and recording of air quality index at the Port, KPL would like to enhance no. of monitoring locations and its monitoring criteria. The following is the scope of work of the contract but not limited:-

1. To upgrade the existing three CAAQMS with additional parameters *viz., SO<sub>x</sub>, NO<sub>x</sub>, CO, O<sub>3</sub>, NH<sub>3</sub>, BTEX, ambient noise levels, wind speed, wind direction and humidity* in addition to the existing PM10 & PM2.5 by providing suitable additional accessories required.
2. To install additional 3nos. of CAAQMS with parameters *viz., viz., PM10, PM2.5, SO<sub>x</sub>, NO<sub>x</sub>, CO, O<sub>3</sub>, NH<sub>3</sub>, BTEX, ambient noise levels, wind speed, wind direction and humidity* along with all the accessories and ancillaries as prescribed in this document.
3. To undertake “Operation & Maintenance for all the six CAAQMS (3 existing CAAQMS+ 3 new CAAQMS), including supply of filter papers, calibration gases, chemicals, spare parts for sensors and analyzers, general laboratory supplies, data logging and transmission equipment, and specialized data analysis and display software for reporting spares, repairs to the air conditioning units and deployment of technician at CAAQMS on regular basis for attending operation & maintenance of all the six CAAQMS at KPL.

The contractor has to provide network connection to all the six CAAQMS with individual UPS backup, 5G modem and other communication modes for transmission of data to the central receiving station located at ‘Care Air Centre’ of TNPCB, Head Quarter at Chennai and at CPCB, Head Quarters, New Delhi.

The locations of existing CAAQMS and proposed new locations where CAAQMS are to be installed are attached herewith this bid document. The detailed scope of the work is as mentioned under Scope of Work.

### **2.3 TENDER DOCUMENT**

The tender document can be downloaded from the web site of Kamarajar Port [www.ennoreport.gov.in](http://www.ennoreport.gov.in) or [www.gem.gov.in](http://www.gem.gov.in).

**2.3.1** The bidder is responsible to download Addendum/Amendments/Errata/replies to the queries of the applicant etc., if any, issued by KPL, from the website before submission of the tender document. Any shortfall in submission of the said Addendum/Amendments/Errata/replies to the queries on the tender document, etc., along with the downloaded documents while submitting the tender documents, the bid will not be considered. Incomplete tender documents may be rejected outright. Any changes/updations in the tender document will be displayed through the websites [www.ennoreport.gov.in](http://www.ennoreport.gov.in) / [www.gem.gov.in](http://www.gem.gov.in)

**2.3.2** The offers will be received only through GeM portal on or before **00.00.2025** at 1500 hrs.

**2.3.3** The bids will not be entertained from Bidders who have on-going litigation against Kamarajar Port Limited. If such Bidders submit the bids, the same will not be considered.

**2.3.4** The bidders are required to pay the Earnest Money Deposit (EMD) equivalent to **2%** of the total estimated cost. The MSME/NSIC bidders are exempted from payment of EMD, however, in lieu of Bid Security/EMD, Bid Security Declaration shall be furnished as per the format enclosed at **ANNEXURE-6** of the tender document.

The copy of the same shall be enclosed with the tender document and the bidder shall submit Bid Security Declaration form in the specified format given in **ANNEXURE-6** in original before the due date and time as specified in the Tender.

#### **2.3.5 BID SUBMISSION**

The completed tender in all documents shall be submitted at Government e-market Place (GeM) portal web site [www.gem.gov.in](http://www.gem.gov.in). The tender documents submitted shall be opened online on the due date and time as mentioned in the Notice Inviting Tender [NIT] of this tender document in the presence of tender committee members.

#### **2.3.6 KPL's RIGHT TO ACCEPT/REJECT TENDERS:**

KPL reserves the right to accept a Bid other than the lowest and to accept or reject any Bid in whole or part, to annul the bidding process or to reject all Bids with or without notice or reasons. Such decisions by KPL shall bear no liability whatsoever consequent upon such decisions. Kamarajar Port reserves the right to reject any or all Form of Tender, without limiting the generality of the foregoing:

- (a) Any Form of Tender that is not accompanied by the EMD
- (b) Any Form of Tender which is incomplete, obscure or irregular;
- (c) Any Form of Tender containing any unauthorized alterations or samples required by these Conditions of Tender;
- (d) Any Form of Tender containing details which do not fully comply with the Conditions of Tender;
- (e) Any Form of Tender received after the stipulated time stated in the Tender Notice.

#### **2.3.7 COST FOR SUBMISSION OF BIDS**

The costs associated with the preparation and submission of tender through GeM procurement mode shall be borne by the bidders and KPL will in no case be responsible or liable for such costs.

#### **2.3.8 TENDER DOCUMENTS**

The tender procedures, contract terms and technical specifications are incorporated in the tender document. The bidders shall furnish all the relevant information required as per the tender document and any bid which is not responsive to the tender document in every aspect will result in rejection of tender.

#### **2.3.9 PRE-BID MEETING**

A pre-bid meeting will be held on the date as indicated in Notice Inviting Tender (NIT) at the **Port Administrative Office, Vallur Post, Chennai- 600120**. The bidders who are willing to participate in the tender process may be provided an opportunity to visit the site and to obtain clarifications if any. The bidders are

advised to go through the various clauses of the tender document carefully and if there appears to be any ambiguity or discrepancy in the document or any clarification needed on the tender document shall send their queries through GeM portal or by email between **02.01.2026 to 30.01.2026** addressed to the General Manager (Marine Services) at email ID gm-ms@kplmail.in with a copy to kkannan@kplmail.in. To the extent possible, the bidders are requested to submit their queries well in advance in order to answer during the pre-bid meeting. The pre bid meeting may be conducted in offline/virtual mode. The date, time and link for attending the pre-bid meeting will be intimated in the GeM procurement portal.

### **2.3.10 CORRESPONDENCE**

All the correspondence in connection with this Tender shall be addressed to the General Manager (Marine Services) at

**General Manager (Marine Services),**  
Kamarajar Port Limited,  
Vallur Post, Chennai - 600120,  
Tamil Nadu. E-mail: gm-ms@kplmail.in

### **2.3.11 CHANGE/EXTENSION IN SUBMISSION DATE**

The Port at its discretion may if required extend the last date for submission of tenders in order to give a reasonable time to the bidders to take the amendments into account for preparing their tenders and the same will be intimated through the website www.gem.gov.in

### **2.3.12 LANGUAGE**

The tender and all the correspondences and supporting documents shall be in English language.

### **2.3.13 THE TENDER PROPOSAL SHALL BE SUBMITTED IN TWO PARTS**

Tender document can be submitted online only in the designated e-Tender website www.gem.gov.in on or before the due date, as below:

- (a) **Technical proposal:** The bidders shall furnish all the relevant technical details along with the terms and conditions mentioned in the tender documents.
- (b) **Price Proposal (BOQ):** The price proposal shall be as per the Price Bid/Bill of Quantities (BOQ) and the same should be indicated separately. The format for the price proposal which need to be uploaded in the GeM Portal under *financial document head* is indicated at **SECTION 8** of the tender document. The bidder is requested to furnish the price breakup in the financial proposal indicating the GST part separately.

### **2.3.14 RESPONSIVE TENDER**

The bidders are advised to submit all the documents relevant to the tender clauses to consider the bids as responsive.

1. Application or Covering letter from the bidder.
2. Copy of the Demand Draft/Bank Guarantee/Pay Order towards EMD. However, the bidders are required to submit the original EMD to this office before the due date and time as specified in the Tender.
3. In case of MSME/NSIC bidders, duly signed photocopy of the Bid Security Declaration Form as given in Annexure-6 shall be enclosed with the tender document and the original to be submitted to this office before the due date and time as specified in the Tender.
4. Form of particulars (Please refer Annexure 1).
5. Details of previous experiences of the firm to meet the Pre-qualification criteria along with supporting documents (Please refer Annexure 4).
6. Audited Annual financial statements (Balance Sheet and P&L Statement) of the firm/Company certified by Chartered Accountant for the last three years to meet the Pre Qualification Criteria (Section 3).
7. Documents to prove the PAN No, GST registration No, PF & ESI details of the firm.
8. Tender document downloaded from website, duly filled in with relevant details and signed on each page (EXCEPT PRICE BID) submission.
9. Photocopy of the Integrity Pact to be submitted in online as required under clause 2.3.17. Further, the original Integrity Pact shall be submitted along with Bid Security Declaration. The bids without enclosing Integrity pact may lead to disqualification.

### **2.3.15 NON-RESPONSIVE TENDER**

The bidders without accompanying the above documents may be considered as non-responsive. Hence the bidders are requested to submit all the documents as mentioned in the tender document along with their bids.

### **2.3.16 EARNEST MONEY DEPOSIT (EMD):**

The bidders are required to pay Earnest Money Deposit (EMD) equivalent to 2% of the total estimated cost which works out to the tune of **Rs. 14,74,370/- (Rupees Fourteen Lakhs Seventy Four Thousand Three Hundred and Seventy only)**. The MSME/NSIC bidders are exempted from payment of EMD, however, in lieu of Bid Security/EMD, Bid Security Declaration shall be furnished as per the format enclosed at **ANNEXURE-6** of the tender document. The copy of the same shall be enclosed with the tender document and the bidder shall submit Bid Security Declaration form in the specified format as given in **ANNEXURE-6** in original before the due date and time as specified in the Tender.

### **2.3.17 INTEGRITY PACT**

The bidders participating in the tender process shall have to submit a copy of the 'Integrity Pact' as per the format annexed at **ANNEXURE-7** of this tender document. The original copy of the same shall be submitted to the address specified in the tender document in person (or) through post/courier before opening of the technical bids.

### **2.3.18 VALIDITY OF THE TENDER**

The bidders shall hold the offer valid for a period of 120 days from the date of opening of the techno-commercial bid of the tender. However, on mutual consent, the validity of the tender can be extended.

### **2.3.19 OPENING OF TENDERS**

The technical bid shall be opened online on the date and time mentioned in the Notice Inviting Tender of this tender document or any other date as indicated in e-procurement portal during the course of tender process.

### **2.3.20 EVALUATION OF PRICE BIDS**

The **Price Proposal (BoQ)** of the technically qualified bidders will be opened at a later date. The date and time of opening the price bids will be informed in the e-procurement portal in advance to the bidders whose technical proposals have been found acceptable/responsive.

The total rate quoted against BoQ items, excluding the GST component will be considered for finalizing the Lowest (L1).

### **2.3.21 AWARD OF CONTRACT**

KPL will ascertain itself whether the bidders can execute the contract satisfactorily as per the technical standards set by KPL.

The contract will be awarded to the successfully qualified (L-1) bidder. However, the employer does not bind himself to accept the lowest or any other tender and has the right to reject any or all the tenders without assigning any reasons. No representation whatsoever will be entertained on this account.

**2.3.22** On any clarifications sought from the bidders on any related matters, the reply shall be in writing.

**2.3.23** Kamarajar Port Limited at its sole discretion shall reject any tender which is non-responsive or the offer is found to be technically not qualified.

**2.3.24** Kamarajar Port Limited reserves the right to accept or reject any or all of the tenders and to annul the tender process, at any time without any liability for such action. Kamarajar Port Limited may cancel or withdraw this tender at its discretion. Kamarajar Port Limited at its discretion reserves the right to modify the timelines for accepting/opening the tenders.

**2.3.25** Failure of the successful bidders to comply with the requirements as per the tender shall constitute sufficient grounds for the annulment of the award and forfeiture of the amount declared in the Bid Security Declaration form.

**2.3.26 The price bid (BOQ) to be uploaded as per the format given in BOQ. The quoted price will be firm for full contract period without any escalation.**

**2.3.27** The prices quoted shall be inclusive of all charges and taxes. Any increase or decrease or introduction of any other taxes during the currency of the contract will be on KPL's account except GST which will be reimbursed by KPL on production of GST remittance challan.

**2.3.28** The Bidders shall take into account all costs without limitations and include transport, overtime, labour, profit, taxes, liabilities and obligations, insurance for men and equipment, third party liability insurance, payment of bonus and any other expenses for smooth conduct of this Contract.

**2.3.29** Should the successful Bidders fail to furnish security or refuse to execute the work in accordance with the accepted tender, Bid Security will be forfeited and Kamarajar Port Limited may thereon award the contract to other bidders.

**2.3.30** In the event of the Tender being submitted by a firm, it must be signed by competent and authorized person or in the event of the absence of any partner, it must be signed on his behalf by a person holding a power of Attorney, authorizing him to do so. Such power of attorney is to be produced with the tender.

**2.3.31** Any tender received with conditional offers is liable for rejection.

**2.4 PORT ENTRY:** The work is required to be carried out at Kamarajar Port and as such all requirements in connection with such working areas are to be strictly complied with. The required Port entry permit for men & material has to be arranged and borne by the Contractor.

**2.5 Any bidders found to be banned or blacklisted by Ministry of Ports, Shipping & Waterways or any of the Major Ports, is not eligible to participate in this tender.**

**2.6** For any queries with regard to online tendering procedure the bidders are asked to contact by sending email at [gm-ms@kplmail.in](mailto:gm-ms@kplmail.in) / [kkannan@kplmail.in](mailto:kkannan@kplmail.in) in advance.

### अनुभाग/SECTION 3

#### पूर्व योग्यता मानदंड/PRE-QUALIFICATION CRITERIA

##### **(A) WORK EXPERIENCE**

The bidder should have satisfactorily completed the contracts involving similar works of value listed below during the last 7 years ending last day of the month, previous to the one in which applications are invited.

(a) **3 (three)** similar works each costing not less than an amount equal to **40%** of the total estimated cost i.e., **Rs.2,94,87,407/-** (Rupees Two Crore Ninety-Four Lakh Eighty-Seven Thousand Four Hundred and Seven only), Excluding GST.

**(OR)**

(b) **2 (two)** similar works each costing not less than an amount equal to **50%** of the total estimated cost i.e., **Rs.3,68,59,259/-** (Rupees Three Crore Sixty-Eight Lakh Fifty-Nine Thousand Two Hundred and Fifty-Nine only), Excluding GST.

**(OR)**

(c) **1 (one)** similar work costing not less than an amount equal to **80%** of the total estimated cost i.e., **Rs.5,89,74,814/-** (Rupees Five Crore Eighty-Nine Lakh Seventy-Four Thousand Eight Hundred and Fourteen only), Excluding GST.

##### **DEFINITION OF SIMILAR WORK:**

“**Similar work**” means experience in ‘Supply, Installation, Commissioning with/without comprehensive annual maintenance/O&M contract of on-line Continuous Ambient Air Quality/Stack Monitoring Station(s) (CAAQMS)’ to monitor air/stack quality parameters in any PSUs/Central or State Govt. organizations/reputed industries.

The value of the similar works completed by the bidder will be brought to current cost level by enhancing the actual value of the work upon completion by using the following enhancement factors. For this purpose, the completed year’s work value will be considered for the enhancement.

<b>Year before</b>	<b>Enhancement multiplication factor</b>
Current year [FY 2025-26]	1.0
One year [FY 2024-25]	1.07
Two years [FY 2023-24]	1.14
Three years [FY 2022-23]	1.21
Four years [FY 2021-22]	1.28
Five years [FY 2020-21]	1.35
Six years [FY 2019-20]	1.42

**(B) FINANCIAL TURNOVER**

Average annual financial turnover of the bidder's firm during the **last 3 years** 2022-23, 2023-24 & 2024-25 ended 31.03.2025 shall be at least **30%** of the total estimated cost for three years **i.e., Rs.2,21,15,555/-** (Rupees Two Crore Twenty-One Lakh Fifteen Thousand Five Hundred and Fifty-five only). Bidders shall submit copies of the audited profit/loss statement and balance sheets for the last three years ended 31.03.2025.

**Note:**

1. The bidders should submit a list of orders executed (completed works) during the last 7 years as per the format given in **ANNEXURE-4**.
2. The Bidder shall submit, with its technical proposal, the documentary evidence regarding fulfillment of all the above criteria.

## अनुभाग/SECTION 4.0

### अनुबंध की सामान्य शर्तें / GENERAL CONDITIONS OF THE CONTRACT

**4.1** The Bids will be received by the General Manager (Marine Services), Kamarajar Port Limited in open tender system through GeM procurement portal as per the particulars given in the Tender Schedule in Technical and Financial bids.

Only those Bidders who are reputed Manufacturers or their Authorized Dealers/Distributors in the line and are in a position to complete the supplies within the timeline specified, should quote.

**4.2** Rates should be quoted in figures and words clearly inclusive of all DUTIES, DISCOUNTS, if any etc., ON SITE WARRANTY as mentioned in the tender.

**4.3** The Government Sponsored Institutions and registered MSME/NISC are exempted from the payment of Earnest Money Deposit provided they produce a Certificate from the concerned authorities to that effect, duly mentioning the product for which they have quoted. However, in case of seeking exemption from payment of EMD, the MSME/NSIC/Government Sponsored Institutions will have to produce a 'Bid Security Declaration' as per the format annexed at **ANNEXURE-6** of this bid document.

#### 4.4 SITE CONDITION

The Contractor shall study the existing site conditions, referring to the Bidding Documents carefully in order to familiarize themselves with the works. The Contractor should ascertain all particulars of the location and site conditions at their own expense.

#### 4.5 SPECIFICATION OF EQUIPMENT

**4.5.1** The performance, materials, duty, workmanship, operating conditions and design conditions for the equipment shall meet and comply with the specifications.

**4.5.2** Required infrastructure for measurement of the prescribed ambient air quality parameters shall be taken care by the bidder.

**4.5.3** All the analyzers except BTEX must be approved by USEPA and TUV QAL 1 & BTEX must be approved by USEPA/TUV QAL1/MCERTS QAL1. To this effect, the tenderer should submit certificates for the proposed analyser models.

