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1 DISCLAIMER

1.1. Though adequate care has been taken in the preparation of this *Request for Proposal* Document, the Bidder should satisfy himself that the Document is complete in all respects. Intimation of discrepancy, if any, should be given to the below mentioned office latest by the date mentioned in Sec.5.7. If this office receives no intimation by the date mentioned in Section 5.7, it shall be deemed that the Bidder is satisfied that the *Request for Proposal* Document is complete in all respects.

Member Secretary
Maharashtra Pollution Control Board
Kalpataru Point, 3rd floor,
Opp. PVR Cinema, Sion Circle
Sion (E), MUMBAI – 22
Ph: 022-24087295
Fax: 022-24024068

1.2. Neither **MPCB,** nor their employees or consultants make any representation or warranty as to the accuracy, reliability or completeness of the information in this RFP nor is it possible for **MPCB** to consider the financial situation and particular needs of each party who reads or uses this RFP. **MPCB** recognizes the fact that certain prospective Bidders may have a better knowledge of the subject matter than others and thus encourages all prospective Bidders to conduct their own investigations and analysis and check the accuracy, reliability and completeness of the information in this RFP and obtain independent advice from appropriate sources.

1.3. Neither **MPCB** nor their employees or consultants will have any liability to any prospective Bidder or any other person under the law of contract, tort, the principles of restitution or unjust enrichment or otherwise for any loss, expense or damage which may arise from or be incurred or suffered in connection with anything contained in this RFP, any matter deemed to form part of this RFP, the award of the Contract, the information and any other information supplied by or on behalf of **MPCB** or their employees, any consultants or otherwise arising in any way from the selection process for the assignment.

1.4. **MPCB** reserves the right to reject any or all of the Bids submitted in response to this *Request for Proposal* at any stage without assigning any reasons whatsoever.

1.5. **MPCB** reserves the right to change any or all of the provisions of this *Request for Proposal.* Such changes would be intimated to all parties procuring this *Request for Proposal.*

2 LIST OF ABBREVIATIONS

MPCB	Maharashtra Pollution Control Board
CPCB	Central Pollution Control Board
PMC	Project Management Consultant
HO	Head Office, MPCB
RFP	Request for Proposal
IMIS	Integrated Management Information System
PBG	Performance Bank Guarantee
LoA	Letter of Award
SP	Service Provider
CAAQMS	Continuous Ambient Air Quality Monitoring Station
OCEMS	Online Continuous Emission Monitoring System

3 DEFINITIONS

3.1 BID
The bids submitted by the prospective Bidders in response to this Request for Proposal Document issued by **MPCB.**

3.2 BIDDER
Bidding Firm / Company that has submitted a Bid in response to this Request for Proposal Document.

3.3 DOCUMENT / BID DOCUMENT
This Request for Proposal Document.

3.4 PROJECT
To select an appropriate IT Service Provider (SP) for “Development of web-Services Portal” for Maharashtra Pollution Control Board

3.5 REQUEST FOR PROPOSAL
This Document being issued to the prospective Bidders, inviting their Bids.

3.6 RESPONSIVE BIDDER
Responsive Bidder is the bidder whose bid is found responsive after evaluation of the Bid as outlined in Section 5.2.

3.7 SERVICE PROVIDER
The successful bidder selected after Technical and Price bid evaluation of bids and which completes all the formalities such as accepting the LoA, signing of the contract and furnishing the requisite guarantees as per the RFP terms.

3.8 SUCCESSFUL BIDDER
The highest ranked bidder on the basis of compound score after technical and price bid evaluation of bidders.

4 PROJECT CONCEPT & STRUCTURE

4.1 BACKGROUND

Maharashtra Pollution Control Board (MPCB) is an organization under the Environment Department, Government of Maharashtra. The Board is responsible for ensuring that all norms under the Pollution Control Act as stated by the Ministry are adhered to by all relevant establishments in Maharashtra, which can, through their operations or processes, influence the natural environmental conditions.

The Board has deployed Integrated Management Information System (IMIS) – an integrated e-governance application for automation of their various processes and workflows, such as consent management, cess management, waste management, etc.

The IMIS is rolled out at all field offices of the Board and the same is accessed through IT infrastructure deployed at these offices. As a part of IMIS rollout, the Board has commissioned a Data Centre facility at HO.

Various Online Application forms, Annual Reports, Annual Returns are received at MPCB from various Industries which needs to be analysed by comparing the Consent / Authorization form related information with Annual Returns submitted by the Industries.

MPCB has made tremendous efforts in visualising the need for environmental monitoring along with information collation from various point and non point sources in the past and thereby making efforts to establish a network of monitoring stations all across the state of Maharashtra. It actually covers about 72 such air quality stations including 10 Continuous Ambient Air Quality Monitoring Station (CAAQMS), 250 water quality monitoring stations including those involved in generating WQI for surface as well as ground water. Other than these, there are various CAAQMS, OCEMS & manual monitoring carried for industrial sources including ETP, STP & Stacks. Other than these, information regarding solid, hazardous & Bio medical waste is regularly collected and collated from local bodies, industries, CHWTSDF, CETP, BMW facilities and other such institutions on a regular basis. Event based monitoring is also carried out in order to understand environmental behaviour during such events. MPCB makes an attempt to publish these data and its limited analytics & interpretation though such tasks pose a humongous challenge in terms of creating a continuous & real time analytics for direct use in compliance monitoring.
Hence, the need of implementing Data Analytics and Artificial Intelligence tools for analyzing the entire Data pattern and initiate predictive Data Analysis. The detailed scope is mentioned in the ToR attached on **Annexure - 3**.

4.2 OBJECTIVES

It is observed of-late that the environmental information is not easily generated and involves huge resources. As there are limitations in regular supervision or quality control checks on operation of these monitoring stations and data generated, the concept of Environmental Quality Indices was introduced to cater to this specific need & subsequent

information dissemination on the MPCB website. Compliance needs are changing each day and with the quality of environment being felt as compromised due to characteristic changes in population x affluence x technology, data such obtained needs to be urgently utilized to meet its objectives of decision making.

Thereby, the concept of utilizing this data in a usable form has become utmost important from the perspective of converting it into information through interpretation and ultimately putting it to effective use to attain the overall objective of strategy development for environmental pollution abatement & then for further dissemination. The proposed project intends to cover this basic aspect of data transformation into information & knowledge via use of fundamental statistical & predictive analysis tools thus, forms an integral part of the desired objective and probably one of the most important steps for effectively addressing the objective of policy planning & efficient, understandable & acceptable communication.
The objective shall revolve around creating a Data analytics and Artificial Intelligence based solution that would enable pool of options for analysis and decisions for betterment of environmental quality in Maharashtra as a whole. The solution addresses the need

- To assess, evaluate & transform environmental quality data interpreted, meaningful information through application of fundamental & advanced data analysis methodologies for MPCB owned data
- Extract data from registration forms and correlate it against other submission documents, to cross link & perform dependency analysis of environmental / source attributes to evaluate environmental quality
- Predictive analysis & pattern recognition analysis for compliance behaviour of point & non point sources
- Establish an Early Warning System (EWS) to mitigate any possible environmental failures
- Creating decision support system for strategic policy / action plan for environmental attributes [Analysis of Alternatives with Benefit Analysis]

4.3 CURRENT IT INFRASTRUCTURE SETUP

The MPCB website is currently developed using the following software and tools

- Operating System : Linux Operating System
- Database : MySQL
- Web server : Apache
- Scripting Language : PHP5
- Data Format : XML, Unicode

The IMIS application works on Windows platform and uses SQL Database.

Currently all the Regional and sub- Regional Offices are connected to MPCB HO through MPLS VPN. Internet connectivity is provided to MPCB users through a secured single gateway at MPCB HO.

4.4 SCOPE OF WORK

The detailed Scope of Work is mentioned in the attached as **Annexure - 3** of this RFP. The broad deliverables as capabilities of the decision support system are mentioned here for the benefits of the bidders. The Intelligent Decision Support System should

- Compare production/Waste Generation & Disposal details submitted in consent applications with the details submitted in Environment Statement (Form V) and highlight discrepancies w.r.t applications

- Compare production/waste generated & disposal details submitted in consent applications with the details submitted in Annual Reports (Hazardous Waste/Bio-Medical Waste/E-Waste etc.) and highlight discrepancies w.r.t applications

- Prevent Duplicate registration & application based on reading the mandatory files uploaded by industries (Which are in PDF format)

- Parameter values captured in Online Continuous Emission Monitoring System (OCEMS) should be compared with the standards mentioned in consent and **exceedance**, anomalies should be highlighted

- Generate comparative & consolidated reports region wise after comparison of all the parameters in Consent, Authorizations & OCEMS portal

- Should analyse the relevant parameters of data through OCEMS to establish a trend of pollution and give predictive analysis for a defined time-frame/s in the future

- Should offer a Management dashboard view of the important statistical analysis for alerts and decision making.