**4.5.4** The certificates submitted by the bidder must be available on the respective websites of USEPA, TUV and MCERTS

#### 4.6 MINIMUM TECHNICAL SPECIFICATIONS

The Specifications indicate the principal and minimum technical requirements for each equipment. The details of the Equipment shall be fully examined and suitably selected through the detailed engineering and design without compromise in quality or serviceability of the equipment.

#### **4.7 CODE AND STANDARD**

All the Equipment and the Works shall conform to the approved and authorized codes and standards of the origin country, the following standards wherever applicable and are in force at the moment of the installation.

- (i) Environmental Protection Agency of United States (U.S. EPA) Standard and
- (ii) Technical Inspection Association (TUV), Germany

#### **4.8 ELECTRICAL RATINGS**

The Equipment shall conform to the following ratings and standards wherever applicable.

- a) All the electrically operated equipment specified herein shall be single phase, AC 220 V  $\pm$  10 % and 50 Hz, unless otherwise specified in the Specifications.
- b) Electrical plugs for the Equipment shall conform to local regulations and standards.

#### **4.9 PRECAUTION AGAINST VOLTAGE FLUCTUATION**

Adequate automatic voltage regulator for the Equipment shall be arranged by the Contractor wherever indicated in the Specifications. The Contractor shall pay due attention to electrical voltage fluctuation that exerts a serious influence and damage upon functioning of the Equipment.

#### **4.10 PROTECTION AND SAFETY**

The bidder shall be totally responsible for all the reasonable precautions against fire in respect of the Works, temporary works, offices, storage yards and other places and things connected therewith.

The bidder shall comply with all rules and regulations and orders which have been made by the State, Central Government, KPL or any other competent authority and the contractor shall provide sufficient fire-fighting protection in respect of the safety of the property and personnel.

#### **4.11 PERFORMANCE GUARANTEE**

- 1) The successful bidder shall obtain and provide to the Employer, an amount equal to **10% of the total contract value** of the work as performance guarantee. Though it is restricted to 5% in GeM portal, the successful bidder is liable to 10% of the total contract values as the Performance Guarantee in one of the following forms
  - (i) Deposit at call receipt/Banker's cheque/Demand Draft/Pay order of a Nationalized Bank.
  - (ii) An irrevocable Bank Guarantee of any nationalized bank in the prescribed form given at **ANNEXURE-5** of the tender document.
- 2) The above performance guarantee shall be submitted by the contractor within 15 days of issue of work order/Letter of award for a sum equivalent to 10% of

the total contract value. The Performance Guarantee submitted shall be valid for the total contract period plus claim period of three months.

- 3) The Performance Guarantee shall be as per the format annexed to the tender (Annexure-5) and as approved by the Employer. The cost of complying with the requirements of this clause shall be borne by the Contractor.
- 4) The above Bank Guarantee submitted to KPL will not be released till completion of the contract. The performance bank guarantee shall be renewed periodically from time to time atleast one month before expiry.
- 5) The performance security shall remain in force until the satisfactory completion of the contract and will be discharged thereafter. The obtaining of such guarantee (and the cost of guarantee) shall be at the expense of the Bidder(s).
- 6) The contractor shall provide performance security considering the said claim period of 90 days i.e., the performance security to be provided by the contractor shall be valid for a period of five years and seven months (i.e., 4 months of supply, installation & commissioning period + 5 years of O&M + 3 months of claim period).
- 7) If the performance of the Contractor is found to be unsatisfactory or in case of breach of any of the tender conditions, KPL reserves the right to en-cash the above performance security (bank guarantee) at any time during the contract period.

#### **4.12 OPERATION & MAINTENANCE:**

- a) The contractor shall undertake installed and upgraded Continuous Ambient Air Quality Monitoring Stations for Operation & Maintenance for a period of five years including warranty period of one year.
- b) However the Contractor shall warrant to KPL that the Equipment to be supplied under the Contract is new, unused, of the most recent or current models, and that they incorporate all recent improvements in design and materials unless provided otherwise in the Contract.
- c) The warranty includes all spare parts and services to keep the instruments and equipment in operating condition.
- d) The Contractor shall further warrant to KPL that the Equipment complies strictly with the Specifications and has no defect, arising from design, materials, or workmanship or from any act or omission of the Contractor that may develop under normal use of the supplied Equipment in the prevailing site conditions.

#### **4.13 INSURANCE**

- a) The Equipment supplied under the Contract shall be fully insured in currency acceptable as per the existing Law of India against loss or damage incidental to manufacture or acquisition, transportation, storage, shipment, delivery, installation and training involved with the Works naming Kamarajar Port Ltd., as the beneficiary, until issuance of taking over certificate.
- b) The buyer will not pay for transit insurance and the bidder will be responsible until the entire consignment reaches the destination of purchaser in good condition.
- c) The supply includes packing, transportation, insurance, custom clearance, port clearance and handling, inland transportation, inland transit insurance and delivery to site, installation, testing and commissioning of equipment and provision of training to the officials of KPL.
- d) Successful Bidder would bear the cost of insuring the equipment and facilities against any theft, fire, acts of God, natural calamities, civil, wars, strikes, fire frost, floods, riots and acts of unsurped power and other applicable provisions during the full tenure of contract period including O&M for an appropriate amount. The copy of the insurance shall be provided to KPL for records.

#### **4.14 RETURN OF PERFORMANCE SECURITY**

The performance security will be discharged by KPL and returned to the Contractor not later than ninety (90) days after completion of the contract period including warranty and O&M obligations. The contract shall provide the performance security considering the said claim period of 90 days i.e the performance security to be provided by the contractor shall be valid for a period Six years and 90 days.

## अनुभाग/SECTION 5.0

### अनुबंध की विशेष शर्तें/SPECIAL CONDITIONS OF THE CONTRACT

The following Special Conditions of Contract shall supplement the General Conditions of Contract (GCC). Whenever there is a conflict, the provisions herein shall prevail over those in the General Conditions of Contract, the corresponding clause number of the GCC is indicated in parentheses, if applicable

#### 5.1 WORK SCHEDULE

- a) The supply includes packing, transportation, insurance, custom clearance, port clearance and handling, inland transportation, inland transit insurance and delivery to site, installation, testing and commissioning of equipment and provision of training to KPL officials.
- b) The upgradation includes packing, transportation of additional sensors, custom clearance, port clearance and handling, inland transportation, inland transit insurance and delivery to site, installation, testing, commissioning of equipment and onsite insurance.
- c) Contractor shall complete all activities covered in the scope of work up to installation & commissioning of CAAQM Stations within **four months** from the date of issue of Letter of Award.
- d) The contractor shall undertake the operation & maintenance of the continuous monitoring stations during for a period of 5years including warranty period of one year from the date of commissioning of the Continuous Ambient Air Quality Monitoring Stations (CAAQMSs).
- e) The same can be further extended at the mutually agreed rates, terms and conditions.

#### 5.2 CLIMATE CONDITION

Precaution and protection against specific climate conditions in India and marine environment such as heavy rain, high temperature, high humidity, gales, excessive sunshine, corrosion effect, flooding or any other climate conditions which could cause damage upon the Equipment or otherwise interfere with the execution of the works shall be taken into account.

#### 5.3 CONSUMABLES AND SPARE PARTS

- a) The Contractor shall provide the consumables and spare parts as per requirement of Operation and Maintenance of Air Quality Monitoring Stations.
- b) Articles supplied shall be as per the approved specifications, or else, such Articles shall be rejected and will be asked for replacement at the risk and cost of the Bidder.

#### **5.4 AFTER SALES SERVICES**

- a) The Contractor shall guarantee the availability of all consumables, spares parts, maintenance and repair work for each Equipment on cost basis for at least ten (10) years after the O&M period, unless otherwise specified in the Specifications.
- b) Bidder should submit certificates from the manufacturers in support of available service centers and availability of spares parts and consumable in India.

#### **5.5 O&M CONTRACT**

- a) The newly installed and upgraded Continuous Ambient Air Quality Monitoring Stations shall be under Warranty and O&M Contract from the date of commissioning. However, the Contractor shall warrant to KPL that the Equipment to be supplied under the Contract is new, unused, of the most recent or current models, and that they incorporate all recent improvements in design and materials unless provided otherwise in the Contract. This warranty includes all spare parts and services to keep the instruments and equipment in operating condition.
- b) It is the scope of contractor to provide O&M Contract for the monitoring stations during the warranty period.
- c) Maintenance of all equipment in good working condition throughout the currency of the contract including supply of all material shall be the responsibility of the contractor.
- d) The Contractor shall, in addition, comply with the performance guarantees if specified under the contract. If, for reasons attributable to the Contractor, these guarantees are not attained in whole or in part, the Contractor shall make such changes, modifications, and/or additions to the Equipment or any part thereof as may be necessary in order to attain the contractual guarantees specified in the contract at its own costs and expenses and to carry out further performance test.

#### **5.6 INSURANCE FOR THE EQUIPMENTS**

- (a) The insurance (Comprehensive) shall be in an amount of equal to One Hundred Ten (110) percent of the value of the Equipment up to handing over of the Equipment to KPL on "All Risks" basis, including war risks and strikes, naming the KPL as the beneficiary.
- (b) The Contractor shall take the comprehensive all risk insurance cover for the complete station during O&M period including statutory insurance of Contractor's personnel. The value shall be 110% of the total value of the stations depreciated annually as per standard norms.

## 5.7 PAYMENT TERMS

The payment schedule for the supply, installation and commissioning of Continuous Ambient Air Quality Monitoring Stations will be as below.

- a) No advance payments shall be paid to the contractor.
- b) The payment shall be made upon completion of supply, installation and commissioning of Continuous Ambient Air Quality Monitoring Stations shall be paid upon completion of supply, installation, and commissioning and data synchronization with TNPCB & CPCB servers in all respects, as below:-

<b>Schedule of payment</b>	<b>Payment terms</b>
Upon completion of supply, installation, upgradation and commissioning of the CAAQM Stations.	100%
Charges towards operation & maintenance of CAAQM Stations by deploying technical manpower at site on regular basis	Paid monthly on successful completion of each month and submission of invoice upon submission of required air quality reports as per annexures attached herewith the tender document and calibration reports of the equipment.

## 5.8 PENALTY CLAUSE

- a) During the Operation & maintenance period, in case of any Analyser/system failure including display board, penalty will be charged by KPL @ Rs.1000/- (Rupees One Thousand only) per day per Analyzer after a grace period of three (3) continuous non-working days. The grace period of three (3) continuous non-working days shall be given only once per quarter (i.e., once in 3 months).
- b) Total penalty per year during O&M period on account of the above conditions shall be limited to 30% of total O&M charges for one year. Failing which defective/malfunctioning sensor/system has to be replaced ones at his own cost, failing which KPL shall have the right to terminate the O&M contract.

## 5.9 LIQUIDATED DAMAGES

**5.9.1** The Contractor shall pay to Kamarajar Port as liquidated damages a sum equivalent to half percent (0.5%) of the contract price of each station for per week of delay in commissioning of each station after scheduled date of completion.

### 5.9.2 Maximum Deduction

- a) The total liquidated damages on account of delay in supplies payable to the Board shall not in any case exceed 10% percent of the Contract price of supply portion only (Excluding O&M charges).

- b) In addition to above Liquidated damages for delay, the Contractor is liable to pay penalty on account of failure of systems during O&M period as described in this document.

## **5.10 SAFETY MEASURES**

The contractor is responsible for taking precautionary measures for the safety of lives of men working under him and the responsibility arising due to any mishap during the execution of work, the payment of any compensation etc. lies entirely on the part of the contractor. The contractor has to provide required personal protective equipments (PPE) like safety shoes, safety jacket, uniform, boiler suit, helmets, nose masks, gloves, etc., while carrying out the work.

In the event of any loss or damage being caused to the Contractor's property or person(s) while discharging this contract, the Contractor shall indemnify and keep indemnified Kamarajar Port Limited against all such losses. The Contractor shall be solely responsible for any injury or death to any of its employees and in the event of any claim being made on Kamarajar Port Limited; the Contractor shall indemnify Kamarajar Port Limited in this regard. Necessary fire fighting equipments should be in place at the dumping and segregation yard.

## **5.11 PF, ESI, AND INSURANCE etc., TO WORKMEN**

- (i) The Contractor shall comply with all applicable labour law(s) requirements like Provident Fund (PF), Employees State Insurance (ESI), Group health insurance, Workmen compensation Act, Safety Laws etc., all other applicable Acts and Rules from time to time as per Ministry of Labour, Govt. of India and Tamil Nadu Labour Welfare Board, TN Govt. Irrespective of the number of men employed in the work, insurance of staff and all personnel deployed by him including third party insurance shall be done by the Contractor against risk due to any accident at site. The Tenderer shall make payment to their employees not lesser than minimum Wages Act.,
- (ii) The contractor shall provide with group insurance to cover the life, temporary (or) permanent disability for all the personnel deployed at Kamarajar Port for the total period of the contract. The insurance shall cover the employees when at site and off-site also for any unforeseen eventuality.

In the event of default on the part of the contractor to make any statutory payments as per the above Acts/Rules, Kamarajar Port Limited shall have right to recover the same from the Contractor's bills immediately next falling due or from his BG without prejudice to other rights of Kamarajar Port Limited under this contract.

## **5.12 ACCIDENT OR INJURY TO WORKMEN**

Kamarajar Port shall not be liable for or in respect of any damages or compensation payable at law in respect or in consequence of any accident or injury to any workmen or other person employed by the contractor and the contractor shall indemnify and keep indemnified the Employer against all such damages and compensation and against all

claims, demands, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

### **5.13 WORKMEN COMPENSATION**

The successful bidder shall take suitable Comprehensive Insurance keeping nature of job at his cost for his personnel engaged at Kamarajar Port Ltd. Also submit proof of payment of insurance premium to Kamarajar Port Ltd., on or before the commencement of the operation. The contractor should take group insurance to cover the life, temporary, permanent disablement for all the personnel deployed in Kamarajar Port site for the total period of the contract. Insurance benefits should cover for all the employees while at site and off-site also. The minimum insurance sum assured per personnel should not be less than Rs. 5,00,000/- in the event of any eventuality.

### **5.14 SETTLEMENT OF DISPUTES:**

If the successful tenderer desires to appeal against the decision of KPL of any work as not being in accordance with the contract, the contractor may submit a written application indicating the same within 15 days of the occurrence and submit to the General Manager (Marine Services) for settlement. If the contractor feels aggrieved with the decision of General Manager (Marine Services), he may appeal to the Managing Director, KPL. If the contractor is not satisfied with the decision, he may refer the dispute to Dispute Resolving Mechanism.

#### **5.14.1 AMICABLE SETTLEMENT**

The parties shall use their best efforts to settle amicably all disputes arising out of or in connection with this Contract or the interpretation thereof.

#### **5.14.2 ARBITRATION**

Unresolved dispute between the Successful Tenderer and KPL shall be referred to sole arbitrator to be appointed by the Board. The arbitration shall be conducted in accordance with the provisions of the Indian Arbitration and Conciliation Act, 1996 (26 of 1996) or any statutory modification or re-enactment hereof and the rules made there under and for the time being in force shall apply to the arbitration proceedings. In such cases, Fees, if any, payable to the Arbitrator shall be paid equally by both the parties. The Arbitrator shall be final and binding on both the parties.

#### **5.14.3 JURISDICTION**

The avenue of jurisdiction for any disputes shall be at Chennai only.

### **5.14 FORECLOSURE**

- (i) The Kamarajar Port has the right to foreclose the contract for National Security, National Emergency and in general public interest or for any other reasons, the Kamarajar Port feels deemed fit. The Kamarajar Port will issue a written notice of not less than one month of the intended foreclosure to the contract specifying therein reasonable details, the reasons for foreclosure and expressing readiness to relieve all undertakings of the contractor.

(ii) If the Kamarajar Port does not require the services, the Kamarajar Port shall give one month notice to the contractor and no compensation shall be sought or paid.

#### **5.15 FORCE MAJEURE**

In the event of either party being rendered unable by Force Majeure to perform any obligations required to be performed under this contract, the relative obligation of the party affected by such force majeure shall upon notification to the other party be suspended for the period during which such cause lasts, unless force majeure operates for a period in excess of 15 Days.

- (i) The term force majeure shall mean War and Any Prevailing Acts & Regulation of Government of India, State Government or any Local Government, Act of God such as flood, Landslide, volcanic eruption or fire, war, hostilities (Whether war be declared or not), invasion, act of foreign enemies, Rebellion, revolution, insurrection or military or usurped power or Civil war.
- (ii) Upon the concurrence of such cause and upon its termination, the Party alleging that it has been rendered unable as aforesaid thereby, shall notify the other party in writing within Twenty-four hours (24) hours of the alleged.

## अनुभाग/SECTION 6

### काम की विस्तार/ SCOPE OF WORK

#### 6.1 DETAILS OF PROPOSED WORK

Successful Bidder would be awarded the contract under a Supply and Service Agreement, which would entail but not limited to:

- a) Supply, Installation and Commissioning of 3 nos. of CAAQM Stations at the defined locations of Kamarajar Port Limited, Chennai.
- b) Upgradation of existing 3 nos. of CAAQM Stations with the enhanced parameters as described in the table given below.
- c) Providing uninterrupted network connections to all the existing and newly supplied and commissioned CAAQM Stations.
- d) Integrate & synchronize all the monitoring stations, i.e., existing three stations and three newly installed stations with TNPCB and CPCB servers.
- e) Install digital display Boards at two locations by installing steel/concrete posts of height not less than 3 meters.
- f) Undertake the operation & maintenance of all the six (3new + 3 existing upgraded) continuous monitoring stations for a period of 5years from the date of commissioning of the Continuous Ambient Air Quality Monitoring Stations (CAAQMSs) by deploying technical manpower at site on regular basis.
- g) Supply of consumables & spares, attending repairs to the analyzers, Computer units, Air Conditioning units, UPSs for uninterrupted data collection during the entire contract period.

The price to be given in the Tender are fixed prices, irrespective of rise in materials prices and increase in taxes etc., till complete supply, installation, operation and maintenance of the Continuous Marine Water Quality Stations.

#### 6.2 PARTICULARS OF ITEMS TO BE SUPPLIED FOR NEWLY PROPOSED STATIONS

S. No	Item/Analyzer Name	Total Quantity Per station
1	RCC foundation (Monitoring Station Foundation), pillars miscellaneous works including Caging, civil (for CAAQM stations as well as Data Display Boards) including labour and material etc., complete.,	Three
2	Housing Inside length: 4200 mm Inside width: 3500 mm Inside height: 2500 mm	Three

3	Automatic PM10 Particulate Matter Monitor	Three
4	Automatic PM2.5 Particulate Monitor	Three
5	Continuous Ambient Oxides of Nitrogen (NO-NO <sub>2</sub> - NO <sub>x</sub> ) analyzers	Three
6	Continuous Ambient Ammonia (NH <sub>3</sub> ) Analyzer	Three
7	Continuous Ambient Sulphur Di Oxide (SO <sub>2</sub> ) Analyzer	Three
8	Continuous Ambient Carbon Monoxide (CO) Analyzer	Three
9	Continuous Ambient Ozone (O <sub>3</sub> ) analyzer	Three
10	Continuous Ambient BTEX analysers	Three
11	Continuous Ambient Noise Level Sensor	Three
12	Meteorological Sensors for Wind Direction, Wind speed, Ambient temperature, Relative humidity, Solar Radiation, etc.,	Three
13	UPS systems have a capacity of 10 KVA each for analyzers with 1 Hrs. back-up	Three
14	Split Air Conditioners (1.5 Ton capacity)- 5 Star rated	Six (Two nos. at each station)
15	19" Rack cabinet to accommodated all Analyzers & System	Three
16	Data Acquisition System (DAS)	Three
17	Computer system for Data Acquisition System (DAS)	Three
18	Computer System for AQI	Three
19	Unattended IoT devices for direct push of ambient air quality data to TNPCB and CPCB servers	Three
20	Server Rack	Three
21	Access Point/network connection	Three
22	Central Management Software with License w.r.t Data Acquisition	Three
23	Multi calibration System for Gas calibration and Meteorological, Flow and Electronic Calibration	Three
24	Sampling System having 10 port manifold	Three
25	Electrical works (for CAAQMS stations) including cables, switches, panels, sockets, etc., complete	Actual

### 6.3 PARTICULARS OF ITEMS TO BE SUPPLIED AT EXISTING CAAQM STATIONS

S. No	Item/Analyzer Name	Total Qty Per station
1	Continuous Ambient Oxides of Nitrogen (NO-NO <sub>2</sub> - NO <sub>x</sub> ) analyzers	Three
2	Continuous Ambient Ammonia (NH <sub>3</sub> ) Analyzer	Three
3	Continuous Ambient Sulphur Di Oxide (SO <sub>2</sub> ) Analyzer	Three
4	Continuous Ambient Carbon Monoxide (CO) Analyzer	Three
5	Continuous Ambient Ozone (O <sub>3</sub> ) analyzer	Three
6	Continuous Ambient BTEX analysers	Three
7	Continuous Ambient Noise Level Sensor	Three
8	Meteorological Sensors for Wind Direction, Wind speed,	Three

	Ambient temperature, Relative humidity, Solar Radiation, etc.,	
9	UPS systems have a capacity of 10 KVA each for analyzers with 1 Hrs. back-up	Three (existing UPS system to be replaced with the new units)
10	19" Rack cabinet to accommodate all Analyzers & System	Three
11	Data Acquisition System (DAS)	Three
12	Computer system for Data Acquisition System (DAS)	Three
13	Unattended IoT devices for direct push of ambient air quality data to TNPCB and CPCB servers	Three
14	Server Rack	Three
15	Access point/network connection	Three
16	Central Management Software with License w.r.t Data Acquisition	Three
17	Multi calibration System for Gas calibration and Meteorological, Flow and Electronic Calibration	Three
18	Sampling System having 10 port manifolds	Three
29	Electrical works (for CAAQMS stations) including cables, switches, panels, sockets, etc., complete	Actual

#### **6.4 DATA DISPLAY BOARDS**

As part of the scope of work, the successful bidder shall be responsible for the supply, installation, testing and commissioning of Data Display Boards at two identified locations within the Port.

The Display Boards shall be mounted on a suitable steel or reinforced concrete post, erected to a height not less than 3 meters from the ground level, ensuring clear visibility to the public and Port users. The Display Boards should be designed to accommodate real-time display of all monitored air quality parameters along with the Air Quality Index (AQI).

In addition, provision shall be made for extra scrolling lines to display public awareness messages, environmental conservation quotes, and pollution control slogans.

The air quality data generated from the CAAQMS units shall be integrated with the Display Boards to enable seamless, real-time display of information. All costs associated with supply, installation, erection structure, electrical and network connectivity integration required for the functioning of the Display Boards shall be borne by the Contractor.

##### **Standard Specifications of Data Display Boards**

###### **a) Display Type**

- Outdoor Full Matrix LED Display
- High brightness:  $\geq 5500\text{--}6500$  nits (sunlight readable)

- Auto brightness control (LDR-based)

**b) Display Size (Typical):** Minimum: 8 ft (W) × 4 ft (H) (for readability from 50 m)

**c) LED Specifications**

- LED Type: SMD RGB / Amber
- Pixel Pitch: P6 / P8 / P10 (outdoor)
- Viewing Angle:  $\geq 140^\circ$  (H & V)

**d) Display Content & Layout (Mandatory)**

**Header**

- Location Name
- Monitoring Station ID
- Organization Name

**Main Display**

- Real-time values of:
  - $PM_{2.5}$  |  $PM_{10}$
  - $SO_2$  |  $NO_2$  | CO |  $O_3$  |  $NH_3$  | BTEX | Ambient Noise Levels
- Units clearly shown

**AQI Section**

- **AQI Value (large font)**
- **AQI Colour Code:**
  - Green – Good
  - Light Green – Satisfactory
  - Yellow – Moderate
  - Orange – Poor
  - Red – Very Poor
  - Maroon – Severe

**Meteorology Section**

- Wind Speed & Direction
- Temperature & Humidity
- Pressure

**Footer**

- Date & Time (IST)
- Data Status: Live / Validated

**Communication & Integration**

- Data Source: Directly from CAAQMS server
- Protocol: TCP/IP, RS485, or API-based
- Update Frequency: Every 1–5 minutes
- Compatibility:
  - CPCB / TNPCB servers
  - AQI calculation algorithm (CPCB)

## **6.5 TIMELINE FOR INSTALLATION AND COMMISSIONING**

The successful firm has to complete the work of supply, installation, upgradation, commissioning and handing over equipment within a period of **four months** from the date of issue of the Letter of Award.

## **6.6 INSTALLATION, COMMISSIONING, OPERATION & MAINTENANCE**

- (i) Complete supply, installation and commissioning shall be in the bidder's scope. Any civil, mechanical, electrical, carpentry, masonry, hot works, etc., or any other work required for the installation shall be borne by the successful bidder. All manpower and tools etc., software required shall also be in the bidder's scope.
- (ii) Laying of all cables, hiring of crane/labour for lifting of the instruments to the site of installation is in the scope of the contractor.
- (iii) Setting up of solar power input to the CAAQMSs by way of installing suitable capacity of solar panel with UPS backup for uninterrupted power supply will be in the scope of contractor.
- (iv) Setting up of Data Server Center at respective stations and Server at TNPCB and CPCB with Lease Line connectivity for data transmission will be in the scope of the contractor.
- (v) The data to be connected to the central server and output shall be displayed by installing suitable size of display Board.
- (vi) The contractor shall ensure quality data generation, regular calibration of analyzers, online data validation, and timely submission of software validated data by deploying service engineer to KPL on regular basis during the currency of the contract.
- (vii) The full insurance of the offered CAAQMS shall be in the contractor's scope during the warranty period and O&M contract period.
- (viii) O&M also includes maintenance of the shelter boxes in good condition by way of painting external surface with primers and anti-corrosive paint once a year or whenever required during the warranty and O&M period for keeping them in good condition.
- (ix) The Maintenance & Operation of CAAQM Stations is inclusive of cost of all the spares, parts and components of analyzer probes, filter paper/roll, printer paper/roll, electrical or electronic spares and parts, operational software and accessories like Personal Computer, (CPU, monitor, keyboard, mouse), UPS, stabilizers, shelter box and its accessories power cables, including technicians'

charges, transport charges, etc., to keep the supplied equipment in good working condition.

## **6.7 POWER SUPPLY**

Kamarajar Port will provide the 3-phase power supply to the CAAQM stations from its nearby source located within 100m of the CAAQM Stations. However, drawing the supply lines from the source to the CAAQM stations by deploying suitable length of core cable will be in the scope of contractor.

## **6.8 MINIMUM TECHNICAL SPECIFICATIONS**

The minimum technical specification requirements for the CAAQMS to be installed are as mentioned in Section-7. However, the actual technical proposal can have higher or better technical performance parameters and the minimum specifications proposed should not be taken as a constraint on the upper side.

The technical specifications given in the bid documents are descriptive, and Selection Committee can also consider technical proposals having similar specifications.

## **6.9 DATA MANAGEMENT AND QUALITY CHECKS**

**6.9.1** Data shall be collected and validated according to National Ambient Air Quality Standards. All Sensors shall have current USEPA & TUV QAL1 (both are mandatory) reference or equivalent method designation and shall be of the latest model and design, and a certificate/declaration in this regard also need to be submitted.

**6.9.2** Successful bidder shall submit a Standard Operating Procedure (SOP) for the Water quality monitoring station to KPL before award of contract. This Standard Operating Procedure shall be approved by KPL prior to award.

The Standard Operating Procedure shall contain the following:

- a) Operating procedures
- b) Calibration procedures
- c) Calibration schedule
- d) Maintenance procedure
- e) Maintenance schedule
- f) Data validation procedures
- g) Data reporting as per the requirement of TNPCB & CPCB.

**6.9.3** Data obtained from these calibration checks and copies of associated Quality Assurance and calibration documentation, shall be submitted to KPL along with the Air Quality Data. The contractor should defend the data quality before State Pollution Control Board or MoEFCC, New Delhi or before any other statutory bodies as and when required.

**6.9.4** Inventory of spares and consumables are to be maintained and recorded from time to time and a buffer stock for any eventuality to be maintained.

**6.9.5** Upon 3days notice from the KPL once a year, Successful Bidder shall agree to submit to an audit of calibrations, conducted by a third party at their cost and bidders shall provide all necessary facilities to carry out required audit. The audit/calibration reports shall immediately be submitted to KPL.

**6.9.6 WORKING HOURS:** The successful bidder shall deploy technical manpower/service engineer(s) at KPL site for continuous operation & maintenance of CAAQMSs. The deployed personnel should report to project in charge or his authorized representative during office hours. The service engineer has to care maintenance of analyzer probes, data quality and all required maintenance activities on day-to-day basis.

**6.9.7 INSURANCE:** Successful Bidder would bear the cost of insuring the equipment (Comprehensive) and facilities against any theft, fire, washing out due to sudden flood and other applicable provisions during the tenure of contract period including O&M for an appropriate amount. The copy of the insurance to be produced to KPL for records.

## **6.10 LOCATIONS**

The tentative locations of the CAAQM Station are given below.

<b>Sl. No</b>	<b>Location of the Port</b>	<b>Proposal for installation/upgradation</b>
1	Main Gate	Exiting CAAQM Station to be upgraded
2	Adjacent KPL's signal station	Exiting CAAQM Station to be upgraded
3	General Cargo Berth-1 Premises	Exiting CAAQM Station to be upgraded
4	Adjacent to RFID Gate	New CAAQM Sation to be installed
5	Adjacent to KPL's West Gate	New CAAQM Sation to be installed
6	Adjacent to KPL's Guest House	New CAAQM Sation to be installed

The location map is enclosed herewith this tender document. However, if deemed necessary, the location of the stations may be changed at the sole discretion of KPL, prior to installation and during contract period. In such cases the shifting of the CAAQM Stations and establishing of the data setup will be in the scope of the contractor. KPL will pay mutually agreed charges to the contractor for shifting & re-installation.

## **6.11 SUPPLY OF EQUIPMENT**

Particular of Items at each station as specified in the above list to be supplied in the package, quantity of equipment to be supplied, delivered and installed at the above mentioned locations.

## **6.12 INSTALLATION OF EQUIPMENT**

All the necessary arrangements and adjustments for suitable installation and operation of the equipment shall be made by the Bidder including power supply and internet connection at their cost.

## **6.13 INSPECTION AND TEST**

### **6.13.1 PRE-DELIVERY INSPECTION**

The successful bidder has to arrange for pre-delivery inspection of analyzers, other equipment for the officials of KPL. The expenses towards travel, hotel and inspection for the officials of KPL shall be arranged by the contractor at their cost.

### **6.13.2 UNPACKING INSPECTION**

The Contractor in the presence of KPL representative shall inspect at Site whether all the Equipment are packed in conformity with the Equipment list and packing list without any damage immediately after arrival of the Equipment at each Location.

### **6.13.3 PERFORMANCE & CALIBRATION TESTS**

- a) The Contractor shall carry out the performance/calibration test for all the Equipment supplied as per the Scope of Work of this document.
- b) In case the Equipment for performance test requires the supplemental and/or supporting Equipment, the Contractor shall carry out the performance test including such Equipment.
- c) The Contractor shall prepare and submit the performance test procedures for approval by KPL at least ten (10) days prior to the testing schedules. Post calibration tests, the Contractor shall submit the performance test report to the KPL.

## **6.14 PROVISION FOR TRAINING**

The contractor shall provide training to the KPL representatives for minimum one week for three (3) officials/personnel (maximum) after the performance test and commissioning. Training should include but not limit to the following:

- a) Inspection of the Equipment.
- b) Precautions in use of the Equipment.
- c) Basic measurement principle.
- d) Principles of operation of the Equipment.
- e) Start-up and shut down procedure.
- f) Operation of the Equipment.
- g) Calibration method.
- h) QA/QC.
- i) Validation & management and software application.
- j) Safety precautions.
- k) Basic maintenance procedure.
- l) “Do’s” and “Don’ts” in operation of the Equipment.
- m) Handling of hazardous chemicals and gas.
- n) Others, which are deemed to be necessary by the Supplier.

In case the Equipment for training requires the supplemental and/or supporting Equipment, the Supplier shall carry out the training including such Equipment. The

Contractor shall discuss and finalize the detailed contents and schedule of the training program in consultation with KPL.

## **6.15 HANDING OVER OF STATIONS**

**6.15.1** On expiry/closure/termination of the Contract Agreement, stations shall be handed over to KPL in working conditions to the satisfaction of KPL.

**6.15.2** All the spares procured by the Contractor and unused as on date of handing over shall be the property of the KPL and the same shall be handed over to KPL.

**6.15.3** In addition, the Contractor shall be liable to provide consumables equivalent to three months consumption on expiry/closure/termination of the Contract Agreement without any extra financial implication.

## **6.16 RELOCATION OF STATION(S)**

During contract period, if KPL intends to shift CAAQM Stations from one location to another location, due to reasons unforeseen, functional or otherwise, the contractor shall shift the CAAQM Stations to new location. In such cases, cost towards shifting, including dismantling, loading & transportation, and reinstallation will be paid by KPL at mutually agreed charges.

## **6.17 OPERATION & MAINTENANCE OF CAAQMS**

- a) The Contractor's responsibilities shall include without limitations the following works to be carried out on the Air Monitoring Stations installed under this Contract during the Operation & Maintenance of the stations
- b) Operation and Maintenance of all the commissioned equipment and ancillaries supplied by the Manufacturer under the Contract including services during forced and planned outages and overhauls.
- c) The Contractor shall provide to KPL a daily/monthly/ quarterly summary of all Operation and Maintenance activities performed by the contractor during each month.

## **6.18 OPERATION AND MAINTENANCE OBLIGATIONS**

- 1) In implementing its obligations to operate and maintain, the facility under this Contract, the Contractor shall:
  - a) Undertake comprehensive maintenance including i.e. schedule and breakdown maintenance & repair at site and keep KPL informed regarding status of equipment and forward daily data as per Scope of Work.
  - b) Obtain permission from KPL and inform for any assistance with regard to the O&M for which equipment is required to be sent to repair works. Contractor shall arrange substitute equipment to keep CAAQM Stations operational.

- c) Take reasonable action to ensure that the personnel deployed at Air Quality Monitoring Stations and any subcontractors and agents are provided with a workplace in compliance with applicable Law.
- d) Keep the Air Quality Monitoring Stations clean, well maintained and in good working conditions.

2) **Security:** It is the duty of the Contractor to secure the movable, immovable and other properties of KPL at the CAAQM Stations till completion of O&M Contract. The Contractor shall indemnify the loss caused to KPL on account of any damage, loss or theft caused to the property of KPL.

3) **Scheduled Maintenance:** Unless KPL and Contractor mutually agree otherwise, perform all required Scheduled maintenance for all equipment, auxiliaries etc., in accordance with the O&M specifications.

4) **Unscheduled Maintenance:** Perform all Unscheduled Maintenance and repairs for all equipment, auxiliaries etc., Within (48) hours of the occurrence of the event requiring Unscheduled Maintenance, the operator shall provide KPL with detailed written information on the nature of the repair or replacement to be carried out, estimated down time and other necessary details as required.