4.5 CONTRACT PERIOD

The entire project is expected to be completed in 45 weeks. The Pilot of the project should be completed within 11 weeks from the date of the work Order / Contract.

5 DESCRIPTION OF THE SELECTION PROCESS

5.1 SUBMISSION OF BIDS

The submission of Bids by interested bidders in response to the Request for Proposal should be through e-Tender system only as mentioned in Annexure 5. The Bids will be

Envelope 1 / Cover 1: Technical Bid
Envelope 2 / Cover 2: Price Bid.

5.2 RESPONSIVENESS OF BID

The Bids submitted by Bidders shall be initially scrutinized to establish “Responsiveness”. A Bid may be deemed “Non-responsive” if it does not satisfy any of the following conditions:

1. It is not received by the due time & date specified in the section 5.7 and Annexure - 5
2. It does not include EMD as stipulated in the RFP
3. It does not include sufficient information for it to be evaluated and/or is not in the formats specified.
4. It is not signed and / or submitted in the manner and to the extent indicated in Section 6 and Annexure 5 of this RFP Document.
5. It does not conform to the terms and conditions mentioned in the RFP

The Bids of Responsive Bidders shall be evaluated in the following two steps.

5.3 STEP 1 (COVER 1) – TECHNICAL BID EVALUATION

In the first step, MPCB will evaluate the information submitted by the Bidder in Cover 1 of the Bid. Bids of only the responsive Bidders shall be considered for the subsequent technical evaluation. The evaluation criteria for assessment of the Technical Bid are described in Section-7. Of the RFP, on a written demand, will return unopened, the Cover 2 of the Bid, viz: the Price Bid, to the Bidders whose Bids are not responsive.

5.2 STEP 2 (COVER 2) – PRICE BID AND PRICE BID EVALUATION

The Price Bid would seek to identify the Bidder making the most competitive price offer to MPCB. The evaluation criteria for assessment of the Price Bid are described in Section - 8. The format for the Price Bid is specified in **Annexure - 2**

A ranked list of Bidders based on the results of the evaluation, as detailed in Section-9 of this Document, would be presented. The top ranked Bidder will be designated the Successful Bidder. MPCB is not bound to award a LoA to the lowest price bidder.

5.3 LETTER OF AWARD

Successful Bidder would be given a Letter of Award (LoA) stipulating the conditions under

which the bid has been qualified as the Successful Bid.

5.4 SIGNING OF ORDER ACCEPTANCE

The Successful Bidder would sign a copy of the Purchase / Work Order as a token of acceptance of the same.

5.5 SCHEDULE OF ACTIVITIES

Sr. No.	ACTIVITY	Date
1.	Date of Start of Sale of RFP document	1st February 2020
2.	Date of End of Sale of RFP document	10th February 2020
3.	Last date for receipt of requests for clarifications to be addressed in Pre-bid meeting	1700 Hrs 11th February 2020
4.	Date and time for Pre-bid Meeting	16:00 Hrs 12th February 2020
5.	Last time & date for receipt of eBids (Containing Covers 1 & 2)	1500 Hrs 14th February 2020
6.	Time and Date of Opening of Cover-1	1100 Hrs 18th February 2020
7.	Date for presentations by the Bidders	1430 Hrs 18th February 2020

In order to enable MPCB to meet the target dates, Bidders are expected to respond expeditiously to clarifications, if any, requested during the evaluation process. MPCB shall adhere to the above schedule to the extent possible. MPCB, however, reserves the right to modify the same. Intimation to this effect shall be given to all Bidders.

6 PROCEDURES TO BE FOLLOWED

6.1 ENQUIRIES & CLARIFICATIONS

Enquiries, if any, should be addressed to:

Member Secretary
Maharashtra Pollution Control Board
Kalpataru Point, 3rd floor,
Opp. PVR Cinema, Sion Circle,
Sion (E), MUMBAI – 400 022
Ph: 022-24087295
Fax: 022-24024068

All queries that are received on or before the date mentioned in Section 5.7 shall be addressed by MPCB in writing. MPCB shall aggregate all such queries, without specifying the source and shall prepare a response, which shall be distributed to all parties who have procured the Request for Proposal Document. It may be noted that queries in writing would be entertained only from those parties who have procured this Document.

Request for clarifications received after the last date mentioned in Section 5.7, may not be addressed. Decision of the Board in the matter will be final.

Sr. No	RFP Page No	RFP Clause No	Description in RFP	Clarification Sought	Additional Remark (if any)

6.2 SUBMISSION OF THE BID

1. Cover 1 – Technical Bid

   The information to be submitted by the Bidders as Cover 1 of their Bids is described in Section 7 and Annexure 5.

2. Cover 2 – Price Bid

   The Information to be submitted by the Bidders in the Price Bid (Cover 2) is described in Section 8 and Annexure 5.

3. Submission of the Bid

   The Bidders are requested to follow the Bid submission process which is detailed in Annexure 5 as per the schedule elaborated in Section 5.7 and Annexure 5.

   MPCB shall not be responsible for any delay in submission of the Bids. Any Bid received by MPCB after the due date for submission of the Bids stipulated in Section 5.7 and Annexure 5, will not be opened.

6.3 INITIALING OF THE BIDS

Each page of the Bid should be stamped and initialed by the Authorized Representative and Signatory (as defined in Section 6.4), of the Bidder.

6.4 INSTRUCTIONS TO BIDDERS

All Bidders should note the following:

1. Bids received after the scheduled time will not be accepted by MPCB under any circumstances. MPCB will not be responsible for any delay for any reason whatsoever.

2. Bid once submitted will be treated, as final and no further correspondence will be entertained on this. No Bids will be modified after the deadline for submission of Bids.

3. Bid*s* that are incomplete in any respect or those that are not consistent with the requirements as specified in this *Request for Proposal* or those that do not contain the Covering Letter and other documentation as per the specified formats may be considered non-responsive and may be liable for rejection.

4. Strict adherence to formats, wherever specified, is required. Non-adherence to formats may be a ground for declaring the Bid non-responsive.

5. All communication and information should be provided in writing and in the English language only.

6. The metric system shall be followed for units.

7. The price quotations for the bid should be denominated in Indian Rupees.

8. All communication and information provided should be legible, and wherever the information is given in figures, the same should also be mentioned in words.

9. Arithmetical errors will be rectified as follows –

    a. If there is a discrepancy between the unit price and the total price that is obtained by multiplying quantities, the unit price will prevail
    b. In case of discrepancy between grand total obtained by adding various line item totals & the grand amount stated in words, the grand total will be recalculated and the same will be taken as correct.
    c. The price bid will be treated as inconsistent & non-responsive, in case if more than one type of discrepancy is observed in the price bid. Such price bid/s will be rejected summarily and considered as intentional misrepresentation and the EMD will be forfeited.

10. MPCB reserves the right to seek additional information from the Bidders, if found necessary, during the course of evaluation of the Bid. Non-submission, incomplete submission or delayed submission of such additional information or clarifications sought by MPCB, may be a ground for rejecting the Bid.

11. The Bids shall be evaluated as per the criteria specified in this RFP Document. However, within the broad framework of the evaluation parameters as stated in this Request for Proposal, MPCB reserves the right to make modifications to the stated evaluation criteria, which would be uniformly applied across all the Bidders.

12. The Bidder should designate one person ("Contact Person" and "Authorized Representative and Signatory") authorized to represent the Bidder in its dealings with MPCB. The Acknowledgement of Receipt of Request for Proposal Document shall be signed by the "Contact Person" and "Authorized Representative and Signatory". This designated person should hold the Power of Attorney and be authorized to perform all tasks including but not limited to providing information, responding to enquiries, entering into contractual commitments on behalf of the Bidder etc. The Covering Letter submitted by the Bidder shall be signed by the Authorized Signatory and shall bear the stamp of the entity thereof.