5) The Contractor shall source all the spares required for maintenance & repairs of the installed equipment from O&M only.

#### **6.19 The Contractor personnel shall not:**

- a) Make any modifications to the Air Monitoring Stations, other than in an emergency, without the prior written approval of KPL, or
- b) Dispose off any assets, settle lawsuits or engage in transactions relating thereto on KPL's behalf without the prior written approval of KPL.
- c) The Contractor shall purchase and provide the spare parts, materials, supplies and other consumable items, and maintain an inventory thereof, for the Air Monitoring Stations. All such material is supplied and sourced from OEMs only.
- d) The Contractor shall review all applicable laws and initiate and maintain such prosecution, procedures and operating plans relating to operation of the Air Quality Monitoring Stations as necessary to comply there with or assist KPL in complying there with as the case may be.
- e) The Contractor shall operate the equipment as per the laid-out standards in the operating manual of the equipment and provide data for Air Quality to KPL on daily basis in the suggested format. (The daily/monthly/quarterly/ yearly reporting formats)
- f) The CAAQM Station has to be in operation for a minimum of 85% of the days in a year, 24 hours a day, and should not be inoperable for more than 3 days at a stretch.
- g) Provide data collected through operation of the equipment on daily basis in suggested output formats given in the bid document.

- h) Establish and maintain a daily, monthly and yearly reporting system to provide storage and ready retrieval of operation and maintenance data including such information necessary to verify calculations. The monthly reporting shall contain variances from targets.
- i) Provide access to KPL to the Air Monitoring Stations and its data at all reasonable times and when required.
- j) Provide the operational data required to all competent authorities including TNPCB and CPCB.
- k) Online transfer of data to TNPCB and CPCB website.
- l) The Contractor shall ensure accuracy of the data provided as per standards.
- m) The contractor shall ensure periodic re-calibration of all the equipment as per manufacturer's instructions and maintain "Protocol Calibration" to submit the same.
- n) KPL shall pay O&M charges to the Contractor, in accordance with the payment terms detailed in Clause No. 5.7 of Special Conditions of scope of the tender document.
- o) The successful bidder shall make the arrangement, network connection at the site which makes the part of contract.
- p) KPL will provide 3-phase electricity supply point from the nearest source. However, the contractor shall have to

## **6.20 PENALTIES**

- (a) During the Operation & maintenance period, in case of any Analyser/system failure including display board, penalty will be charged by KPL @ Rs.1000/- (Rupees One Thousand only) per day per Analyzer after a grace period of three (3) continuous non-working days. The grace period of three (3) continuous non-working days shall be given only once per quarter (i.e., once in 3 months).
- (b) Total penalty per year during O&M period on account of the above conditions shall be limited to 30% of total O&M charges for one year. Failing which defective/malfunctioning sensor/system has to be replaced ones at his own cost, failing which KPL shall have the right to terminate the O&M contract.

## અનુભાગ/SECTION 7

### તકનીકી નિર્દેશ/TECHNICAL SPECIFICATIONS

#### 7.1 GENERAL SPECIFICATIONS OF CONTINUOUS AMBIENT QUALITY MONITORING STATIONS

The newly installed Continuous Ambient Air Quality Monitoring Station consists of analysers and sensors will be for monitoring following 12 parameters along with network connection and trained service engineer for operation & maintenance for transmitting data to Central receiving station (Care Air Centre, TNPCB and CPCB).

S.No	Existing stations	Newly proposed stations
1	-	Particulate Matter - PM10
2	-	Particulate Matter- PM2.5
3	Oxides of Nitrogen (NOx)	Oxides of Nitrogen (NOx)
4	Oxides of Sulphur (SOx)	Oxides of Sulphur (SOx)
5	Ambient Ammonia (NH <sub>3</sub> )	Ambient Ammonia (NH <sub>3</sub> )
6	Carbon Monoxide (CO)	Carbon Monoxide (CO)
7	Ozone (O <sub>3</sub> )	Ozone (O <sub>3</sub> )
8	Benzene, Toluene, Ethylene and Xylene (BTEX)	Benzene, Toluene, Ethylene and Xylene (BTEX)
9	Ambient Noise Levels	Ambient Noise Levels
10	Wind Speed	Wind Speed
11	Wind Direction	Wind Direction
12	Humidity	Humidity

**7.2** Validation of data and event detection through Sensor or similar system should be integrated part of the software.

**7.12** The instrument should be capable of working in marine environment. All sensors must have flexibility to equip either with multi-parameter head or single parameter head following the CPCB guidelines.

#### 7.13 UNIFORM OEM MAKE FOR ANALYSERS

The successful bidder shall supply and install all the air quality analyzers (except BTEX) of the **same OEM make and approved by** USEPA and TUV QAL1 (having both certifications is mandatory). All analysers shall be compatible with the proposed Data Acquisition System (DAS), calibration equipment, spares, and consumables. The responsibility to ensure interoperability and

integration shall rest with the Contractor. The BTEX analyser supplied should have MCERT certification.

**Uniform OEM supply is mandated to ensure:**

- a) Standardised Calibration & QA/QC: Same OEM instruments enable uniform calibration procedures, consistent QA/QC checks, and harmonised data quality across all parameters.
- b) Seamless Data Integration: Simplifies connectivity with the Data Acquisition System, display boards, cloud platforms, and CPCB portals with minimal software conflicts.
- c) Reduced Maintenance Complexity: Common spares, consumables, firmware, and trained manpower reduce downtime and simplify troubleshooting.
- d) Improved Reliability & Interoperability: Having all analysers from one OEM ensures synced performance, stable communication protocols, and predictable long-term service support.
- e) Optimised Lifecycle Cost: Uniform inventory of spare parts and lower requirement of varied consumables reduces recurring operational cost.

The Contractor shall ensure that all supplied analysers meet the required performance specifications, certification standards, and are fully compatible with each other and with the overall CAAQMS system.

**7.14** The Sensor should have optimized referencing for excellent zero point and long-term stability.

**7.15** The sensor should be preferably with efficient integrated ultrasonic cleaning facility. If the ultrasonic cleaning can't be provided then the bidder should include the air-pressure cleaning system to ensure long maintenance intervals for this sensor. Air supply for the same will need to be accounted for by bidder.

**7.16** The Material of Construction should be Titanium or better to sustain the sensor in highly corrosive wastewater environment. The sensor should be completely reagent free for operation.

## **7.2 TECHNICAL SPECIFICATIONS OF THE ANALYSERS AND CAAQMS COMPONENTS**

**7.2.1 Housing of CAAQMS:** Each CAAQMS station supplied by the bidder has to be accompanied by its housing arrangement to protect them from dust and heat. Racks shall be installed inside the station so that the analyzers are easily

accessible from front & back for calibration and maintenance whenever required. The specifications of the Housing are as below.

1	Material/make	Stainless steel (SS)	
2	Dimensions (minimum)	Inside length	4200 mm
		Outside length	3500 mm
		Inside width	2500 mm
3	Frame		All metal surfaces shall be protected against corrosion.
4	Paneling		<ul style="list-style-type: none"> <li>(i) The exterior panel of the housing container shall be made of pre-coated SS sheet of atleast 1.2mm thickness. The outer side of the SS sheet (exposed face) shall be permanently painted with silicon modified polyster coating of dry film thickness of minimum 20micron.</li> <li>(ii)Inner face of the sheet shall be provided with suitable pre-coated 2mm thick aluminium sheet fixed over an inlay of 4mm marine plywood.</li> </ul>
5	Floor		It should be acid and alkaline resistant, water proof, anti slippery and easily cleanable/washable.
6	Outer door		One door shall be provided at the front side of the station with isolated 3-point locking & door handled to be fitted.
7	Electric power supply box		Three phase electrical wiring shall be laid in ducts. Required fuses, switches, MCBs, shall be provided. Copper wiring of appropriate gauge shall be used. The fluorescent light(s) with adequate no. of sockets shall be provided.
8	Partitioning		The housing shall be provided with ample space for storing ancillaries like computer, UPS etc., The air conditioners shall be mounted on proper supporting structures with rubber blocks to avoid vibration of the structure.
9	Container foundation L X W X H = at least 10ft X 10ft with 300mm height from the ground		In the locations where the concrete/paved block structure is not available for proper placing of the shelter, the contractor has to provide

	<p>the foundation as below but not limited:-</p> <p>L X W X H = at least 10ft X 10ft with 300mm height concrete 1:2:4). Outer wall of the foundation to be plastered with 1:4 cement sand mortar and same shall be painted with waterproof paint. RCC steps to approach the main door of the container to be provided and each step should not be more than 150mm height.</p>
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### 7.2.2 EARTHING & LIGHTENING ARRESTORS

- a) The Contractor shall design, supply, install, test and commission a dedicated earthing system for the CAAQMS, analyzer shelter, data logger, display board, meteorological sensors, and all associated electrical/electronic equipment.
- b) The earthing system shall conform to relevant **BIS/IEC standards** and ensure safe dissipation of fault currents with earth resistance values within permissible limits.
- c) All required materials, including earth pits, electrodes, copper/GI strips, earthing wires, clamps and accessories, shall be provided by the Contractor.
- d) It is the responsibility of the contractor to make proper earthing as per BIS standards. The stations shall be properly grounded with Copper based Electrical Grounding/Earthing Strip/Chemical earthing or as per BIS Standards with proper plate and only copper strip at least on 2 corners (diametrically opposite).

### 7.2.3 STATION FURNISHING

The newly supplied stations shall be accompanied with the following ancillaries with each unit.

- (i) 19" racks – 03 Nos.
- (ii) Fire extinguishers – 02 Nos. (Clean Agent – 2 KG each)
- (iii) Furniture: Furniture made of water resistant laminated board, cupboard, working table, powdered coated MS frame size 1400 x 900 x 750 mm (w x d x h) and top 19 mm thickness Board
- (iv) Revolving tilting chair – 02 Nos.
- (v) Folding/fixed aluminium ladder for roof access.
- (vi) Sensor for measuring the inside temperature of the station and Display
- (vii) Hygrometer for measurement of Humidity inside the station and Display
- (viii) Standard vacuum cleaner covering dry & wet surfaces

The successful bidder shall supply the following ancillaries at each station of the existing units:

- (i) 19" racks – 01 Nos.
- (ii) Fire extinguishers – 02 Nos. (Clean Agent – 2 KG each)
- (iii) Sensor for measuring the inside temperature of the station and Display
- (iv) Hygrometer for measurement of Humidity inside the station and Display
- (v) Standard vacuum cleaner covering dry & wet surfaces

existing supplied stations shall be accompanied with the following ancillaries with each unit.

### **Working Principle of the equipment**

The analyzers for Particulate Matter PM10 & PM2.5 shall be based on the principle of  $\beta$ -ray attenuation, particle sampled through the instrument and collected on fiber glass filter tape. Before and after sampling,  $\beta$ -ray radiation is measured by Scintillation/Geiger Muller Counter. An internal microprocessor handles all sequences and automatically calculates the concentration of PM 10 & PM2.5 concentrations.

The beta source shall be of low radioactivity and should be approved by USEPA/German/Japan/Australian/Indian Environmental agencies. The equipment and the analyzers should work unattended and continuous operation. The analyzers should determine the particle mass concentration, independent of the particle form, colour and size.

#### **7.2.4 Technical specifications for PM<sub>10</sub> analyzer:**

1	Principle	:	$\beta$ -ray attenuation
2	Particle size cut off	:	0-10 Microns
3	Measuring Range	:	0-1000 $\mu$ g/m <sup>3</sup>
4	Resolution	:	1% of the measurement range
5	Lower Detection Limit	:	<4.8 $\mu$ g/m <sup>3</sup> (1 hour)
6	Detector	:	Plastic Scintillator/GM Counter/Silicon semiconductor base
7	Air Flow Rate	:	16.7 Litres/minute
8	Filter Material	:	Glass Fiber Filter
9	Display	:	LED/LCD
10	Sampling Head	:	Dynamic heated sampling line with proper outer insulation for measurement of PM10 with adjustable temperature 20-70°C
11	Calibration	:	Reference membrane facility should be provided for calibration of analyzer
12	Compatibility	:	Analyzer should be compatible with protocols of DAS system to be used in station
13	Analog Output	:	0-1 V, 0-10 V, 2-20mA/4-20mA
14	Digital Output	:	Multi drop RS-232 port/USB port/TCP/IP/Ethernet
15	Roll Length	:	Minimum 20meters
16	Measurement cycle time	:	1 hour

17	Approval	:	USEPA & TUV QAL 1 and shall comply with CPCB
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#### **7.2.5 Technical specifications for PM<sub>2.5</sub> analyzer:**

1	Principle	:	β-ray attenuation
2	Particle size cut off	:	0-2.5 Microns
3	Measuring Range	:	0-1000µg/m <sup>3</sup>
4	Resolution	:	1% of the measurement range
5	Lower Detection Limit	:	<4.8µg/m <sup>3</sup> (1 hour)
6	Detector	:	Plastic Scintillator/GM Counter/Silicon semiconductor base
7	Air Flow Rate	:	16.7 Liters/minute
8	Filter Material	:	Glass Fiber Filter
9	Display	:	LED/LCD
10	Sampling Head	:	Dynamic heated sampling line with proper outer insulation for measurement of PM10 with adjustable temperature 20-70°C
11	Calibration	:	Reference membrane facility should be provided for calibration of analyzer
12	Compatibility	:	Analyzer should be compatible with protocols of DAS system to be used in station
13	Analog Output	:	0-1 V, 0-10 V, 2-20mA/4-20mA
14	Digital Output	:	Multi drop RS-232 port/USB port/TCP/IP/Ethernet
15	Roll Length	:	Minimum 20meters
16	Measurement cycle time	:	1 hour
17	Approval	:	USEPA & TUV QAL 1 and shall comply with CPCB

#### **7.2.6 Technical specifications for SO<sub>2</sub> analyzer:**

1	Principle	:	Pulsed UV Fluorescence
2	Measurement	:	SO <sub>2</sub> in Ambient Air
3	Display Digital	:	Digital
3	Measuring Range	:	Auto ranging 0-200 ppb
5	Lower Detection Limit	:	1 ppb
6	Noise Level	:	0.5 ppb
7	Zero Drift	:	<1 ppb/24 Hrs. with automatic zero compensation
8	Span Drift	:	<1 ppb in 24 Hrs.
9	Linearity	:	+/- 1% of full scale
10	Response time	:	120 Sec
11	Span check facility	:	Cylinders for each gas to be provided
12	Calibration	:	Through Multi-Gas Calibrator
13	Analog Output	:	0-1 V, 0-10 V, 2-20mA/4-20mA

14	Digital Output	:	Multi drop RS-232 port/USB port/TCP/IP/Ethernet
17	Approval	:	USEPA & TUV QAL 1 and shall comply with CPCB

#### **7.2.7 Technical specifications for NO-NO<sub>2</sub>-NO<sub>x</sub> analyzer:**

1	Principle	:	Chemiluminescence
2	Measurement	:	NO-NO <sub>2</sub> -NO <sub>x</sub> in Ambient Air
3	Display Digital	:	Digital
4	Measuring Range	:	Auto ranging 0-2000 ppb
5	Lower Detection Limit	:	1 ppb
6	Noise Level	:	0.5 ppb
7	Zero Drift	:	<1 ppb/24 Hrs.
8	Span Drift	:	<2% in 15 days of full scale.
9	Linearity	:	+/- 1% of full scale
10	Response time	:	120 sec or less.
11	Span check facility	:	Cylinders for each gas to be provided
12	Calibration	:	Through Multi-Gas Calibrator
13	Analog Output	:	0-1 V, 0-10 V, 2-20mA/4-20mA
14	Digital Output	:	Multi drop RS-232 port/USB port/TCP/IP/Ethernet
17	Approval	:	USEPA & TUV QAL 1 and shall comply with CPCB

#### **7.2.9 Technical specifications for NH<sub>3</sub> analyzer:**

1	Principle	:	Chemiluminescence method with NH <sub>3</sub> /NO converter. (NH <sub>3</sub> /NO <sub>2</sub> conversion to NO by oxidation by measuring output of two sample stream as equal to NH <sub>3</sub> ) Converter make must be same as NH <sub>3</sub> analyzer (OEM Make).
2	Measurement	:	NH <sub>3</sub> in ambient air
3	Display Digital	:	Digital
4	Measuring Range	:	Auto-ranging 0-1000 ppb
5	Flow range	:	Controlled and monitored (typical 0.5-1 L/min)
6	Lower Detection Limit	:	≤ 1 ppb NH <sub>3</sub>
7	Resolution	:	≤ 0.1 ppb
8	Response time	:	Typically ≤ 120 seconds (10 second averaging time)
9	Noise Level	:	≤ 0.2% of reading
10	Zero Drift	:	< 5 ppb per 24 hours.
11	Span Drift	:	< 2% of full scale over 15 days.
12	Linearity	:	+/- 1% of full scale
13	Calibration	:	Through Multi-Gas Calibrator
14	Analog Output	:	0-1 V, 0-10 V, 2-20mA/4-20mA

15	Digital Output	:	Multi drop RS-232 port/USB port/TCP/IP/Ethernet
16	Approval	:	As per CPCB specification, the individual analyser must have basic USEPA certification. If the bidder intended to supply combined analyzer for NH <sub>3</sub> and NO <sub>x</sub> , the base analyzer model must have USEPA/TUV QAL1 certifications.