13. The Bid (and any additional information requested subsequently) shall also bear
    the initials of the Authorized Signatory and stamp of the entity thereof on each page of the Bid.

14. MPCB reserves the right to reject any or all of the Bids without assigning any reason whatsoever

15. Conditional bids may be summarily rejected.

16. Mere submission of information does not entitle the Bidder to meet an eligibility criterion. MPCB reserves the right to vet and verify any or all information submitted by the Bidder.

17. If any claim made or information provided by the Bidder in the Bid or any information provided by the Bidder in response to any subsequent query by MPCB, is found to be incorrect or is a material misrepresentation of facts, then the Bid will be liable for rejection and the Bid Security will be forfeited. Mere clerical errors or bona fide mistakes may be treated as an exception at the sole discretion of MPCB and if MPCB is adequately satisfied.

18. The Bidder shall be responsible for all the costs associated with the preparation of the Bid. MPCB shall not be responsible in any way for such costs, regardless of the conduct or outcome of this process.

19. MPCB may, at its discretion, extend this deadline for submission of Bids by amending the RFP which will be intimated through MPCB website, in which case all rights and obligations of MPCB and bidder will thereafter be subject to the deadline as extended.

6.5 VALIDITY OF THE PRICE BID

Each Bid shall indicate that it is a firm and irrevocable offer, and shall remain valid and open for a period of not less than 180 days.

However, MPCB may solicit the Bidder's consent for extension of the period of validity if the Bidder agrees to reasonably consider such a request. The request and response shall be in writing. A Bidder accepting MPCB's request for extension of validity shall not be permitted to modify his Bid in any other respect.

6.6 FEES AND DEPOSITS TO BE PAID BY THE BIDDERS

6.6.1 Fees for Request for Proposal (RFP) document

The RFP can be purchased by making a payment (non-refundable) of Rs. 10,000.00 (Ten Thousand only) through online payment. Please refer Annexure 5 of this document for the payment methodology.

It is mandatory for the bidders to produce the proof of purchase of the RFP document to attend the pre-bid meeting. Prospective bidder failing to pay the fee for the RFP during the sale of RFP document will neither be allowed to attend the pre-bid meeting nor will their bid be accepted.

6.6.2 Earnest Money Deposit (EMD)

Bidders are required to submit a Earnest Money deposit (EMD) for an amount of Rs. 5,00,000.00 (Rupees FIVE Lakhs Only) Please refer Annexure 5 for the payment of the same. Bids of the bidders who have not paid the EMD as stipulated in this RFP, will be rejected by MPCB as non-responsive. No exemptions to this clause will be allowed.

MPCB shall reserve the right to forfeit the Bidder's EMD under the following circumstances:

1. If the Bidder withdraws his Bid at any time during the stipulated period of Bid validity as per Section 9.1 (or as may be extended).

2. If the Bidder, for the period of Bid validity:

   i) in MPCB's opinion, commits a material breach of any of the terms and / or conditions contained in the RFP Document and / or subsequent communication from MPCB in this regard and / or
   ii) fails or refuses to execute the LoA (in the event of the award of the Project to it) and/or
   iii) fails or refuses to furnish the Service Performance Guarantee within the stipulated time

3. Any claim made or information provided by the Bidder in the Bid or any information provided by the Bidder in response to any subsequent query by MPCB, is found to be incorrect or is a material misrepresentation of facts

In the event that any Bid is non-responsive or rejected after technical evaluation, the EMD of such Bidders shall be refunded without opening Cover – 2 of their Bid.

In respect of the bids after Technical Evaluation and eligible for price bid evaluation, the EMD of the unsuccessful Bidders (after opening of Cover 2) can cease to be in force after 60 days following the announcement of award of the Project to the Successful Bidder through the issue of the LoA for the same. The EMD of the successful Bidder will be returned only on submission of SPBG that Successful Bidder will provide at the time of signing Order acceptance & the SLA. EMD of the unsuccessful bidders will be returned after 45 days of award of contract.

7 SUBMISSION OF TECHNICAL BID: COVER - 1

7.1 CRITERIA FOR MINIMUM ELIGIBILITY AND BID RESPONSIVENESS:

The Bidder shall fulfill the following Minimum Eligibility Criteria to participate in the bidding process. The Bidder should provide necessary documentary evidences of compliance as follows. Failure to do so for any of the Criteria mentioned below shall result in disqualification of the Bidder.

1. The Bidder can be a single bidder or a consortium and should be a corporate entity (in case of consortium, at least one of the bidders), public or private limited company registered / incorporated under The Companies Act, 1956, and in business of Software development for minimum THREE (3) years would be eligible to bid for the Contract. The bidder should be registered with GST authorities.

2. In case the bidder is a consortium, the consortium can be of maximum THREE (3) entities with at least one of them having a registered office in India. In case of consortium, a consortium agreement between the consortium members must be submitted as a part of the minimum eligibility criteria.

3. The bidder should have an annual turnover of Minimum Rs. 1 crore or equivalent currency, in the latest financial year. In case of consortium, the turnover criteria to be fulfilled by at least one of the consortium members.

4. The Bidder or at least one of the consortium members should have minimum ONE (1) development centre in Maharashtra

5. The bidder or at least one of the consortium members should have executed (completed) at least one (contract/Work Order) in the past five years ending 31st March 2019 for Artificial Intelligence / Data Analytics

6. The Bidder should have purchased the RFP by paying the online fees for the same as stipulated in the RFP.

7. The bidder should have paid the EMD as stipulated in the RFP.

7.2 COVER 1: INFORMATION FORMATS

Bidders are required to organize Cover-1 as per the following checklist -

Cover 1	Compliance to Minimum Eligibility Criteria and Technical Bid
Section 1	a) Covering Letter as per the format specified in EXHIBIT 1 b) Consortium agreement, in case of consortium c) Attested copy of Power of Attorney d) Original Receipt of fees for RFP issued by MPCB as per section 6.6.1 e) EMD as per section 6.6.2 f) Certificate of incorporation / GST registration g) Self declaration about the address of the development center in Maharashtra h) Copies of orders in compliance section 7.1 (5)
Section 2	a) Documentary Proofs as testimony for Evaluation of Technical bids as per criteria listed in Section 7.4.1 b) List of resources to be deployed for this assignment, if the contract is awarded to the Bidder. The list should include Name of resource, qualification, experience. A proposed organisation structure should be provided. c) Detailed write-up about methodology of executing the contract. This should also include the schedules highlighting major milestones and respective deliverables.

7.3 TECHNICAL BID - COVER 1

The Cover 1 submission will also include Technical Bid of the bidder.

1. The technical bid should be in line with the scope of work defined earlier in the RFP

2. The bid should explain proposed methodology for undertaking the contract as envisaged in the RFP document. Proposed schedule with major milestones and respective deliverables should be explained as a part of this methodology.

3. List of resources to be deployed for this assignment, if the contract is awarded to the Bidder. The list should include Name of resource, qualification, experience and tenure with the current organization.

4. The bid should have all relevant testimonials, so as to ensure they score maximum marks under the evaluation system defined in section 7.4.1

7.4 TECHNICAL BID: EVALUATION CRITERIA & PROCESS

The Bidder shall necessarily submit in Cover 1 of the Bid Document, the Technical Bid detailing his credentials for executing this project and the highlights of the equipment & services offered by him with respect to scope of work defined in the Bid Document and the benefits that would accrue to MPCB. The Screening Committee appointed for this purpose will do this evaluation. The Technical Bid will contain all the information required to evaluate

the bidder's suitability to MPCB for the purpose of this project.

The guidelines for evaluation have been designed to facilitate the objective evaluation of the Technical Bid submitted by the bidder. The information furnished by the bidders in the technical bid shall be the basis for this evaluation. In case any of the information is not made available, the Committee will assign zero (0) marks to that item.

While evaluating the Technical Bid, MPCB reserves the right to seek clarifications from the Bidders. Bidders shall be required to furnish such clarifications in a timely manner.

MPCB also reserves the right to seek additions, modifications and other changes to the submitted Bid. Bidders shall be required to furnish such additions / modifications / other changes in a timely manner.

The technical evaluation of the bidders will be done based on the criteria and marking system as specified as follows:

7.4.1. Evaluation of Technical Bid

Sr. No.	Criteria	Graded Marks	Max Marks	Testimonial to be presented
1	Specific experience of bidder related to Project		20	Copies of Orders and Synopsis of the project giving key highlights
a.	Number of orders executed having AI / ML as main domain		5	
	Orders > **5**	5		
	Orders < 5	3		
b.	Number of Orders for AI / ML each having records > 1 million with accuracy > 95%		5	
	Orders = 1	1		
	Orders / assignments = 2	3		
	Orders / assignments > 2	5		
c.	Number of Orders for AI / ML each having query parameters (field attributes) > 100		5	
	Orders / assignments > 1 but < 3	1		
	Orders / assignments > 3 but < 5	3		
	Orders / assignments > 5	5		
d.	Orders involving AI / ML executed in Govt / Semi Govt / PSU		**3**	
	Orders = 1	1		
	Orders / assignments = 2	2		
	Orders / assignments > 2	3		
e	Experience of working with Pollution Control Boards / Pollution Departments		**2**	
2	Adequacy of the Bidder's proposed work plan in response to RFP		30	Detailed Technical Bid and Plan on the lines of structure presented here
a.	Understanding the Scope of Work and MPCB objectives	5		
b.	Approach & Methodology suggested:			
	Uniqueness / innovative approach suggested and its benefits to MPCB:		10	
	Techniques proposed	5		
	Product / modelling	3		
	Quality Assurance Methodology	2		
	Application of similar approach - case study		5	
c.	*Institutionalization of the approach at MPCB.*		5	
d.	*Adequacy of the proposed work plan*		5	
3	Qualifications and competence of the key professional staff for the assignment		40	CVs of proposed personnel. MPCB reserves right to
a.	Team Leader / Delivery Head	10		

b.	Sr. ML /AI Engineer, Architect (Min 2)	15		interview the candidate
c.	Environment Expert	10		
d.	Data Analyst / Engineer (Min 5)	5		
4	Presentation to MPCB about project execution		10	To be given by Team Lead, Environment expert
	Total Score		**100**	

Notes:

The CVs of the proposed team members of each of the bidders will be evaluated by on the following parameters. The percent distribution of points for qualifications and competence of the key professional staff for the assignment are:

Educational qualifications	30%
Relevant experience for the project	70%

Sr.	Key professionals	Min Qualifications	Area of Specific Expertise
1	Team Leader	Post Graduate / Engineering / similar field with 7 - 10 years' experience	Experience in **Similar** projects ottechnology transformation with leadership qualities to lead the team effectively. Experience in DB Architcture, SQL, AWS, GCP, etc.
2	Sr. ML / AI Engineers, Architects **(Minimum 2)**	Post Graduate (Technical) / PHD in Machine Language / Mathematics / Statistics with 7-10 years' experience	Hands on experience in developing and deploying solutions involving Artificial Intelligence based projects, complex text analytics, pattern recognition, big data analysis, semantics, etc.
3	Environment Expert **(Minimum 1)**	Post Graduate with 10 years' experience	Experience in environment & natural resource sector. Ability to guide analytical and strategic inputs with relevance and refernce to Pollution Control Board
4	Data Analyst / Engineers **(Minimum 5)**	Post Graduate (Technical) in Machine Language / Mathematics / Statistics with 2-3 years' experience	Experience in NLP / NLG techniques with experience in text analytics, deep learning techniques. Technology skills include classification, regression, generation, clustering, transfer learning,RNN, CNN, GAN, etc.

Each responsive Bid will be attributed a **technical score denoted by symbol "S(t)" .** The technical score shall be out of a maximum of 100 marks.

If in MPCB's opinion, the Technical Bid does not meet the minimum technical specifications & service requirements or is otherwise materially deficient / inconsistent in any other aspect; the Bid shall be declared Technically Evaluated & Non-Responsive and shall not be considered for further evaluation.

After technical evaluation, MPCB will rank the bidders in descending order of their technical scores with the top ranked bidder having the highest technical score. If any bidder is found to be technically inadequate to the requirements of MPCB, i.e. if S(t) < **75**, then that bidder's bid would be deemed non-responsive for further evaluation and would not be considered further in the bidding process.

If in case, after technical evaluation, only one bidder is found to be responsive & eligible, i.e. if the technical marks of only one bidder are more than or equal to **75**, the Board will decide an acceptable price band and open Price Bid of the only eligible bidder. If the price bid of the bidder falls within the price band specified by the Board, the bidder will be declared as the SUCCESSFUL BIDDER.

8 EVALUATION OF PRICE BID: COVER 2

8.1 PRICE BID PARAMETERS

Bidders are required to offer their best prices in terms of cost of the Services including all taxes and levies as on the last date of submission of bid (detailed break-up of all applicable taxes and levies over and above the quoted price should be mentioned)

8.2 EVALUATION OF PRICE BIDS AND RANKING

The price bids of only technically successful bidders whose technical Bids have been awarded **75** or more marks will be opened.

The evaluation will be carried out if Price bids are complete and computationally correct.

Lowest Price bid denoted by symbol "P (m)" will be allotted a Price score of 100 marks. The Price score of all the bidders will be denoted by the symbol "S (p)". The Price score of other bidders will be computed by measuring the respective weighted Price bids against the lowest bid i.e. P (m)

These Price scores will be computed as: S (p) = 100 * (P (m) / P(b)) where P(b) is the weighted Price bid of the bidder whose Price score is being calculated. The Price score shall

be out of a maximum of 100 marks.

8.3 COMPUTING THE FINAL SCORE

The composite score is a weighted average of the Technical and Price Scores. The weightages of the Technical vis-à-vis the Price score is **0.75** of the Technical score and **0.25** of the Price score. The composite score (S) will be derived using following formula:

S = (S (t) * 0.75) + (S (p) * 0. 25).

Thus, the composite score shall be out of a maximum of 100 marks and will be computed up to TWO (2) decimal points.

The responsive bidders will be ranked in descending order according to the composite score as calculated based on the above formula. The highest-ranking vendor as per the composite score will be selected. However in order to ensure that MPCB gets best solution in technical terms, MPCB reserves the right to enter into negotiation with bidder having highest technical score and place order with this bidder at a suitable price.

8.4 AWARD CRITERIA

Final choice of MPCB to award this project to a suitable bidder to execute this project shall be made on the basis of composite scoring arrived as per formula mentioned above.

The Bidder having the highest Composite Score will be termed as the Successful Bidder.

In case, two or more bidders have the same composite scores, the Bidder with the highest technical score will be declared as the successful bidder.

In case, two or more bidders have the same composite scores & technical scores, MPCB will decide further criteria of evaluation, which will be binding on all bidders to accept without contest.

8.5 NOTIFICATION OF AWARD

MPCB will notify the successful bidder in writing that his bid has been accepted. Within 10 days of such intimation from MPCB, the successful bidder has to convey the acceptance of LoA issued by MPCB along with the signed Contract Agreement. The successful bidder will also furnish the required performance security as mentioned in section 9.2 (1) of this RFP.

MPCB will promptly notify each unsuccessful bidder and will discharge their bid security.

9 PAYMENT TERMS

9.1 The Price Bid should be valid for a minimum period of 180 days from the last date of submission of bids

9.2 Following payment terms will be offered to the successful Bidder:

1. Within 15 days of signing the Purchase Order / Work Order Acceptance the Successful bidder shall submit at its cost, charges and expenses, a Performance Bank Guarantee (PBG) for an amount equivalent to 10% of the value of the contract in favour of MPCB. The PBG shall be in the form of a guarantee/s of a Nationalised Bank acceptable to MPCB and shall be valid initially till SIX (6) months from the date of work order / contract and to be renewed at the time of every extension of the contract.

2. The stage-wise payment will be given to the Service Provider as per the table below

Milestone #	Milestones and Deliverables	Time Frame in weeks	% of order value
1	**Exploration, estimation and Planning**	**T + 2**	**20**
a	Understanding current tech stack and finalising new tech stack		
b	Exploratory data analysis and presenting findings		
c	Finalisation of		
	Parameters for modelling		
	Backend Architecture		
	Models Approach		
	Front-end wire-frames		
2	**Pilot Project**	**T + 11**	**25**
a	Defining the boundaries for Pilot project		
b	Prototype application with data		
c	Pilot acceptance by MPCB		
3	**Execution**	**T + 30**	**35**
a	Data de-duplication / hygiene		
b	Data migration, collection scripts working and deployed		
c	Models developed and deployed		
4	**Testing**	**T + 34**	**15**
	Final user acceptance testing finalised		
5	**Handover**	**T + 45**	**5**
	Code handover and knowledge transfer		
	TOTAL	**45**	**100**

All payments will be made nett of taxes and after deduction of penalties, if any, within 30 days of submission of invoice.