#### **7.2.10 Technical specifications for O<sub>3</sub> analyzer:**

1	Principle	:	UV Photometric/Chemiluminescence
2	Measurement	:	O <sub>3</sub> in ambient air
3	Display Digital	:	Digital
4	Measuring Range	:	Auto-ranging 0–500 ppb
5	Flow range	:	0.8–1.0 L/min (800–1000 mL/min.)
6	Lower Detection Limit	:	≤ 1.0 ppb NH <sub>3</sub>
7	Resolution	:	≤ 0.1 ppb
8	Response time	:	Typically ≤ 30 seconds
9	Noise Level	:	≤ 0.5 ppb
10	Zero Drift	:	< ½% per month.
11	Span Drift	:	< 1% of full scale over 15 days.
12	Linearity	:	+/- 1% of full scale
13	Calibration	:	Built in auto/multi calibration as per CPCB.
13	Analog Output	:	0-1 V, 0-10 V, 2-20mA/4-20mA
14	Digital Output	:	Multi drop RS-232 port/USB port/TCP/IP/Ethernet
17	Approval	:	USEPA & TUV QAL 1 and shall comply with CPCB

#### **7.2.11 Technical specifications for CO analyzer:**

1	Principle	:	Nondispersive infrared (NDIR) with gas filter correlation
2	Measurement	:	CO in ambient air
3	Display Digital	:	Digital
4	Measuring Range	:	Auto-ranging 0–500 ppb
5	Flow range	:	0.8–1.0 L/min (800–1000 mL/min.).
6	Lower Detection Limit	:	≤ 1.0 ppb NH <sub>3</sub>
7	Resolution	:	≤ 0.1 ppb
8	Response time	:	Typically ≤ 60 seconds
9	Noise Level	:	≤ 0.5 ppb
10	Zero Drift	:	< ½% per month.
11	Span Drift	:	< 1% of full scale over 15 days.
12	Linearity	:	+/- 1% of full scale
13	Calibration	:	Through Multi-Gas Calibrator
14	Analog Output	:	0-1 V, 0-10 V, 2-20mA/4-20mA

15	Digital Output	:	Multi drop RS-232 port/USB port/TCP/IP/Ethernet
16	Approval	:	USEPA & TUV QAL 1 and shall comply with CPCB

#### **7.2.12 Technical specifications for Wind Speed analyzer**

1	Range (Operation)	:	0-60 m/s.
2	Sustainability	:	Upto 75 m/sec
3	Accuracy	:	$\pm 0.5$ m/sec or better
4	Resolution	:	0.1 m/sec
5	Sensor type	:	Ultrasonic
6	Threshold	:	0.5 m/sec or less
7	Response Time	:	10 sec or better
8	Approval	:	USEPA/TUV approved analyzer

#### **7.2.13 Technical specifications for Wind Direction analyzer:**

1	Range (Operation)	:	0 – 359 degree
2	Accuracy	:	$\pm 3$ degree or better
3	Resolution	:	1 degree
4	Sensor type	:	Ultrasonic
5	Threshold	:	0.5 m/sec or less
6	Response Time	:	10 sec or better
7	Approval	:	USEPA/TUV approved analyzer

#### **7.2.14 Technical specifications for Relative Humidity analyzer:**

1	Range (Operation)	:	0 to 100% RH
2	Accuracy	:	$\pm 3.0$ % or better
3	Resolution	:	1%
4	Sensor type	:	Capacitive/Solid State
5	Response Time	:	10 sec or better
6	Approval	:	USEPA/TUV approved analyzer

#### **7.2.15 Technical specifications for Noise Levels monitoring analyzer:**

1	Parameter	:	Continuous ambient noise level monitoring in dB(A)
2	Instrument type	:	Precision Sound Level Meter (SLM)/Noise Monitoring Terminal
3	Measuring Range	:	Dynamic range at least 30–130 dB(A) or better, with auto-ranging.
4	Measuring Parameters	:	
	a) Instantaneous sound level	:	SPL in dB(A)
		:	Leq (period selectable: 1 sec to 1 hr or higher)

	b) Equivalent continuous sound level c) Statistical levels	:	Atleast L10, L50, L90, and Lmax; Lmin desirable.
5	Resolution	:	0.1 dB
6	Data format	:	Time-stamped data with site ID, instrument ID, and all noise descriptors required for CPCB reporting
7	Software	:	Server/PC software for configuration, real-time display, storage, and analysis of noise data from multiple stations. Ability to compute and export day-night Leq, daytime Leq (Ld), nighttime Leq (Ln), and daily/periodic reports in line with CPCB ambient noise standards for different zones
8	Calibration	:	System to log calibration events, power failures, communication failures, and microphone faults.
9	Microphone	:	Free field $\frac{1}{2}$ " condenser microphone (or equivalent Class 1), with preamplifier. The frequency range should be at least 20 Hz–20 kHz.
10	Weather protection	:	Weatherproof outdoor microphone kit with secondary windscreen and bird-spike set, rated at least IP54–IP65.
11	Mounting	:	To be mounted over the CAAQM Station at standard height with vibration isolation.
12	Power supply	:	230 V AC $\pm 10\%$ , 50 Hz
13	Approval	:	USEPA/TUV approved analyzer

### **7.2.16 AMBIENT BENZENE, TOLUENE & XYLENE (BTX) ANALYSER**

A complete analyzer system comprising of sampling pump, transfer line, analyzer, detector, calibrator, computer hardware and software for instrument control, data storage, display, acquisition, processing and for selective determination of volatile compounds in ambient air optimized for Benzene, Toluene, Ethyl Benzene and o, m, p – Xylenes. Continuous unattended measurement system of individual BTEX should work without external cryogenic cooling. System should have protocol compatible to communicate & transfer data to DAS. Raw data storage capacity without erase minimum for three month or more. The system should be delivered with all necessary spares, consumables, tubing etc. for making it functional.

A single stage membrane Pump collect ambient sample automatically an inbuilt adsorption trap. Subsequent, the sample will be dissolved and injected on wide bore capillary gas chromatographic separation. Sample volume controlled by thermal mass flow controller (dust protected). Sample flow range may be 20 -100 ml/min or more (adjustable). Sample volume should be between 400 ml – one liter or more of ambient air

over a 10-15 min sampling cycle. All sample transfer tubing should be in stainless steel and flow & pressure sensor to be preferred with digital display.

**Technical specifications:**

1	Principle	:	Based on gas Chromatographic separation and Photo Ionization Detector (PID)
2	Measurement	:	Benzene, Toluene, Ethylbenzene, m.p-Xylene and 0-Xylene.
3	Measuring Range	:	0 - 100 ppb (0.32 – 325 $\mu$ g/m <sup>3</sup> )
4	Lower detectable limit	:	0.2 ppb (0.65 $\mu$ g/m <sup>3</sup> ) for 15 min cycle for Benzene
5	Temperature Range	:	5 – 35°C or more
6	Repeatability	:	Retention Time: <0.1% RSD Concentration: <0.1% RSD
7	Typical Cycle Time	:	Total Cycle Time should not exceed 15min i.e., Sample Collection Time -15 min approx. Analytical Time- 15 min approx.
8	Sample Volume	:	1 liter for 15 min cycle.
9	Desorption tube	:	Carbotrap
10	Pre concentration	:	Carbopack
11	Calibration	:	The Analyzer should be capable to calibrate through Multi Calibration System also. Please see Multicalibration section (Sl. No. 7) And also calibration section in General Specifications (4.1.7 & 4.1.9).
12	Analog Output	:	0 – 1 V, 0 – 10 V, 2 – 20 mA / 4 – 20 mA
13	Digital Output	:	Multi drop RS 232 port, USB port /TCP/IP ,Ethernet
14	Approval	:	USEPA/TUV/MCERT approved BTEX analyzer

**7.3 MULTICALIBRATOR**

Calibration system should provide for the calibration of the ambient air quality monitoring analysers (Gas). The Multi – Gas calibrator supplied must be of same make as of analyzer.

**7.4 MULTI POINT GAS CALIBRATION SYSTEM**

1. The Gas Calibration System should be capable to do the following:
  - (i) Multipoint calibration using automatic dilution system for the calibration of SO<sub>2</sub>, NO, CO, NH<sub>3</sub> and BTEX analyser.
  - (ii) Auto calibration (user selectable).
  - (iii) Generate zero air of 99.9% purity (High Performance Zero Air Generator to be provided).
  - (iv) Having facility for O<sub>3</sub> Generator for stable and repeatability calibration.
  - (v) Gas Phase Titration (GPT) with O<sub>3</sub> generator having 100% converter efficiency for conversion of NO to NO<sub>2</sub>.
  - (vi) Calibration using permeation tubes for which at least two chambers based Permeation system has to be provided.

(vi) The Permeation System should be capable to accept permeation tubes up to 6 cm in length and 2cm in diameter with user selectable temperature setting of 40°C and 50°C.

2. System should be 19" rack mountable.
3. System should be DAS compatible for remote calibration from Central Server.
4. The system should also have facility for multipoint calibration of Ozone analyzer.

## 7.5 TELESCOPIC CRANK – UP METEOROLOGICAL TOWER

Humidity and temperature sensors are to be supplied with weather and thermal radiation shield made of anodized aluminium and sensor should be supplied with all necessary cables, connector and mounting arrangements as required. The wind speed, wind direction, temperature, relative humidity and solar radiation sensors are to be mounted on the Meteorological Tower. The tower is to be a free standing four section telescopic tower provided with a hand crank to raise and lower the instruments mounted on the tower. Specifications are as follows.

Extended Height	:	10 meters
Retracted Height	:	2 metres
Wind load Limit	:	0.7896 sq. m. (8.5 sq. ft) at 50 mph
Number of Sections	:	4
Construction material	:	Galvanised steel or aluminium or superior

## 7.6 REMOTE MONITORING TOOL/SOFTWARE

Remote calibration & validation management software and its licenses for the entire project duration for stations computer and central servers located at SPCBs and CPCB. Data Acquisition Software (DAS) & its licenses to be provided for Central Servers at each SPCB and CPCB. The remote connectivity tool/software like Teamviewer with License, procurement, installation & updatation for the complete duration for each SPCB & CPCB, is to be done by the supplier.

## 7.7 OPERATIONAL SOFTWARE

The Continuous Ambient Air Quality Monitoring Station should accompany with PC based Data Acquisition System (DAS) for data management and reports generation and should be designed for unattended use. The operation software for data management and reporting shall be of licensed one. The above software shall be loaded in the PC supplied by the successful bidder.

## 7.8 PRINTER SPECIFICATIONS

The successful bidder is obliged to supply one unit of Laser Jet Multi Function Printer (Print-Scan-Copy) at the central PC installed with the following specifications.

Print speed black	:	25 ppm min
Print Speed Colour	:	5 ppm min
Scanner Resolution	:	1200 x 1200 dpi
Processor speed	:	1200 MHz Print or better
Paper handling input	:	Standard 250-sheet input tray or better
Duplex printing	:	Automatic (standard)

Media sizes supported	:	A4 & A5
Connectivity	:	Wireless connectivity and automatic two-sided printing automatically connect to wireless network easily print from virtually anywhere in the office with Ethernet and wireless connectivity connect via USB, and access tools from PC to manage printer
Toner capacity	:	1,500-page toner cartridge or better

### **7.9 WORKSTATIONS AND CENTRAL PC FOR AQI**

- a) The successful bidder shall supply desktop computer of a reputed brand with minimum specifications, mentioned below. This has to be installed at CAAQMS for the preparation of AQI. This PC would be controlled through remote mechanism with CPCB for the purpose of installation & maintenance of AQI software.
- b) Alongside the above PCs, the contractor shall provide one central PC with the same specifications which shall be connected to the all CAAQM Stations and display boards.
- c) The contractor has to maintain the computer system, Hardware, RAM etc., during entire O &M period including warranty period of one year.
- d) All the software packages should be of latest version at the time of supply and also licensed version in CD forms. The contractor should provide tables and chairs at each workstation to place the desktop computer for exclusive use. The workstations installed at existing CAAQM Stations shall be updated with the latest versions of software and antivirus packages.

#### **Specifications:-**

<b>S.No</b>	<b>Specification</b>	
1	CPU	Intel ® Core i7, 11th generation or higher
2	Memory	8GB DDR-IV or better
3	Ethernet Ports	Integrated intel ® Ethernet LAN 10/100/1000
4	PCI slots	Two PCIx16 half height
5	Optical Drive	DVD R/W internal
6	HDD's	3.5" 1TB, SATA drives
7	Power supply	Standard suitable power supply
8	Keyboard	Optical keyboard same as OEM
9	Mouse	Standard Optical mouse same as OEM
10	I/O ports	Minimum 6USB (at least 4 ports of 3.0)
11	Monitor	22" wide or higher LED FHD colour monitor
12	Wireless adapter	USB wireless adapter x 1no.
13	OS support	Windows 10 or latest
14	Warranty	Warranty onsite OEM & Comprehensive
15	Type	Desktop (Flat)/Tower

### **7.10 LAPTOP FOR AIR QUALITY DATA ANALYSIS**

The successful bidder shall supply a laptop of a reputed brand with minimum specifications supporting the following functions:-

**Minimum Specifications:-**

S.No	Specification	
1	CPU	Intel ® Core i7, 13th generation or higher
2	Memory	16GB RAM, 1TB SSD
3	CD/DVD	External DVD connector to be provided
4	OS support	Windows 11 or latest

The laptop provided to be suitable for the following functional inputs:

**A. OEM-Specific Software**

Used for operating and maintaining the monitoring station and analyzers:

- Analyzer Operating Software (for NO<sub>x</sub>, SO<sub>2</sub>, CO, O<sub>3</sub>, PM<sub>10</sub>/PM<sub>2.5</sub>, etc.,)
- Data Logger/Data Acquisition System (DAS) Software
- Calibration & Diagnostics Software for each analyzer
- Maintenance & Troubleshooting Software
- Firmware Updater Tools (OEM provided)

**B. Data Handling & Reporting Software**

For real-time data inspection, processing, and reporting:

- Real-Time Data Visualization Software
- AQI Calculation Module (Must follow CPCB/NAQI algorithm)
- Data Validation & QA/QC Module
- Automatic Report Generation Software (daily/weekly/monthly)
- Alarm & Alert Configuration Software
- Report Export Utilities (CSV, PDF, XML)

**C. Remote Monitoring & Integration Software**

For networking, cloud access, and dashboard display:

- Web-Based Monitoring Platform / Cloud Dashboard
- API/Web Service Integration Interface (REST API/MQTT)
- Display Board Interface Software (for LED public display systems)
- Mobile App/Remote Access Interface (if provided by OEM)

**D. Environmental Data Analysis Tools**

- AQMIS/Envista/OPSIS/AERMOD Environmental Software
- ArcGIS/QGIS (for spatial mapping and location-based pollution distribution)
- AutoCAD – 2D drawings, layouts

**E. Other requirements:** It is the obligation of the contractor to install all the above softwares and application alongside the lifetime free Microsoft office softwares like Office 365 and antivirus softwares. The contractor shall also supply and configure an external storage device of minimum 2 TB capacity for periodic backup of air quality monitoring data.

**7.11 CONNECTIVITY FOR DATA TRANSFER**

Internet connectivity will have to be provided by the firm for the entire project duration at either GSM or Hotspot connectivity. The provision for internet connectivity to the existing CAAQM Stations also will be in the scope of contractor. Internet connectivity should be available on 24X7 basis for data transmission with an uptime of 99.9%.

## **7.12 DATA ACQUISITION SOFTWARE FOR STATION (CAAQM)**

**7.12.1** The software captures data from all channels in the system and stores in the station Computer. The software should have the following features:

**a) Frequency of data acquisition**

- i) User selectable 1,5,30,60,120 second averaging duration online digitally.
- (ii) Minimum frequency will be subject to capability of analyzer cycle.

**b) Channel size**

- i) 32 Channels or more supported
- ii) Expandable to 64 channels, if required in future
- c) Data input Either Analog (0-1 volt/0-10 volt/2-20mA/4-20mA) or Digital to configure with the PC. The condition is that system should remotely operatable.
- d) User configurable channels, stations and equipment with communication parameters.
- e) Analyzer data channel should comprise of Name, Units, Communication Address, validity Range, Operation and Error Status.
- f) Provision to incorporate conversion factors such as PPB to  $\mu\text{g}/\text{m}^3$  etc.,
- g) Software should be equipped to configure the analyzers with it, irrespective of company make and communication protocol of the analyzer and the output mode i.e. Analog or Digital (RS 232) of the instrument.
- h) The output should be provided in user defined units.

## **7.12.2 DATA COLLECTION**

- a) Average data over user selectable time (1,5,30,60 seconds time interval) period.
- b) Operational status, Error status, calibration status and calibration values observed from the analyzer should be captured and should be made available along with the data with a frequency of maximum five minutes.
- c) System should collect of the diagnostics of the instrument comprising actual diagnostics parameters and their values at least once in every five minute to check the state of the health analyzer.

**d) Calibration parameters**

- i) Provision to entering zero calibration, span calibration values of gas cylinder/permeation to devices.
- ii) Provision for collecting zero calibration, span calibration values(pre calibration & post calibration) in to the database for further analysis.
- iii) Provisions to collect electronic system pre calibration & post calibration values from the analyser to ascertain the percentage deviation/ correction applied during each calibration and record it in database at station & Central computer.

#### **7.12.3 DATA STORAGE**

- a) Data along-with diagnostic, calibration, alarms should be stored at station computer at a defined path.
- b) Interval of data dumping will be same as defined in the data collection.
- c) System should be capable to keep every second acquired data from 32 channels for a period of minimum five years.
- d) Current data should be stored as per ISO-7168-1:1999I format and should be available in folder named as c:\Data\ at an interval of 15 minutes. As an example c:\data\01.05.2015.xml. the file will be appending without double data entry and as per ISO format.
- e) Data should also be stored for last two years in E:\data\Year\Month\day i.e. e:\data\2015\05\01.05.2015.xml ....
- f) If data encryption is done, then decryption procedure should be made available in soft file format to check the data at station at any point of time. To convert data on continuous basis for exporting to AQI software, procedure should be available without any licensing. AQI calculating Software will be provided by CPCB/SPCB.