9.3 Liquidity Damages and Penalty:
For any delay in completion of the assignment in the period as mentioned in section 4.6, the Board reserves the right to charge an LD (Liquidated Damages) at the rate of 1% of the contract value per week of delay or part thereof, subject to a maximum of 10%.

10 INDEMNIFICATION

The bidder hereby agrees and undertakes that, during the Term of the Contract, it shall indemnify and keep indemnified and otherwise save harmless, MPCB from any third party suits instituted against MPCB which are proved to be because of a direct consequence of the installation and / or use of equipment & services provided by the successful bidder.

11 ASSIGNABILITY

The successful bidder will not assign its rights, title or interest in the contract in favour of any third party without prior written consent of MPCB. MPCB reserves its rights to grant such consent on such terms and conditions, as it deems fits and proper. MPCB's decision to grant such consent or refusal to grant such consent shall be final.

12 CONFIDENTIALITY

Successful Bidder shall hold data and information about MPCB, obtained during the execution of its responsibilities, in strict confidence and will not reveal such information to any other party without the prior written approval of MPCB.

Successful Bidder and MPCB shall maintain in confidence any information relating to the terms and conditions of this contract, information received from each other hereto in connection with this agreement as well as the business operations and affairs of MPCB or the successful bidder and their affiliates and shall not provide access to such information to any third party. A Non-Disclosure Agreement (NDA) will be executed and the obligations mentioned therein shall expire 2 years after completion of the contract.

13 INTELLECTUAL PROPERTY RIGHTS (IPR):

The vendor will have to submit source code required documentations to the Maharashtra Pollution Control Board and Maharashtra Pollution Control Board will have full rights over the source code and IPR shall belong to Maharashtra Pollution Control Board and vendor will not possess any rights. On changes in the source code or documentation the vendor will have to provide source code / documentation to the Maharashtra Pollution Control Board from time to time. The vendor shall ensure due secrecy of information and data not intended for public distribution.

14 SECURITY AGAINST INFRINGEMENT OF THIRD-PARTY RIGHTS:

The vendor will ensure the Maharashtra Pollution Control Board is protected against all claims of infringement of third party Rights because of any action attributable to the vendor. As soon as such claims arise, the vendor will act immediately to extinguish all such claims & purchase such licenses at their own cost. All incidentals & court fees in this regard will be solely borne by vendor himself.

15 CORRUPT & FRAUDULENT PRACTICES

MPCB requires that the bidder under this RFP document maintains highest standards of ethics during procurement and execution of this project. In pursuance of this policy the board defines the terms set forth as follows

"Corrupt practice" means offering, giving, receiving or soliciting of anything of value to influence the action or decision making of public official in the procurement process or execution of the project.

"fraudulent practice" means misrepresentation of facts in order to influence the action or decision making of public official in the procurement process or execution of the project to the detriment of the board, and includes collusive practice among bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the board the benefits of free & open competition.

If it is determined that bidder / s are engaged in corrupt & fraudulent practices their bid/s will be rejected and also will be declared ineligible for indefinite period or a stated period to time to participate in any future RFP floated by MPCB.

16 ARBITRATION

All disputes, differences, claims and demands arising under or pursuant to or touching this document shall be settled by arbitration of sole arbitrator to be appointed by both the parties and failing such agreement, by two arbitrators, one to be appointed by each party to disputes. All arbitrations shall be held at Mumbai location.

17 LEGAL JURISDICTION

All legal disputes are subject to jurisdiction of Mumbai courts

EXHIBIT 1: FORMAT OF THE COVERING LETTER

(The covering letter is to be submitted by the Bidder along with the Cover 1 of the Bid on Bidder's Letterhead)

Date:
Place:

To

Member Secretary
Maharashtra Pollution Control Board
Kalpataru Point, 3rd floor,
Opp. PVR Cinema,Sion Circle,
Sion (E), Mumbai – 22

Dear Sir,

Sub: Selection of **Solution Provider (SP) for "Development of Intelligent Decision Support System" for Maharashtra Pollution Control Board**

Please find enclosed our Bid for "**Development of Intelligent Decision Support System**" in response to the Request for Proposal (RFP) Document issued by **MPCB** dated ……...
We hereby confirm the following:

1. The Bid is being submitted by *(name of the* Bidder) who is the Bidder in accordance with the conditions stipulated in the RFP.
2. We have examined in detail and have understood the terms and conditions stipulated in the RFP Document issued by **MPCB** and in any subsequent communication sent by **MPCB.** We agree and undertake to abide by all these terms and conditions. Our Bid is consistent with all the requirements of submission as stated in the RFP or in any of the subsequent communications from **MPCB**.
3. We have enclosed the EMD as per the RFP terms.
4. The information submitted in our Bid is complete, is strictly as per the requirements as stipulated in the RFP and is correct to the best of our knowledge and understanding. We would be solely responsible for any errors or omissions in our Bid.
5. We as the Bidder, designate Mr /Ms (mention name, designation, contact address, phone no., fax no., etc.), as our Authorized Representative and Signatory who is authorized to perform all tasks including, but not limited to providing information, responding to enquiries, entering into contractual commitments etc. on behalf of us in respect of the Project.

For and on behalf of:
Signature:
(Authorized Representative and Signatory)
Name & Designation of the Person:

EXHIBIT 2: FORMAT OF THE COVERING LETTER

(The covering letter is to be submitted by the* Bidder *along with the Cover 2 of the Bid on Bidder's Letterhead along with duly filled Annexure - 2)

Date:

Place:

To,

Member Secretary
Maharashtra Pollution Control Board
Kalpataru Point, 3rd floor,
Opp. PVR Cinema, Sion Circle,
Sion (E), Mumbai – 400 022

Dear Sir,

Sub: Selection of **Solution Provider (SP) for "Development of Intelligent Decision Support System" for Maharashtra Pollution Control Board**

As a part of the Bid, we hereby make the price offer as per Annexure 2 to MPCB.

We agree to bind by this offer if we are selected as the Successful Bidder.

For and on behalf of:

Signature (Authorized Representative and Signatory of the Bidder):

Name of the Person:
Designation:
(Authorized Representative and Signatory)
Name & Designation of the Person:

ANNEXURE – 1

Details filled in this form must be accompanied by sufficient documentary evidence, in order to verify the correctness of the information.

Sr. No.	Item	Details
1.	Name of the Company (companies in case of consortium)	
2.	Mailing Address	
3.	Telephone and Fax numbers and Email Address	
4.	Constitution of the Company	
5.	Name of the Managing Director	
6.	Brief Description of facilities related to the scope of work mentioned in this tender document.	

Date: _____

Place: _____

For and on behalf of:

Signature (Authorized Representative and Signatory of the Bidder):

Name of the Person:
Designation:

ANNEXURE – 2 FORMAT FOR PRICE BID

Sr. No.	Description	Unit	Basic Price in Rs (A)	GST in Rs. (B)	Final Amount in Rs. A+B=C
1	Implementation of Intelligent Decision Support System for Pollution Parameters in Maharashtra	Lump-sum			
Grand Total					

Grand Total Amount in Rs.: _____ In Word_____

For and on behalf of:

Signature (Authorized Representative and Signatory of the Bidder):

Name of the Person:
Designation:

ANNEXURE – 3

Scope of Work / Terms of Reference (ToR)

1.0 Background

MPCB has made tremendous efforts in visualising the need for environmental monitoring along with information collation from various point and non-point sources in the past and thereby making efforts to establish a network of monitoring stations all across the state of Maharashtra. It actually covers about 72 such air quality stations including 10 Continuous Ambient Air Quality Monitoring Station (CAAQMS), 250 water quality monitoring stations including those involved in generating WQI for surface as well as ground water. Other than these, there are various CAAQMS, OCEMS & manual monitoring carried for industrial sources including ETP, STP & Stacks. Other than these, information regarding solid, hazardous & Bio medical waste is regularly collected and collated from local bodies, industries, CHWTSDF, CETP, BMW facilities and other such institutions on a regular basis. Event based monitoring is also carried out in order to understand environmental behaviour during such events. MPCB makes an attempt to publish these data and its limited analytics & interpretation though such tasks pose a humongous challenge in terms of creating a continuous & real time analytics for direct use in compliance monitoring.

2.0 Introduction

Environmental surveillance and monitoring is one of the core functions of the Pollution Control Board. Whether ambient air quality (AAQ), water quality soil behaviour, solid waste or other environmental attributes; all in urban areas are affected due to the emissions from wither point or area or line sources, that are either in gaseous, particulate or organic loading form & more often than not in form of toxics. There are multiple sources and each having its own specific characteristics that may have synergistic or antagonistic effects and with other abiotic components of environment such as meteorology, background concentrations, water dilution, ground water movement, geology, soil characters, and many others may effect in the overall behavioural patterns of such pollutants.

On the one hand, data collected from various monitoring programs of MPCB need to be transformed into information via interpretation then in turn into knowledge by putting it to

use for policy research & implementation. This transformation and use of data has been a missing link in almost all the sectors of environmental quality assessment. The paraphrase is more prominent considering the huge amount of continuous and minute database gathered through the functioning of regional & industrial data in different regions of Maharashtra by MPCB.

The main sequential features of pollution management is a 4 step process

1. Environmental Quality Monitoring & Generation of data
2. Data Interpretation and Analysis (use of statistical tools)
3. Predictive Analysis & Analysis of Alternative Strategy
4. Data Communication & Strategy Planning & Implementation

MPCB in its attempt towards environment management have already been successfully carrying out monitoring and data collection for the past several years and have also recognised the urgent need for taking up next potential steps towards achieving the wholesome goal of environment management through science based regulatory approach.

3.0 Need for the Proposed Project

It is observed of-late that the environmental information is not easily generated and involves huge resources. As there are limitations in regular supervision or quality control checks on operation of these monitoring stations and data generated, the concept of Environmental Quality Indices was introduced to cater to this specific need & subsequent information dissemination on the MPCB website. Compliance needs are changing each day and with the quality of environment being felt as compromised due to characteristic changes in population x affluence x technology, data such obtained needs to be urgently utilized to meet its objectives of decision making.

Thereby, the concept of utilizing this data in a usable form has become utmost important from the perspective of converting it into information through interpretation and ultimately putting it to effective use to attain the overall objective of strategy development for environmental pollution abatement & then for further dissemination. The proposed project intends to cover this basic aspect of data transformation into information & knowledge via use of fundamental statistical & predictive analysis tools thus, forms an integral part of the desired objective and probably one of the most important steps for effectively addressing the objective of policy planning & efficient, understandable & acceptable communication.

4.0 Objectives

The objective shall revolve around creating a Data analytics and Artificial Intelligence based solution that would enable pool of options for analysis and decisions for betterment of environmental quality in Maharashtra as a whole. The solution addresses the need

- To assess, evaluate & transform environmental quality data interpreted, meaningful information through application of fundamental & advanced data analysis methodologies for MPCB owned data
- Extract data from registration forms and correlate it against other submission documents, to cross link & perform dependency analysis of environmental / source attributes to evaluate environmental quality
- Predictive analysis & pattern recognition analysis for compliance behaviour of point & non-point sources
- Establish an Early Warning System (EWS) to mitigate any possible environmental failures
- Creating decision support system for strategic policy / action plan for environmental attributes [Analysis of Alternatives with Benefit Analysis]

5.0 Scope & Methodology

To achieve the objectives of the proposed, the scope and respective methodologies have been addressed in the following discussion

5.1 Setting Data Interpretation Objectives

The objectives are to be thought initially before setting up the project which in this case though has been done by MPCB, the same shall be reviewed and further augmented depending on the data type, its domain, frequency, extent, variability, QA/QC, etc. The proposed project shall take into account this first step of understanding the objectives and if need be, assessing to revisit these objectives considering the availability and end use of data.

5.2 Evaluation & Reasoning of Various Tools for Interpretation

Performing analytics on the available date is a means to represent data in an interpretable form. However, most analytical tools only are limited by data form and format requirements. More importantly, the inclusion of domain knowledge and understanding is at best limited or non-existent. The proposed project therefore shall assess the available data and the objectives and end use and present the most logical and applicable solution to meet MPCB objectives.

5.3 Exploratory Data Analysis for Preliminary “First Look” Investigation

It is surely envisaged that the amount of data available from these monitoring locations are huge & thereby requires a “first look” exploration for understanding the type of analysis to be followed. This type of analysis is universally accepted and forms the first step in most of the statistical analysis protocol. This shall help understand the need for inclusion/exclusion of certain class of data, which may or may not be important from the objectivity point of view as well it could help format the data in the form to be used by various tools for further analysis & interpretation.

5.4 Data Analysis & Interpretation

The Solution framework would utilize a combination of different machine learning and regression/statistical models to learn structured and unstructured data as well as learn from historical patterns to accurately predict future outcomes and adverse events. As stated, the methodologies that would be applied will be based on the final data analysis

5.4.1 AI Framework

Solution to leverage following ML based engines as and when required to address the need to extract unstructured data and reconcile with additional data points.

- **Optical Character Engine (OCR)** – Machine Learning based engine that systematically converts image/scanned files containing, text, into a machine-readable format
- **Extraction Engine** – Machine Learning and Neural Net based engine that applies functions such as morphology operations, segmentation techniques, feature Detection and several other complex mathematical models to extract data out of documents
- **Natural Language Processing Engine** – Deep Neural Net based engine that leverages knowledge libraries and ontologies to decipher language and apply them in further analysis

In addition to above techniques and based on data provided any of the following predictive and statistical models will be leveraged to analyse the data.

5.4.2 Descriptive Statistics

Descriptive statistics are used to describe the main features of a collection of data in quantitative terms. Descriptive statistics are distinguished from inferential statistics (or inductive statistics), in that descriptive statistics aim to quantitatively summarize a data set, rather than being used to support inferential statements about the population that the data are thought to represent. Descriptive statistics shall be studied using the following tools.

5.4.2.1 Manual & Continuous Data

1. Location – Mean (Arithmetic, Geometric, Harmonic), Median & Mode
2. Dispersion – Range, Standard Deviation & Coefficient of Variation
3. Moments – Variance & Skewness

5.4.2.2 Categorical Data

Frequency

5.4.3 Inferential Statistics

Statistical inference or statistical induction comprises the use of statistics and random sampling to make inferences concerning some unknown aspect of a population. It is distinguished from descriptive statistics.

1. Inference – Confidence intervals, Significance, Meta Analysis (If need)
2. General Estimation – Method of Moment, Bayesian estimation
3. Specific tests – Pearson's (if Need be)

5.4.4 Correlation & Regression

Correlation (often measured as a correlation coefficient, ρ) indicates the strength and direction of a relationship between two random variables. The commonest use refers to a *linear* relationship, but the concept of *nonlinear* correlation is also used. In general statistical usage, *correlation* or co-relation refers to the departure of two random variables from independence. In this broad sense there are several coefficients, measuring the degree of correlation, adapted to the nature of the data. The same shall be studied using the following systems.

1. Correlation – Pearson product-moment, Spearman's rho, Confounding variables
2. Linear Regression – Linear model, Analysis of variance
3. Multiple Regression – Principal Component Analysis, Factor Analysis to create Receptor Modelling for source understanding
4. Predictive Analysis – Pattern Recognition, Cluster Analysis for compliance assessment & behavioural analytics
5. Dependency Analysis – Point to Area Source matrix, Source to Ambient Analysis
6. Hot Spot identification – identifying such issue and environmental attribute based critical areas / domains and providing for strategic options

5.4.5 Statistical Graphics

The data shall be represented in various forms for making it user friendly through guide user interface using multiple modes of graphical representation with either one or more of the following tools.

Bar Chart, Biplot, Box plot, Scatter, Scree plot & others using various frequencies with regional & timescale search options [search for all input variable]

In addition to the above mentioned tools, some of the non conventional means of data interpretation shall also be deployed in order to evaluate the data from a birds eye perspective depending upon the need for it as and when appearing during the course of project.

5.5 Data Validation

To be carried out especially for identifying outliers, missing data, gap analysis, data filtering, creating validation pointers for environmental attributes

5.6 Sampling Adequacy Analysis

It is an index for comparing the magnitudes of the observed correlation coefficients to the magnitudes of the partial correlation coefficients using Kaiser-Meyer-Olkin measure. Use of tools to assess need for additional sampling and/or optimization of same.