#### **7.12.4 DATA DISPLAY (STATISTICAL ANALYSIS OF DATA)**

- a) Main window for real time display of all measured parameters with status of all analyzers/sensors.
- b) In 4-in-4 graphs and 4-in-1 graph formats
- c) In tables of 4-in-1 format
- d) Real time multi – graphs over user selectable time period i.e. 6:00 AM to 6:00 AM etc., e) Display of graphic & tabular display of the current data.
- f) Graphical form should comprise of 4-4 graphs, 4-1 graphs in user defined format (1, 5, 10, 15, 30 min, 1hour, 4, 8, 24 hour, 30 days and yearly; user definable time series)
- g) Tabular form should comprise of 4 channel list in user defined format (1, 5, 10, 15, 30 min, 1hour, 4, 8, 24 hour, 30 days and yearly; user definable time series)
- h) Station instruments basic configuration etc., should be visible on screen continuously.
- i) Statistical analysis tools like regression analysis, co-relation analysis and other analysis as per industry standards in the field of environment should be available and if not the firm should develop these for CPCB within a time frame of six months.
- j) The system should have procedures for normal analysis tools like calculation of data with respect to a threshold value, average, minimum, maximum, calculation of violating value with respect defined values(National Air Quality Standards) for defined period for the database etc.,

#### **7.12.5 DATA BACKUP**

- a) There should be defined data backup procedure through which data can be extracted from station computer in simple text format/excel/ ISO format(user definable).
- b) There should be defined restore procedure also to restore the data in case of data loss.
- c) A display screen should be available to update the user about data availability.

#### **7.12.6 DATA VALIDATION AUTOMATIC CHECKS AT STATION SOFTWARE**

- a) Zero level and span level checks if performed cyclically and defined results are not obtained up to +/- 5%(user definable 0-10%) then system should alarm the user of system failure and the recorded alarm should be transmitted to central software.
- b) After instruments perform the calibration the results obtained should be recorded and should be transmitted to central computer.
- c) There should be provision of two databases one is raw database and another corrected database.
- d) Validation of data through calibration database Pre calibration & post calibration values collected.

#### **7.12.7 DATA ACQUISITION SOFTWARE AT THE CENTRAL STATION AT EACH SPCB & CPCB**

Data communication system handles the data transmission of an ambient air quality network and receives incoming messages/signals from remote stations. The central software processes signals and data and displays it. Detailed requirement is as below:

##### **(i) Software at Central Station**

- a) Software should not have any restriction on number of locations and computers either technologically or in terms of licensing.
- b) Should display multiple stations on – line data (momentary values) in tabular text and graphic format.
- c) Data should be received by the central from all locations maximally within 5minutes duration or at user defined time intervals.
- d) Data along-with diagnostics and calibration details should be transmitted at central from all connected locations.
- e) Should support dialup systems, broadband connectivity, wireless connectivity, 4G/5G or any new technology which shall be in place during project time should be compatible and if not, need to developed by the system provider upto project duration without additional charges.
- f) Should have the remote control facilities for calibrations (Zero & Span) of instruments and measuring range modifications. g) Should have facility for displaying data communication error reports, image management which should be recorded and should be available for display.

##### **(ii) Data Display at Central Station**

- a) In 4-in-4 graphs, 4-in-1 graph and/or 16-in-1 graph formats

- b) In terms of 4-in-1 table format a) Real time multi – graphs over user selectable time period i.e. 6.00 AM to 6.00 AM etc.,
- c) Display of graphic & tabular display of the current data like simple 3D line and column chart, polar diagnostics and 3D perspective column chart.
- d) Graphical form should comprise of 4-4 graphs, 4-1 graphs in user defined format i.e., 1, 5, 10, 15, 30 min, 1hour, 4, 8, 24 hour, 30 days and yearly. (user definable time series)
- e) Tabular form should comprise of 4 channel list in user defined format i.e., 1, 5, 10, 15, 30 min, 1hour, 4, 8, 24 hour, 30 days and yearly. (user definable time series)
- f) Display of data using selectable name of different stations.
- g) Generation of Wind Roses, Pollution Roses (minimum 12 directional) with user defined time limits.
- h) Calculate vector mean of wind direction.
- i) Programmable downloading of data.
- j) Comparison of data w.r.t., Standards in Graphical form and tabular form with information of values exceeds the Standards.
- k) Specific data zooming facility

### **(iii) Data Export**

- a) Data export in ISO 7168 format is required to be done automatically.
- b) Possibility of exporting the data files in Excel, Text and other Tabular formats should be in user defined format i.e. 1, 5, 10, 15, 30 min, 1 hour, 4, 8, 24 hours, 30 days and yearly.

### **(iv) Data Import**

In case of communication medium fails there should a mechanism to shift the data into Pen drive (Physical medium for data collection) physically and a procedure to import the same on central software.

### **(v) Data Printing**

The central station PC should have the provision for connecting different types of printers and auto printing facility for all displays generated throughout the analysis of data at any point of time.

### **(vii) Data display and installation of display boards**

The successful bidder shall supply and install the LED air quality display boards (**2Nos.**) with the Air Quality Monitoring Stations. The display board shall be installed at the main gate and administrative office of KPL (or) as directed by the project in charge. Software supplied by the contractor should have the provision to connect the data output including current pollutants concentration to the display board (LED) to be installed at site. The contractor shall ensure the continuous working condition input to the display board installed throughout the warranty and CAMC period.

The Display Boards shall be mounted on a suitable steel or reinforced concrete/steel post, erected to a height not less than 3 meters from the ground level, ensuring clear visibility to the public and Port users. The Display Boards shall be designed to

accommodate real-time display of all monitored air quality parameters along with the Air Quality Index (AQI). In addition, provision shall be made for extra scrolling lines to display public awareness messages, environmental conservation quotes, and pollution control slogans.

The air quality data generated from the CAAQMS units shall be integrated with the Display Boards to enable seamless, real-time display of information. All costs associated with supply, installation, erection structure, electrical and network connectivity integration required for the functioning of the Display Boards shall be borne by the Contractor.

### **7.13 UPS (UNINTERRUPTED POWER SUPPLY)**

**New Stations:** All the new CAAQM stations shall be provided with UPS of 10KVA capacity or more with each AAQMS (total 3nos.) along with Automatic Delayed Restoration Device (ADRD) with 1hour backup in full capacity for the smooth performance of analyzers and peripherals at the station.

**Existing:** The existing CAAQM station units having 6KVA capacity UPS systems shall be replaced with similar specifications of UPS provided at newly installed CAAQM stations. This UPS is meant exclusively to protect the installed Continuous Ambient Air Quality Monitoring Station and their parts, including the computer, monitor etc., from voltage fluctuations and surges. The specifications of the UPS are given as below.

1	Capacity	:	10.0 KVA or more	
2	Input	Voltage	:	230 V AC
		Voltage range	:	± 25%
		Frequency	:	50 Hz ± 3%
3	Output	Voltage	:	230 V AC
		Voltage range	:	± 1%
		Frequency	:	50 Hz
		Frequency regulation	:	± 0.01%
		Waveform	:	Pure sine wave
4	Battery	Battery type	:	Sealed maintenance free
		Backup time	:	1 hour at full load
		Battery capacity	:	For required backup time
		Recharge time	:	5 hours to 90% after complete discharge
5	Power factor	:	0.9 to 1	
6	Indicator	:	L.E.D – Battery charge, load level, online, over load, on battery, replace battery	
7	Alarm	:	Audible alarm for battery backup, battery low and fault	
8	Protections	Surge	:	Surge suppression meets B.I.S or International standards
		Overload	:	Fuse & current limited
		Short circuit	:	Fuse & current limited & cut off

	Battery low cut-off	:	No battery drain after cut off
9	Overload capacity	:	110% for continuous load
10	Efficiency	:	More than 90%
11	Environment	Operating Temp.	: 0 - 50° C
		Operating Humidity	: 10% to 95% (Non condensing)
		Audible Noise	: Less than 45 db (at 1 meter)

#### 7.14 SERVO STABILIZERS

The contractor has to provide servo stabilizer with a minimum of 10KVA capacity at each CAAQMS for step up/step down the input power so as to provide stabilized power to the UPS units.

The specifications of the servo stabilizers are as below.

Input voltage	:	170V – 270V
Output voltage	:	230V ± 1%

#### 7.15 SPLIT AIR CONDITIONING UNIT (A/C) - 1.5 TONS CAPACITY INVERTER TYPE

Each CAAQMS shall have to be accompanied by two no. of split air conditioning unit (total 6nos. for 3monitoring stations). This is to be fixed in the shelter cabin of the station. The specifications of the air conditioning unit which needs to be provided by the contractor are as below.

**7.15.1 Type & Capacity: Newly installed CAAQM Stations:** 2Nos. split type, 1.5 ton cooling capacity, inverter AC, roof mounted of 5star rating with an automatic timer. Though the AC unit provided is of inverter type, a separate automatic voltage stabilizer shall have to be provided by the contractor.

**7.15.2 Existing CAAQM Stations:** The air conditioning units installed at existing CAAQM Stations shall be repaired and put into full operational condition. The upkeep of the existing air conditioning units throughout the operation & maintenance period of the contract is also in the scope of the contract.

**7.15.3 Minimum specifications of AC Units:** The indoor units should be running alternatively at an interval of four hours with timer control and the temperature inside the station should be maintained at 25° C during peak summer months.

a	Air conditioner capacity	:	1.5 Ton (2nos. at each CAAQMS)
b	Star rating	:	BEE 5 Star inverter with copper coil
c	Indoor noise level	:	40-50 db
e	Power supply	:	230 V ± 10 V AC and 50 Hz ± 3%
f	Warranty	:	Comprehensive with AAQMS

**अनुभाग/SECTION 8**  
**मात्राओं का बिल/BILL OF QUANTITIES**

**PRICE BID FORMAT**

The BoQ can be downloaded only from [www.gem.gov.in](http://www.gem.gov.in). This BoQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevant columns or else the bidder is liable to be rejected for this tender. Bidders are allowed to enter the values only.

<b>S. No</b>	<b>Description of Item</b>	<b>Qty</b>	<b>Unit</b>	<b>Amount per unit in Rs.</b>	<b>GST in %</b>	<b>GST Amount in Rs.</b>	<b>Total Including GST in Rs.</b>
1	Supply, Installation, and Commissioning of 3nos. of CAAQM Stations with all accessories and ancillaries as prescribed in the bid document.	3	Nos.				
2	Supply, Installation of additional sensors at existing 3nos. of Continuous Ambient Air Quality Monitoring Stations with all the accessories & ancillaries as prescribed in the bid document, upgradation and commissioning of existing CAAQM Stations	3	Nos.				
3	Operation & Maintenance contract for the all the six continuous ambient air quality monitoring stations (existing 3nos.+new 3nos.) including deployment of manpower, tools, transport, accessories, consumables and comprehensive maintenance.	60	Months				
<b>Total amount in Rs.</b>							

**Total Amount in Words:**

**Note:**

1. The L1 bidder will be evaluated considering the base rate quoted against items (1), (2) & (3).
2. The period of work will be for a period of five years.

3. *The rate quoted in the BOQ shall be in accordance with the scope of work mentioned at Section 6.*
4. *The payment will be made as per the payment terms given at Clause No. 5.7 of Special Conditions of the tender document.*

**PREAMBLE TO SCHEDULE OF RATES**

- a) The Schedule of Rates shall be read with all other sections of this Bidding Document.
- b) The Bidder is deemed to have studied the specifications and details of works to be done within the Time Schedule and should have acquainted himself of the conditions prevailing at site.
- c) The quantity shown against various items are only approximate and may vary to any extent individually as detailed in General Conditions of Contract. No claim shall be entertained during the currency of this Contract towards any items due to the above including where the CONTRACTOR has quoted low/high rates.
- d) All works mentioned shall be carried out as per the specifications, and instructions of KPL and the rates are deemed to be inclusive of consumables, labour, supervision, tools & tackles wherever required as called for in the detail specification and conditions of the Contract.

**FORM OF PARTICULARS**  
**INFORMATION OF BIDDER**

1. (a) Name:  
(b) Address of the corporate headquarters and its branch office(s), if any, in India:  
(c) Date of incorporation and/or commencement of business:
2. Details of individual(s) who will serve as the point of contact/ communication for Kamarajar Port within the company for the present tender:
  - (a) Name:
  - (b) Designation:
  - (c) Company:
  - (d) Address:
  - (e) Telephone Number:
  - (f) E-mail address:
  - (g) Fax Number:
3. Name, designation, address and phone numbers of authorised signatory of the Bidder:
  - (a) Name:
  - (b) Designation:
  - (c) Address:
  - (d) Phone No. :
  - (e) Fax No. :

**FORMAT OF BID SUBMISSION LETTER**  
**(On letter head of the bidding firm)**

Reference No.

Date:

From:

.....  
.....

To:

**General Manager (Marine Services)**

Kamarajar Port Limited,  
Vallu Post, Near NCTPS,  
Chennai – 600120, Tamil Nadu.

Dear Sir,

**Subject: Submission of tender for “Supply, installation, upgradation, commissioning and operation & maintenance of Continuous Ambient Air Quality Monitoring Stations (CAAQMS)” at Kamarajar Port Limited, Chennai, Tamil Nadu”**

**Reference: Tender No: KPL/MS/HSE/ENV/CAAQMS/2025**

\*\*\*\*\*

- 1) Having examined the completeness of bid documents including Invitation of Bid, Instruction to bidders, Conditions of contract, Technical specifications, Bill of Quantities, Drawings, Forms and Annexures for the execution of the above named works, we, the undersigned offer to execute and complete such works and remedy any defects therein in conformity with the said Bid document being awarded to us.
- 2) I/We undertake, if our bid is accepted, to:
  - i) Furnish Performance Security Deposit within the timelines specified in the tender document upon receipt of the Letter of Acceptance/Work order.
  - ii) Enter into Contract Agreement within the timelines specified in the tender document.
- 3) Unless and until a formal agreement is prepared and executed, this bid together with your written acceptance thereof shall constitute a binding contract between us, but without prejudice to your right to withdraw such acceptance under the provisions of the conditions of contract.
- 4) I/We ..... (Name of the Bidding Firm) submit herewith our bid through e-procurement portal for selection of our firm/organization as contractor for the above mentioned contract. The submission comprises, **separately of :**

- i) Technical Bid &
- ii) Financial Bid

5) I/We undertake that, in competing for (and, if the award is made to us, in executing) the above contract, we will strictly observe the laws against fraud and corruption in force in India namely “Prevention of Corruption Act 1988”.

6) We certify that in preparation and submission of Technical and Financial information, we have not taken any action which is or which constitutes a corrupt or fraudulent practice as defined in the tender documents.

7) Our Bid is valid for the period of hundred Eighty (120) days from the date of submission deadline fixed for the tender and will be binding on us.

8) We have not made any tampering or changes in the bid documents on which the bid is being submitted and if any tampering or changes are detected at any stage, we understand the bid will invite summary rejection and forfeiture of bid security/ the contract will be liable to be terminated along with forfeiture of contract performance security, even if LOA has been issued.

9) I/We understand that, the Kamarajar Port Limited is not bound to accept any bid that the Kamarajar Port Limited may receive.

Yours faithfully,

.....

Signature & seal of authorized signatory of the firm

Address: .....

.....

**FIRM'S FINANCIAL DATA**

<b>S. No.</b>	<b>Particulars of the Financial Year</b>	<b>Total</b>
1	2022-23	
2	2023-24	
3	2024-25	
<b>Average of 3 years</b>		

**Amounts in Rupees:*****Note:***

*Bidder shall submit the copy of the Audited Balance Sheets/ Profit & Loss Accounts of their firm/s for the last three- year as required in eligibility criteria at **Section 3**. The copy of document should be duly notarized, subject to production of the originals when demanded.*

DATE:

BIDDER's SIGNATURE WITH STAMP

**ANNEXURE -4**

**WORKS EXECUTED DURING LAST SEVEN (7) YEARS ending last day of month previous to the one in which tenders are invited**

Contractor's Experience in '**Supply, installation, upgradation, commissioning and operation & maintenance of Continuous Ambient Air Quality Monitoring Station (CAAQMS)**'

<b>S. No.</b>	<b>Project Name</b>	<b>Project Value (Excl. GST)</b>	<b>Contract Period</b>		
			<b>Date of commencement</b>	<b>Date of Actual completion</b>	<b>Date of scheduled completion</b>
<b>Individual Firm:</b>					
1.					
2.					
3.					
4.					
5.					

**Note:**

- i. *Copy of the document proof for the completed works(the best illustrated above) issued by the employer/competent authority to the bidder should be enclosed as required in pre qualification criteria. The copy of document should be duly notarized, subject to production of the originals when demanded.*

DATE:

BIDDERS SIGNATURE WITH SEAL

**FORMAT FOR PERFORMANCE SECURITY**

**(BANK GUARANTEE)**

*(On non-judicial stamp paper of the appropriate value in accordance with stamp Act. The stamp paper to be in the name of Executing Bank. The executing bank shall be from a Nationalized/Scheduled Bank in India)*

From:

.....

.....(Name and Address of the Bank)

.....

To:

**General Manager (Marine Services),**  
Kamarajar Port Limited  
Vallu Post, Near NCTPS,  
Chennai – 600120, **Tamil Nadu.**

This DEED OF GUARANTEE executed at .....by ..... (Name of the Bank) having its Head/Registered Office at ..... (hereinafter referred to as “the Guarantor” which expression shall unless it be repugnant to the subject or context thereof include its heirs, executors, administrators, successors and assigns;

**In favour of**

Kamarajar Port Limited (hereinafter called “the KPL”) having its office at Kamarajar Port Limited, Port administrative office, Vallur, Chennai -600120 which expression shall unless it is repugnant to the subject or context thereof include its heirs, executors, administrators, successors and assigns;

WHEREAS, M/s .....(Name of Bidder/contractor, if individual, or the Lead member in case of a Consortium/Joint Venture)....., (hereinafter called ‘the Contractor’ which expression shall unless it be repugnant to the subject or context of thereof include its executors, administrators, successors and assigns; has successfully bid and has been selected as Contractor in respect of the works contract of **“Supply, Installation, Upgradation, Commissiong and Operation & Maintenance of Continuous Ambient Air Quality Monitoring Stations at Kamarajar Port Limited, Chennai, Tamil Nadu”** hereinafter called to as “the Contract”) and the KPL has issued Letter of Acceptance for Award of Contract to the Successful bidder.

WHEREAS the KPL has sought an unconditional and irrevocable Bank Guarantee for an amount of Rs.....(Rupees .....only) by way of Security for execution of the Contract Agreement for the Contract within a period of .....days from the date of issue of the letter of Acceptance for Award of Contract and for guaranteeing the contract and the Guarantor has agreed to provide a Guarantee being these presents;

NOW THIS DEED WITNESSETH that in consideration of the premises, we .....Bank hereby guarantees as follows:

The Successful bidder shall execute the Contract Agreement before .....(date) and shall perform the contract of **“Supply, Installation, Upgradation, Commissiong and Operation & Maintenance of Continuous Ambient Air Quality Monitoring Stations at Kamarajar Port Limited, Chennai, Tamil Nadu”**

In accordance with the bid documents,

- 1) We, the Guarantor, shall without demur, pay to the KPL an amount not exceeding Rs.....(Rupees.....only) within three (3) days of receipt of a written demand thereof from the KPL stating that the Successful Bidder has failed to meet its performance obligations as stated in the tender clauses of the subject work.
- 2) The above payment shall be made by us without any reference to the Successful Bidder or any other person and irrespective of whether the claim of the Company is disputed by the Successful bidder or not.
- 3) This Guarantee shall be valid and shall remain in force for a period of 63 months from the date of issue (inclusive of 60months of contract period and 3 months of claim period).
- 4) In order to give effect to this Guarantee, the KPL shall be entitled to treat the Guarantor as the principal debtor and the obligations of the Guarantor shall not be affected by any variations in the terms and conditions of the Contract or other documents by the KPL or by the extension of time of performance granted to the Successful Bidder or any postponement for any time of the power exercisable by the KPL against the Successful Bidder or forebear or enforce any of the terms and conditions of the Contract and we shall not be relieved from our obligations under this Guarantee on account of any such variation, extension, forebearance or omission on the part of the KPL or any indulgence by the KPL to the Successful Bidder to give such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.
- 5) This Guarantee shall be irrevocable and shall remain in full force and effect until all our obligations under the guarantee are duly discharged.

6) The Guarantor has power to issue this guarantee and the undersigned is duly authorised to execute this Guarantee pursuant to the power granted under .....

7) It is also hereby agreed that the courts in Chennai would have exclusive jurisdiction in respect of claims, if any, under this guarantee.

8) Notwithstanding anything contained herein:

- Our liability under this Bank Guarantee shall not exceed Rs. \_\_\_\_\_ only);
- This Bank Guarantee shall be valid up to \_\_\_\_\_; and
- We are liable to pay the guarantee amount or any part thereof under this bank guarantee only and only if you serve upon us a written claim or demand on or before \_\_\_\_\_ (date of expiry of guarantee).
- This Guarantee is **encashable at Chennai** (Name of the Branch and address to be given).

IN WITNESS WHEREOF the Guarantor has set its hands hereunto on the day, month and year first herein above written.

Date: .....

Place: .....

(Signature of Authorized person of Bank)  
(Name in Block letters)  
.....(Designation)

(Address).....

Bank's Seal

Authorization No.....

Witness:

1. Signature

Name & Address & Seal

2. Signature

Name & address & Seal

**BID SECURITY DECLARATION**

(To be Executed and submitted on bidder's letter head)

Tender No.: KPL/MS/HSE/ENV/CAAQMS/2025

Date:--/\_/2025

To,

**General Manager (Marine Services)**

Kamarajar Port Limited,  
Vallur Post, Chennai – 600 120.

Sir,

**Subject: Tender for “Supply, Installation, Upgradation, Commissiong and Operation & Maintenance of Continuous Ambient Air Quality Monitoring Stations at Kamarajar Port Limited, Chennai, Tamil Nadu” – reg.**

I/We. The undersigned, do hereby declare that:

I/We understand that, according to your conditions, bids must be supported by a Bid Securing Declaration. I/We accept that I/We may be disqualified from bidding for any contract with you for a period of two year from the date of notification if I am /We are in breach of any obligation under the bid conditions, because I/We

(a) have withdrawn/modified/amended, impairs or derogates from the tender, my/our Bid during the period of bid validity specified in the form of Bid;

or

(b) having been notified of the acceptance of our Bid by the purchaser during the period of bid validity (i) fail or reuse to execute the contract, if required, or (ii) fail or refuse to furnish the Performance Security, in accordance with the Instructions to Bidders.

I/We understand this Bid Securing Declaration shall cease to be valid if I am/we are not the successful Bidder, upon the earlier of (i) the receipt of your notification of the name of the successful Bidder; or (ii) thirty days after the expiration of the validity of my/our Bid.

Name, Designation & Signature of the

Authorized Signatory of the Tender.

Place:

Date:

(The above said declaration to be submitted in original and the copy of the same to be uploaded in GeM portal portal along with other documents).

**INTEGRITY PACT**

**(The Integrity Pact agreement shall be executed in Rs 100/- non judicial stamp paper and shall be enclosed along with original financial instrument and reach Kamarajar Port Limited (KPL) corresponding address before opening Technical bid as per date and time given in the Tender.)**

**GENERAL**

This pre-bid pre-contract Agreement (herein after called the Integrity Pact)

**BETWEEN**

Kamarajar Port Limited, represented by the Managing Director, Kamarajar Port Limited, Chennai hereinafter referred to as "THE PRINCIPAL"/ "EMPLOYER"

**AND**

..... represented by  
..... hereinafter referred to as "The BIDDER/ CONTRACTOR".

**Preamble**

The Principal intends to award, under laid down organizational procedures, contract/s for .....

(Name of the Contract / Project / Stores equipment / item). The Principal values full compliance with all relevant laws and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with the Bidder/s and Contractor/s.

In order to achieve these goals, the Principal will appoint an External

Independent Monitor who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

NOW, THEREFORE,

To avoid all forms of corruption by following a system that is fair, transparent and free from any influence / prejudiced dealings prior to, during and subsequent to the currency of the contract to be entered into with a view to:-

Enabling the PRINCIPAL/EMPLOYER to obtain the desired said stores/equipment at a competitive price in conformity with the defined specifications by avoiding the high cost and the distortionary impact of corruption on public procurement, and Enabling BIDDERs / CONTRACTORs to abstain from bribing or indulging in any corrupt practice in order to secure the contract by providing assurance to them that their competitors will also abstain from bribing and other corrupt practices and the PRINCIPAL/EMPLOYER will commit to prevent corruption, in any form, by its officials by following transparent procedures.

The parties hereto hereby agree to enter into this Integrity Pact and agree as follows:-

### **Commitments of the PRINCIPAL/EMPLOYER**

The PRINCIPAL/EMPLOYER undertakes that no official of the Principal/Employer connected directly or indirectly with the contract, will demand, take a promise for or accept, directly or through intermediaries, any bribe, consideration, gift, reward, favour or any material or immaterial benefit or any other advantage from the BIDDER/CONTRACTOR, either for themselves or for any person, organization or third party related to the contract in exchange for an advantage in the bidding process, bid evaluation, contracting or implementation process related to the contract.

The PRINCIPAL/EMPLOYER will, during the pre-contract stage, treat all BIDDERs/CONTRACTORs alike, and will provide to all BIDDERs/CONTRACTORs the same information and will not provide any such information to any particular BIDDER/CONTRACTOR which could afford an advantage to that particular BIDDER/CONTRACTOR in comparison to other BIDDER/CONTRACTOR and could obtain an advantage in relation to the tender process or the contract execution.

All the officials of the PRINCIPAL/EMPLOYER will report to the Managing Director/Chief Vigilance Officer of Kamarajar Port Limited any attempted or completed breaches of the above commitments as well as any substantial, suspicion of such a breach.

If the PRINCIPAL/EMPLOYER obtains information on the conduct of any of its employees with full and verifiable facts and the same is *prima facie* found to be correct which is a criminal offence under the Indian Penal Code/Prevention of Corruption Act, or if there be a substantive suspicion in this regard, the Principal will inform its Chief Vigilance Officer and in addition can initiate disciplinary actions.

### **Commitments of the BIDDER / CONTRACTOR**

The Bidder / Contractor commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the post contract stage.

- i. The Bidder/Contractor will not enter with other Bidder/Contractors 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.
- ii. The Bidder/Contractor will not commit any offence under the Indian Penal Code, 1860/Prevention of Corruption Act, 1988 further the Bidder/Contractor will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
- iii. The Bidder/Contractor will not offer, directly or through intermediaries, any

bribe, gift, consideration, reward, favour, any material or immaterial benefit or any other advantage, commission, fees, brokerage or inducement to any official of the Principal/Employer, connected directly or indirectly with the bidding process, or to any person, organization or third party related to the contract in exchange for any advantage in the bidding, evaluation, contracting and implementation of the contract.

- iv. The Bidder/Contractor further undertakes that it has not given, offered or promised to give directly or indirect any bribe, gift, consideration, reward, favour, any material or immaterial benefit or any other advantage, commission, fees, brokerage or inducement to any official of the Principal/Employer or otherwise in procuring the Contract or forbearing to do or having done any act in relation to the obtaining or execution of the contract or any other contract with the Principal for showing or forbearing to show favour or disfavour to any person in relation to the contract or any other contract with the Principal.
- v. The Bidder/Contractor of foreign origin shall disclose the name and address of the Agents/representatives in India, if any. Similarly the Bidder/Contractor of Indian Nationality shall furnish the name and address of the foreign principals, if any.
- vi. Bidder/Contractors shall disclose the payments to be made by them to agents or any other intermediary, in connection with this bid/contract.
- vii. The Bidder/Contractor further confirms and declares to the Principal/Employer that the Bidder/Contractor is the original manufacturer/integrator/authorized government sponsored export entity of the stores and has not engaged any individual or firm or company whether Indian or foreign to intercede, facilitate or in any way to recommend to the Principal/Employer or any of its functionaries, whether officially or unofficially to the award of the contract to the Bidder / Contractor, nor has any amount been paid, promised or intended to be paid to any such individual, firm or company in respect of any such intercession, facilitation or recommendation.
- viii. The Bidder/Contractor, either while presenting the bid or during pre-contract negotiations or before signing the contract, shall disclose any payments he has made, is committed to or intends to make to officials of the Principal/Employer or their family members, agents, brokers or any other intermediaries in connection with the contract and the details of services agreed upon for such payments.

The Bidder/Contractor will not collude with other parties interested in the contract to impair the transparency, fairness and progress of the bidding process, bid evaluation, contracting and implementation of the contract.

- x. The Bidder/Contractor will not accept any advantage in exchange for any corrupt practice, unfair means and illegal activities.
- xi. The Bidder/Contractor shall not use improperly, for purposes of competition or personal gain, or pass on to others, any information provided by the

Principal/Employer as part of the business relationship, regarding plans, technical proposals and business details, including information contained in any electronic data carrier. The Bidder/ Contractor also undertakes to exercise due and adequate care lest any such information is divulged.

- xii. The Bidder/Contractor commits to refrain from giving any complaint directly or through any other manner without supporting it with full and verifiable facts.
- xiii. The Bidder/Contractor will not instigate third persons to commit offences outlined above or be an accessory to such offences.
- xiv. If the Bidder/Contractor or any employee of the Bidder/Contractor or any person acting on behalf of the Bidder/Contractor, either directly or indirectly, is a relative of any of the officers of the Principal/Employer, or alternatively, if any relative of an officer of the Principal/Employer has financial interest/stake in the Bidder/Contractor's firm, the same shall be disclosed by the Bidder/Contractor at the time of filing of tender. The term, relative for this purpose would be as defined in Section 6 of the Companies Act 1956.
- xv. The Bidder/Contractor shall not lend to or borrow any money from or enter into any monetary dealings or transactions, directly or indirectly, with any employee of the Principal/Employer.

### **Previous Transgression**

The Bidder/Contractor declares that no previous transgression occurred in the last three years immediately before signing of this Integrity Pact, with any other company in any country in respect of any corrupt practices envisaged hereunder or with any Public Sector Enterprises in India or any Government Department in India that could justify Bidder / Contractor's exclusion from the tender process. If the Bidder / Contractor makes incorrect statement on this subject, the Bidder / Contractor can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

### **Sanction for Violations**

Any breach of the aforesaid provisions by the Bidder/Contractor or any one employed by it or acting on its behalf (whether with or without the knowledge of the Bidder/Contractor shall entitle the Principal/Employer to take all or any one of the following actions, wherever required:-

- (i) To immediately call off the pre contract negotiations without assigning any reason or giving any compensation to the BIDDER/CONTRACTOR, However, the proceedings with the other BIDDER / CONTRACTOR (s) would continue.
- (ii) The Earnest Money Deposit (in pre-contract stage) and/or Security Deposit/Performance Bond (after the contract is signed) shall stand forfeited

either fully or partially, as decided by the PRINCIPAL/EMPLOYER and the PRINCIPAL/EMPLOYER shall not be required to assign any reason therefore.

- (iii) To immediately cancel the contract, if already signed, without giving any compensation to the BIDDER / CONTRACTOR.
- (iv) To recover all sums already paid by the PRINCIPAL/EMPLOYER, and in case of an Indian BIDDER/CONTRACTOR with interest thereon at 2% higher than the prevailing Prime Lending Rate of State Bank of India , while in case of a BIDDER/CONTRACTOR from a country other than India with interest thereon at 2% higher than the LIBOR. If any outstanding payment is due to the BIDDER/CONTRACTOR from the PRINCIPAL/EMPLOYER in connection with any other contract for any other stores, such outstanding payment could also be utilized to recover the aforesaid sum and interest.
- (v) To encash the advance bank guarantee and performance bond/ warranty bond, if furnished by the BIDDER/CONTRACTOR, in order to recover the payments, already made by the PRINCIPAL/EMPLOYER, along with interest.
- (vi) To cancel all or any other Contracts with the BIDDER/CONTRACTOR. The BIDDER/CONTRACTOR shall be liable to pay compensation for any loss or damage to the PRINCIPAL/EMPLOYER resulting from such cancellation/rescission and the PRINCIPAL/EMPLOYER shall be entitled to deduct the amount so payable from the money(s) due to the BIDDER/CONTRACTOR.
- (vii) To debar the BIDDER/CONTRACTOR from participating in future bidding processes of the Principal for a minimum period of five years, which may be further extended at the discretion of the PRINCIPAL/EMPLOYER.
- (viii) To recover all sums paid in violation of this Pact by BIDDER/CONTRACTOR(s) to any middleman or agent or broker with a view to securing the contract.
- (ix) In cases where irrecoverable Letters of Credit have been received in respect of any contract signed by the PRINCIPAL/EMPLOYER with the BIDDER/CONTRACTOR, the same shall not be opened.
- (x) Forfeiture of Performance Bond in case of a decision by the PRINCIPAL/EMPLOYER to forfeit the same without assigning any reason for imposing sanction for violation of this pact.
- (xi) The Bidder/Contractor accepts and undertakes to respect and uphold the Principal's absolute right to resort to and impose such exclusion and further accepts and undertakes not to challenge or question such exclusion on any ground, including the lack of any hearing before the decision to resort to such exclusion is taken.

This undertaking is given freely and after obtaining independent legal advice.

- (xii) If the Bidder/Contractor can prove that he has restored/recouped the damage caused by him and has installed a suitable corruption prevention system, in such a case, it will be discretion of the Principal to revoke the exclusion prematurely.
- (xiii) The PRINCIPAL/EMPLOYER will be entitled to take all or any of the actions mentioned at Para (i) to (xii) above of this Pact also on the Commission by the BIDDER/CONTRACTOR or any one employed by it or acting on its behalf (whether with or without the knowledge of the BIDDER / CONTRACTOR), of an offence as defined in Chapter IX of the Indian Penal code, 1860 or Prevention of corruption Act, 1988 or any other statute enacted for prevention of corruption.
- (xiv) The decision of the PRINCIPAL/EMPLOYER to the effect that a breach of the provisions of this Pact has been committed by the BIDDER/ CONTRACTOR shall be final and conclusive on the BIDDER/ CONTRACTOR. However, the BIDDER/CONTRACTOR can approach the Independent Monitor (s) appointed for the purposes of this Pact.

#### **Fall Clause**

The BIDDER/CONTRACTOR undertakes that it has not supplied/is not supplying similar product/systems or subsystems at a price lower than that offered in the present bid in respect of any other Ministry/Department of the Govt. of India or PSU and if it is found at any stage that similar product/systems or subsystems was supplied by the BIDDER/CONTRACTOR to the Principal at a lower price, then that very price, with due allowance for elapsed time, will be applicable to the present case and the difference in the cost would be refunded by the BIDDER/ CONTRACTOR to the PRINCIPAL/EMPLOYER, if the contract has already been concluded.