5.7 Ensemble Mean / Average & SD for Outliers

It shall be used as one of the various methods of descriptive statistics especially considering huge amount of data over a period of time and more representative of the mean & identification of outliers

The major emphasis of the data analysis & interpretation in the study shall be oriented towards **linear & Multiple regression** wherein linear regression refers to any approach to modeling the relationship between one or more variables denoted *y* and one or more variables denoted *X*, such that the model depends linearly on the unknown parameters to be estimated from the data. Such a model is called a "linear model." Most commonly, linear regression refers to a model in which the conditional mean of *y* given the value of *X* is an affine function of *X*. Less commonly; linear regression could refer to a model in which the median, or some other quintile of the conditional distribution of *y* given *X* is expressed as a linear function of *X*. Like all forms of regression analysis, *linear regression* focuses on the conditional probability distribution of *y* given *X*, rather than on the joint probability distribution of *y* and *X*, which is the domain of multivariate analysis.

However, It is an interesting fact that all of the variables may not be independent of each other and hence there is a need to develop mathematical techniques that permit the study of these simultaneous variations of multiple variables. One such analysis i.e. the correlation is based on identifying the relationships between pairs of variables.

Correlation analysis forms one such method but does not provide a clear view of multiple interactions in the data. Thus, eigenvector analysis was used to convert the correlation data into multivariate information. Factor Analysis is the name given to one of the variety of forms of eigenvector analysis. In terms of air pollution data it is much more prominent that the primary pollutants shall reveal multiple parameter correlation as seen in many of the existing studies in the past. The proposed project shall take into account these multiple variations.

5.8 Assessment & Formulation of Empirical Tools Based on Correlation

One of the major outputs of these studies shall be to assess and identify data gaps, data variability, trends and formulate / identify empirical equations (if any) that could help

establish firm correlations between parameters and their behaviour with respect to other parameters of environmental quality assessment. This might even at times help render situational predictions in cases of lack of facility and/or equipment failure, data gap filling in future & may also lead to reduction / increase in monitoring requirements (i.e. either stations as a whole or just a few parameters). *Additionally, comparative account of various geographical and/or timescale scenario of environmental quality behaviour shall also be represented as one of the contributory aspects of the project. In fact, the data analysed shall also look for scope for correlation of region specific parameters of environmental attributes & predictive analysis for association of various parameters in Maharashtra.*

6.0 In the Nutshell from IT perspective using AI

A] Summarizing Scope to Include

1. **Needs gathering and scoping:** Needs gathering and scoping on design & development of the proposed e-portal including needs gathering on its contents as well as on its hosting, operations and updating time to time.
2. **Design and development:** Design, develop and host the e-portal at MPCB, including loading up of the contents on web pages.
3. **Conduct training:** Conduct training on the operating aspects of the e-portal.

B] Database Creation

The e-portal should be integrated with all the relevant data, its statistical analysis, interpretation & decision support system for strategic policy evaluation & Alternative Options Analysis including the following:

1 Air & Noise Quality data from Manual & CAAQM
2 Air Quality data from Online stacks, JVS, manual stack monitoring, industrial AAQM & others
3 Event based air & noise monitoring data
4 Water quality data from inland surface water, coastal waters, industry discharge data along with WQI
5 MPCB's water quality data for receiving water bodies (rivers, lakes etc.)– continuous monitoring data, historical data, manual monitoring data
6 MPCB's wastewater quality data from industries – OCEMS i.e. continuous online effluent monitoring data, historical data, manual monitoring data
7 Data from industries (ETPs and CETPs) on wastewater quality – before treatment, after treatment, online monitoring, etc.
8 Standard data formats, input protocols and guidelines
9 Data from STPs from cities
10 Data from academia, R&D organizations, NGOs etc that are authenticated and published in reputed communications
11 Solid, Hazardous & BM waste inventories

12 CHWTSDF database
13 AQI, WQI, other available sustainable indicators
14 Maps based information for regions showing AQI, river basins, drainage, land use, etc.
15 Publications, reference documents, etc.
16 Any other as may be relevant

C] e-portal Functionalities

1 **Data Input**: E-portal should include a web-based data input mechanism for authorized multiple users including MPCB regional offices & a separate section for other organizations having environmental quality data. The data should be classified into verified (by a recognized laboratory) and unverified

2 **Data Access**: E-portal should have data access functions as per user needs. Should include public use as well as restricted use via login

3 **Access Control**: e-Portal should have access control for retrieval of data. While some data can be in the public domain, all data marked restricted should be accessible only to the permitted user organizations. Only non-confidential data meant for public consumption should be retrieved through secured web access, ftp or web service calls over the internet to the portal's interfaces.

4 **Data Validation**: E-portal should have inbuilt function of checking if uploaded data conforms to the common data requirements of the portal and mark invalid data for correction/updating.

5 **Search and Querying:** Portal should include data querying systems and statistical analyses in addition to detailed queries and web service calls to disparate data sources. Should include – locations, date/time, data, industry name, interactive maps etc. with multiple query features, viz. time, place, industry, pollutant parameter etc. Search/querying functions should include:
» Search by location
» Search by parameter
» Search by exceedance
» Search by industry name
» Search by industry sector
» Search by area (xx kilometre around xx location)
» Search by geographical domain
» Search by indices
» Search by environmental attributes
» Search by timescale
» Search by cross linking attributes
» Search by hot spots

» Search by deterioration index / improvement index
» Search by Issues
» Search by behavioural patterns of probable non-compliance / compliance
» Search by data inputs / patterns
» Search by any other means as & when derived during the course of project

6 **Downloads**: Data retrieved from the portal should be downloadable in at least 3 commonly used data formats. Data retrieved should support the Digital dashboards currently being used by the agencies, as well as generate Geospatial maps of environmental quality as may be required by MPCB. Search and downloads to be available in multiple formats. Download should support the search functions as above and should include:
» Maps
» Tables, Statistics
» Graphs

7 **Data Analysis:** The portal should enable data analysis:
» Time series analysis
» Pollution incident analysis
» Alerts – accordance and close to exceedance (red, orange, green)
» Trend analysis and projections
» Multi-variate analysis
» All statistical & analytical tool as defined in earlier sections

8 **Sectoral Strategic Options:** In-built options for strategic pollution control based on input data analytics & predictive analysis sounding analysis of alternatives for maximizing benefits of particular strategy to be provided & updated

9 **Dashboard:** The e-Portal should have a web-based or stand-alone Data Visualization Dashboard which interactively displays retrieved data with graphs and detailed maps

10 **Alerts on Pollution**: The portal should provide alerts to the pollution control agencies son any violations of the permissible standards.

11 **Generation of Reports**: The e-portal should also generate user-defined reports as well as automated reports and maps of select parameters as specified by MPCB with specified periodicity, both at the Regional & State level & other geographical domain

12 **How to Use**: e-Portal should have a section with user manuals and videos to help user understand the functions/usage of the portal. A guideline document should be prepared for enabling the data input agencies

13 **Stakeholders Participation:** Initially conduct stakeholders workshops to understand & collate data availability, data needs, validation requirements, formats available & user specifications – at least 3-5 such workshops needed. Consultations with individual HOD, Regional Offices, Statistical & Admin Depts., data gathering agencies, IT Dept. & consultants therein. The proposed e portal shall be in complimentary to existing IMIS and shall be able to augment the system from non-repetition of tasks & data outputs

14 **Stakeholders Training:** Prepare flow chart of e portal, data analytics examples and conduct training to evaluate use of such formats and outputs as relevant to MPCB. Finally conduct workshops for MPCB officials to build capacity for effective use of e portal and data uploading

15 **Operation & Maintenance**: At least 3 years of O&M including debugging, modifications, fresh formats for new data, if available and needed, relevant training & back up for O&M for MPCB

16 Any other as may be relevant

7.0 Hosting, Infrastructure and Team deployment

The solution to be hosted on MPCB servers. The bidders should indicate the hardware and software resources required for hosting their solution. If required, MPCB will procure and install the required hardware and software on the servers for the solution to function appropriately

There has to be a dedicated team (as mentioned in section 7.4.1) deployed at site (MPCB, HO). MPCB will provide sitting space for these resources. Backoffice team has to operate from the development center.

Review and Reporting
A compulsory review has to be taken on a fortnightly meeting with the relevant MPCB officials and the project progress has to be briefed in a documented form.

ANNEXURE – 5

DETAILS FOR E-TENDER PROCEDURE

NOTICE DETAILS

8Tender Reference no.	MPCB/EIC/ / Date :
Name of Work / Item	**Intelligent Decision Support System for Pollution Parameters in Maharashtra**
Cost of blank tender document & Mode of Payment	**Rs. 10,000/- (Rupees Ten Thousand Only) (Non Refundable) to be paid through Online Payment Modes i.e. Net Banking, Debit Card and Credit Card during Tender Document Download Stage.**
EMD Amount & Mode of Payment	**Rs.5,00,000/- (Rupees Five Lakhs Only) to be paid through Online Payment Modes i.e. Net Banking, Debit Card, Credit Card and NEFT/RTGS during Bid Preparation Stage.**
Date ,Time and Place for Training on e-Tendering Process	**Only upon request by bidders**
Date ,Time and Place of Pre Bid Meeting	**12th February, 2020 16:00 Hrs** at MPCB Conference Hall, Kalpataru Point, 4th Floor, opp. PVR Cinema, near Sion Circle. Sion (East), **Mumbai - 400 022**
Venue of online opening of tender	MPCB Conference Hall, Kalpataru Point, 4th Floor, Sion Matunga Scheme Road No.8,Opp. Sion Circle. Sion (East), **Mumbai - 400 022**
Address for Communication	Member Secretary MPC Board, Kalpataru Point, 4th Floor, Opp. Sion Circle. Sion (East), **Mumbai - 400 022**
Contact Telephone & Fax Numbers	Tel.No. - 022- 240 87 295, 022- 240 10437 Fax - 022- 240 87 295 Email - eic@mpcb.gov.in
e-Tendering Helpline Support: **Monday to Friday: 09:00 AM - 08:00 PM** **Saturday - 09:00 AM - 06:00 PM**	**Telephone:** **020 - 3018 7500** **Email: support.gom@nextenders.com**

e-TENDER TIME SCHEDULE

Please Note: All bid related activities (Process) like Tender Document Download, Bid Preparation, and Bid Submission will be governed by the time schedule given under Key Dates below:

Sr. No.	Activity	Performed by	Start Date	Time	Expiry Date	Time
1	*Release of Tender*	*Department*	*01-02-2020*	*1700*	*01-02-2020*	*17:00*
2	**Tender Download**	**Bidders**	*01-02-2020*	**1100**	**10-02-2020**	**17:00**
3	**Bid Preparation**		*01-02-2020*	**1100**	**14-02-2020**	**15:00**
4	*Superhash Generation & Bid Lock*	*Department*	*15-02-2020*	*11:00*	*15-02-2020*	*13:00*
5	**Control Transfer of Bid**	**Bidders**	**15-02-2020**	**13:01**	**17-02-2020**	**17:00**
6	*Envelope 1 Opening*	*Department*	*18-02-2020*	*1100*	*18-02-2020*	*1300*
7	*Envelope 2 Opening*		*24-02-2020*	*1500*	*24-02-2020*	*1700*

** Dates mentioned here, are scheduled dates for Bid Opening Activities. Any changes in dates of opening of technical and commercial bids shall be notified in ' Notice / Corrigendum' section on the e-Tendering sub portal of the department before opening of the same.*

INSTRUCTIONS TO BIDDERS FOR e-Tendering

GENERAL INSTRUCTIONS:

The bidders are requested to familiarize themselves with the use of the e-Tendering portal of Government of Maharashtra well in advance

To view- Tender Notice, Detailed Time Schedule, Tender Document for this Tender and subsequently purchase the Tender Document and its supporting documents, kindly visit following e-Tendering website of **Government of Maharashtra**: https://maharashtra.etenders.in

The Contractors participating first time for e-Tenders on GoM e-tendering portal will have to complete the Online Registration Process for the e-Tendering portal. A link for enrolment of new bidders has been provided on **https://maharashtra.etenders.in**

All bidders interested in participating in the online e-Tendering process are required to procure Class II or Class III Digital e-Token having 2 certificates inside it, one for Signing/Verification purpose and another for Encryption/Decryption purpose. The tender should be prepared & submitted online using individual's Digital e-Token.

An important Training Workshop on e-Tendering procedure will be held on 02-09-2015 at 11:00 Hrs. at 4th floor Conference Hall , MPCB, Sion.

e-Tendering Tool Kit for Bidders (detailed Help documents, designed for bidders) has been provided on e-Tendering website in order to guide them through different stages involved during e-Tendering such as online procedure for Tender Document Purchase, Bid Preparation, Bid Submission.

Bidders will have to pay cost of Tender Document through online modes of payment such as **Net Banking, Debit Card and Credit Card** during **Tender Document Download stage**. This payment will not be accepted by the department through any offline modes such as Cash, Cheque or Demand Draft.

Similarly, Bidders will have to pay Earnest Money Deposit through online modes of payment such as **Net Banking, Debit Card, Credit Card and NEFT/RTGS** during **Bid Preparation stage**. This payment will not be accepted by the department through any offline modes such as Cash, Cheque or Demand Draft.

The interested contractors / bidders will have to make online payment (using credit card/debit card/net banking) of Rs. **1054/-** (inclusive of all taxes) per bid per tender to online service provider of e-Tendering system (Sify NexTenders) at the time of entering **Online Bid Submission** stage of the tender schedule.

If any assistance is required regarding e-Tendering (registration / upload / download) please contact GoM e-Tendering Help Desk on number: **020 – 3018 7500 (Pune Helpline), Email: support.gom@nextenders.com**

For a bidder, online bidding process consists of following 3 stages:

1. Online Tender Document Purchase and Download
2. Online Bid Preparation

3. Online Bid Submission

All of 3 stages are mandatory in order for bidders to successfully complete Online Bidding Process.

TENDER DOCUMENT PURCHASE AND DOWNLOAD:

The tender document is uploaded / released on Government of Maharashtra, (GOM) e-tendering website https://maharashtra.etenders.in. Tender document and supporting documents may be purchased and downloaded from following link of Maharashtra Pollution Control Board on e-Tendering website of Government of Maharashtra, https://allgom.maharashtra.etenders.in by making payment through **Online Payment Modes i.e. Net Banking, Debit Card and Credit Card**.

If for any reason a bidder fails to make this payment through online modes, system won't allow the bidder proceed further for next stage resulting in his/her elimination from Online Bidding Process.

This payment will not be accepted by the department through any offline modes such as Cash, Cheque or Demand Draft.

Subsequently, bid has to be prepared and submitted online ONLY as per the schedule.

The Tender form will be available online only. Tender forms will not be sold / issued manually from M.P.C.Board office

The bidders are required to download the tender document within the pre-scribed date & time mentioned in online tender schedule. After expiry of the date and time for tender document download, Department / Corporation will not be responsible for any such failure on account of bidders for not downloading the document within the schedule even though they have paid the cost of the tender to the Department / Corporation. In such case the cost of the tender paid by the bidders will not be refunded.

Both the Bids (Technical as well as Commercial) shall have to be prepared and subsequently submid online only. Bids not submitted online will not be entertained.

Online Bid Preparation

EARNEST MONEY DEPOSIT (EMD)

Bidders are required to pay Earnest Money Deposit (if applicable) through Online Payment modes i.e. **Net Banking, Debit Card, Credit Card and NEFT/RTGS** during Bid Preparation Stage.

This payment will not be accepted by the department through any offline modes such as Cash, Cheque or Demand Draft.

If for any reason a bidder fails to make this payment through online modes, system won't allow the bidder to complete Bid Preparation stage resulting in his/her elimination from Online Bidding Process.

In case EMD is mandatory to all the bidders for a tender, offers made without EMD shall be rejected.

In Bid Preparation stage, bidders get access to Online Technical and Commercial Envelopes where they require uploading documents related to technical eligibility criteria and quote commercial offer for the work / item in respective online envelopes.

TECHNICAL BID

Following documents should be uploaded in Online Technical Envelope (T1) in PDF format, if required can be zipped as well and then uploaded during **Online Bid Preparation stage**.

The list of documents for Technical Envelope is as follows:

Sr. No.	List of Documents	Compulsory / Additional
1	Covering Letter As per Format in EXHIBIT 1	Compulsory
2	Attested copy of Power of Attorney	Compulsory
3	Proof of Purchase of RFP	Compulsory
4	EMD as per Section 6.6.2	Compulsory
5	Certificate of incorporation / Registration Service Tax registration certificate	Compulsory
6	GST registration certificate	Compulsory
7	Copies of orders in compliance of