#### **Independent Monitors**

The Principal/Employer has appointed two Independent External Monitors (hereinafter referred to as Monitors)

##### **1. Shri Jatinderbir Singh, IAS., (Retd.,)**

House No.1186, Sector-77,  
Mohali -140308, Punjab.  
Contact: +91 9968607788(M)  
[mail: jatinderbir@gmail.com](mailto:jatinderbir@gmail.com)

##### **2. Shri Muvvala Kondala Rao, IFoS., (Retd.,)**

No.201, Kalakunj-B, 22 B, Turf View Apartments,  
Cooperative Society, Lane-6, Dahanukar Colony, Kothrud,  
Pune-411038, Maharashtra.  
Contact: +91 9422161512(M), [mail: mkraomuvvala@gmail.com](mailto:mkraomuvvala@gmail.com)

The task of the Monitors shall be to review independently and objectively, whether and to what extent the parties comply with the obligations under this Pact.

- a) The Monitors shall not be subject to instructions by the representatives of the parties and perform their functions neutrally and independently.
- b) Both the parties accept that the Monitors have the right to access all the documents relating to the project/procurement, including minutes of meetings.
- c) As soon as the Monitor notices, or has reason to believe, a violation of this pact, he will so inform the authority designated by the Principal and the Chief Vigilance Officer of Kamarajar Port Limited.
- d) The BIDDER/CONTRACTOR(s) accepts that the Monitor has the right to access without restriction to all Project documentation of the PRINCIPAL including that provided by the BIDDER/CONTRACTOR.

The BIDDER/CONTRACTOR will also grant the Monitor, upon his request and demonstration of a valid interest unrestricted and unconditional access to his project documentation. The same is applicable to Subcontractors. The Monitor shall be under contractual obligation to treat the information and documents of the Bidder / Contractor / Subcontractor(s) with confidentiality.

- e) The Principal/Employer 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 Principal and the Contractor. The parties offer to the Monitor, the option to participate in such meetings.
- f) The Monitor will submit a written report to the designated Authority of Principal/Employer/Chief Vigilance Officer of Kamarajar Port Limited within 8 to 10 weeks from the date of reference or intimation to him by the Principal/Employer/Bidder/Contractor and should the occasion arise, submit proposals for correcting problematic situation.
- g) As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or to take corrective action, or to take other relevant action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.
- h) If the Monitor has reported to the Principal substantiated suspicion of an offence under the Indian Penal Code, 1860/Prevention of Corruption Act,1988 and the Principal/Employer has not, within reasonable time, taken visible action to proceed against such offence or reported to the Chief Vigilance Officer,

the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

- i) The word "Monitor" would include both singular and plural.

#### **Facilitation of Investigation**

In case of any allegation of violation of any provisions of this Pact or payment of commission, the PRINCIPAL/EMPLOYER or its agencies shall be entitled to examine all the documents including the Books of Accounts of the BIDDER/CONTRACTOR and the BIDDER/CONTRACTOR shall provide necessary information and documents in English and shall extend all possible help for the Purpose of such examination.

#### **Other Provisions**

Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

#### **Law and Place of Jurisdiction**

This Pact is subject to Indian Law. The place of performance and jurisdiction is the seat of the PRINCIPAL/EMPLOYER.

#### **Other Legal Actions**

The actions stipulated in this Integrity Pact are without prejudice to any other legal action that may follow in accordance with the provisions of the extant law in force relating to any civil or criminal proceedings.

#### **Validity**

The validity of this Integrity Pact shall be from date of its signing and extend upto 5 years or the complete execution of the contract to the satisfaction of both the PRINCIPAL and the Bidder/Contractor including warranty period whichever is later. In case Bidder/Contractor is unsuccessful, this Integrity Pact shall expire after three months from the date of the signing of the contract.

If any claim is made/lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged/determined by the Kamarajar Port Limited.

Should one or several provisions of this Pact turn out to be invalid, the remainder of this Pact shall remain valid. In this case, the parties will strive to come to an agreement to their original intentions.

#### **Equal treatment of all Bidders/Contractors/Sub-Contractors**

- (a) The Bidder/Contractor undertake to demand from all sub-contractors a commitment in conformity with this Integrity Pact, and to submit it to the Principal before contract signing.
- (b) The Principal will enter into agreements with identical conditions as this one with all Bidders/Contractors and Sub-Contractors.

(c) The Principal will disqualify from the tender process all Bidder/ Contractors who do not sign this pact or violate its provisions.

The parties hereby sign this Integrity Pact at \_\_\_\_\_ on \_\_\_\_\_.

The Principal represented  
by the **Managing Director,**  
**Kamarajar Port Limited**

**BIDDER/CONTRACTOR**

Name of the Officer

Name

Designation:

Designation:

**Witness 1**

Name & address

**Witness 1**

Name & address

**Witness 2**

Name & address

**Witness 2**

Name & address

Place:

Place:

Date:

Date:

**FORM OF AGREEMENT  
(SAMPLE AGREEMENT)**

Agreement made this ..... day of ..... , TWO THOUSAND AND TWENTY FIVE.

**BY AND BETWEEN**

KAMARAJAR PORT LIMITED, a Company registered under the Companies Act, 1956 and having its registered office at No.17, Jawahar Building, Rajaji Salai, Chennai – 600 001, Tamilnadu, herein after referred to as KPL, which expression shall wherever the context so admits or permits, deem to mean and include its successors in office and assigns of the ONE PART

**AND**

Mr/Mrs. ..... Managing Director/Director, carrying on business under the name and style of M/s ..... having its registered office at ..... hereinafter called the 'CONTRACTOR' which expression shall wherever the context admits or permits shall deem to mean and include his/their successors-in-interest, administrators and assigns of the OTHER PART

WHEREAS KPL have accepted a tender submitted by the contractor for providing fire tender services for Kamarajar Port complying all terms and conditions of the tender (hereinafter called the "work").

AND WHEREAS the contractor has furnished a Bank guarantee for Rs.....(Rupees.....Only) issued by ..... Bank vide BG No ..... dated..... as Security Deposit for the due and proper fulfillment of all contract conditions.

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this agreement words and expression shall have the same meaning as are respectively assigned to them in the conditions of Proposal Document hereinafter referred to.
2. The following documents shall deemed to form and be read and construed as part of this agreement viz:
  - a) Tender No. KPL/MS/HSE/ENV/CAAQMS/2025 including addendums/ corrigendum issued by KPL
  - b) Letter of Acceptance
  - c) Special Conditions of Contract

- d) General Conditions of Contract
- e) Scope of Work
- f) Priced Bill of quantities (Price Bid)
- g) Drawings (if any)
- h) All the correspondences including minutes of meeting by which the contract is added, amended, carried or modified in any way on mutual consent.

3. In consideration of payments to be made by KPL to the Contractor for the “work” to be executed, the contractor HEREBY COVENENTS with the KPL that the contractor shall and will duly provide, execute and complete in all respects the “work” to the full satisfaction of the KPL and shall perform all other acts and things in contract mentioned or described or which are to be implied there from or may be reasonably necessary for completion of the “work” at the said time and in the manner in the contract conditions.

4. In consideration of the due provision, execution and completion of the “work” to the full satisfaction of the Kamarajar Port Limited by the contractor, the Kamarajar Port Limited hereby agree to pay to the contractor the respective amounts for the “work” actually done by the contractor and approved by Kamarajar Port Limited under provisions of the contract at such time and in such manner as provided therein.

5. Any of the counter terms and conditions of the contractor shall not be taken as terms and conditions of this contract/agreement unless Kamarajar Port Limited specifically agrees it in writing.

6. Any failure on the part of the contractor in discharging any of his obligations as per the requirements of this contract will be construed as a breach and will result in forfeiture/encashing of the performance security deposit/Bank Guarantee and cancellation of the contract. KPL reserves the right to cancel and terminate the contract for unsatisfactory performance.

7. All notices required to be sent under this Agreement shall be deemed to validly served if sent by prepaid registered post or by courier (with proof of delivery) to the following address:-

**KAMARAJAR PORT LIMITED:**

General Manager(Marine Services),  
Kamarajar Port Limited,  
Vallur Post, Chennai-600120

**Contractor:** Name & Address (to be indicated)

8. In the event of any part/clause of this Agreement is found to be void or unenforceable, the Parties would be entitled to enforce the other clauses and the unenforceability of any clause(s) shall not render this Agreement void.
9. Any amendment or modification to this Agreement shall only be in writing signed by duly authorised representatives of both Parties.
10. The Tender No. KPL/MS/HSE/ENV/CAAQMS/2025 containing all the terms and conditions, Scope of work etc along with the bid of the Contractor and all correspondences connected therewith between KPL and Contractor shall be deemed to include herein and shall form part of this Agreement and shall be binding on the Parties hereto.

IN WITNESS WHEREOF THE PARTIES HERETO HAVE EXECUTED THIS AGREEMENT ON THE DAY, MONTH AND YEAR ABOVE WRITTEN.

Signed  
on behalf of Kamarajar Port Limited.

.....  
In the presence of

Name

Signature

Signed

on behalf of M/s .....

Managing Director/Director

In the presence of

Name

Signature

(Note: The Agreement is to be executed on "TAMIL NADU STAMP PAPER" of minimum value of Rs. 100/-)

NOTE: The Port reserves the right to modify the agreement suitably.

**CONTINUOUS AMBIENT AIR QUALITY PARAMTERS****DAILY REPORTING FORMAT**

TIME (HRS)	Location: _____											Date: _____		
	SO X	NOX	CO	NH3	O3	PM10	PM2.5	BENZEN E	TOLENE	ETHYLE NE	XYLEN E	AMB. NOISE LEVEL	WIND DIREC TION	WIND SPEE D
0-1														
1-2														
2-3														
3-4														
4-5														
5-6														
6-7														
7-8														
8-9														
9-10														
10-11														
11-12														
12-13														
13-14														
14-15														
15-16														
16-17														
17-18														
18-19														
19-20														
20-21														
21-22														
22-23														
23-24														
Std.														
Min														
Max														

**Brief Description of Results of Analysis:****Signature of Contractor Representative**



**CONTINUOUS AMBIENT AIR QUALITY PARAMTERS**

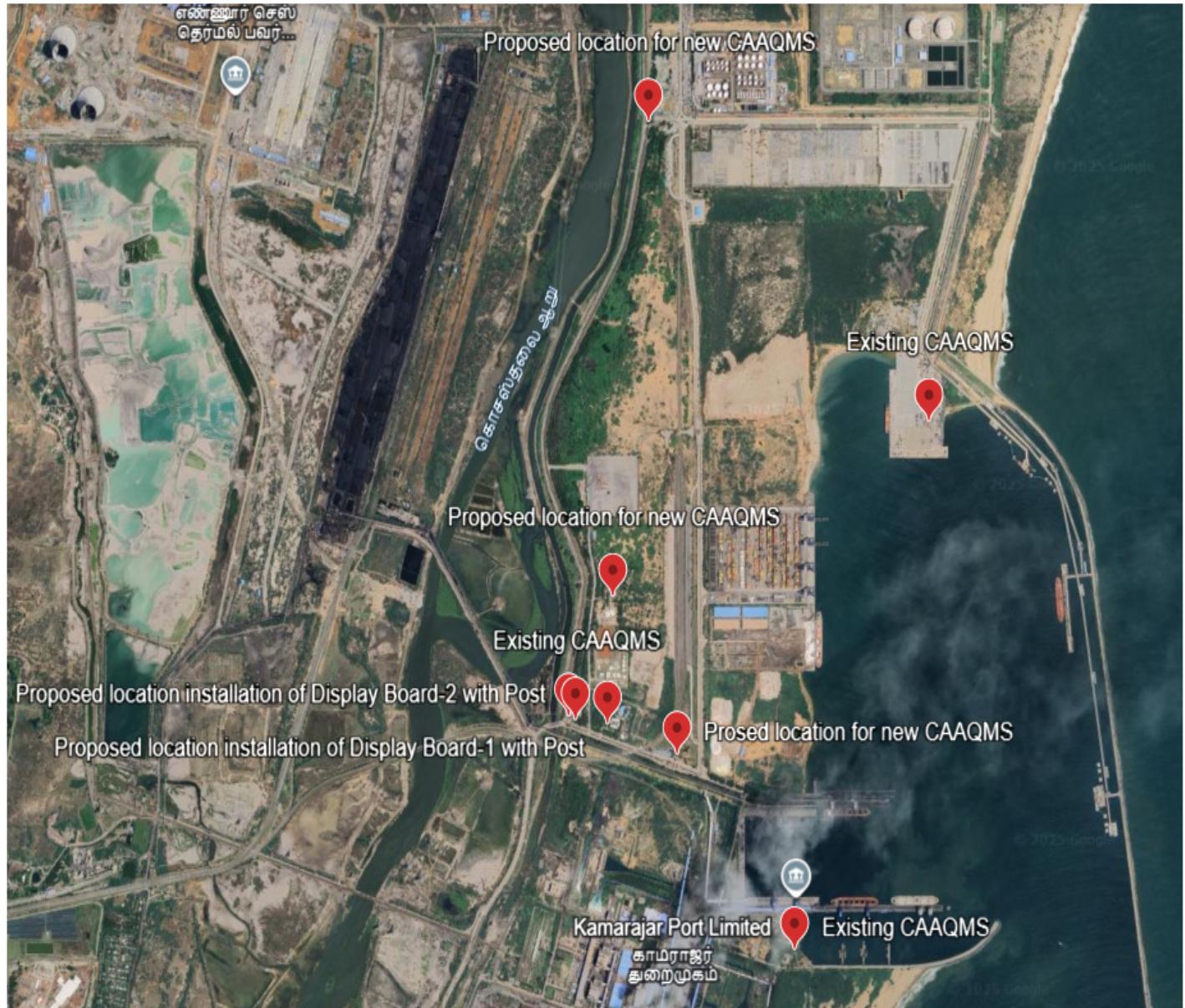
**MONTHLY REPORTING FORMAT**

Day	Location:										Date:				
	SOX	NOX	CO	NH3	O3	PM10	PM2.5	BENZENE	TOLENE	ETHYL ENE	XYLE NE	AMB. NOISE LEVEL	WIND DIRECTION	WIND SPEED	HUMI DITY
1															
2															
3															
4															
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Max															

**Brief Description of Results of Analysis:**

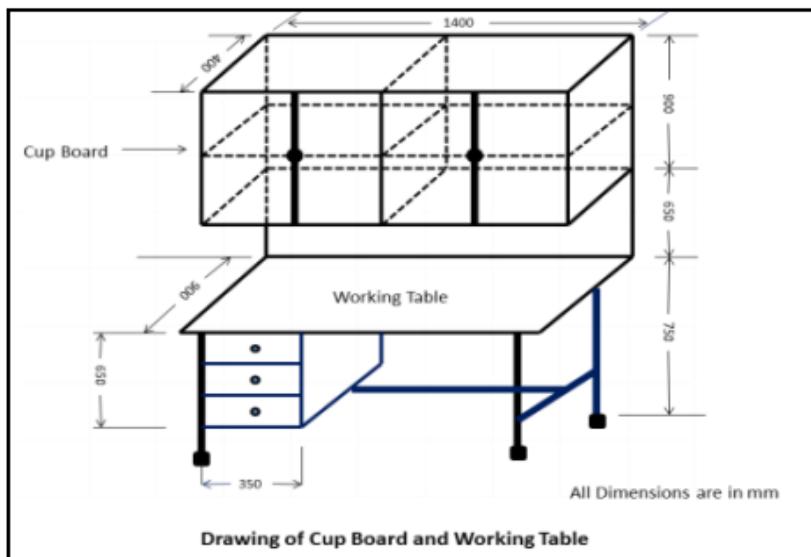
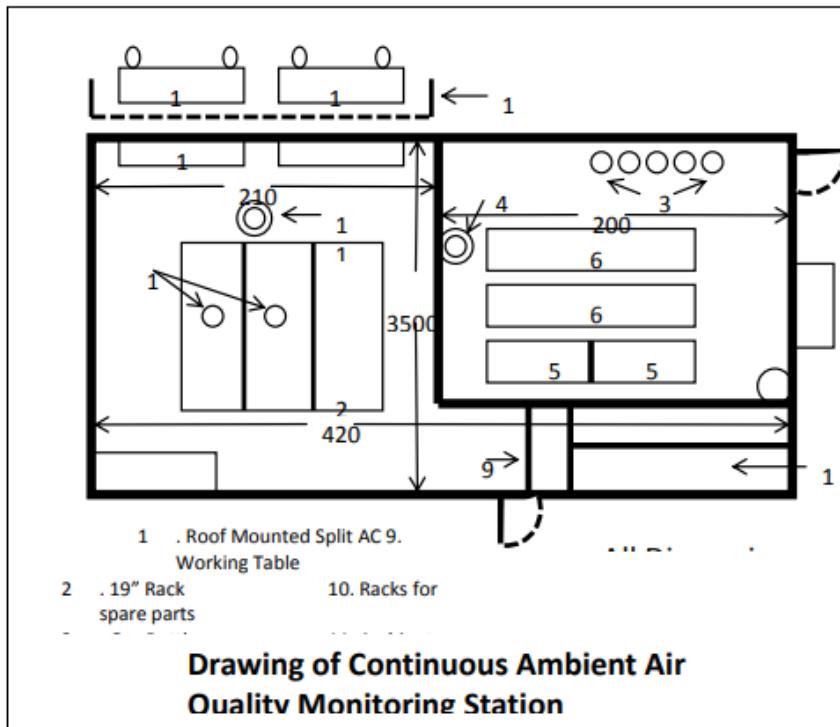
**Signature of Contractor Representative**

**TENTATIVE LOCATION PROPOSED FOR CONTINUOUS AMBIENT AIR QUALITY MONITORING STATIONS & MONITORING DATA DISPLAY BOARDS**



## **APPENDIX-4**

## (A) TYPICAL LAYOUT OF CAAQMS



## (B) Architecture of CAAQM System

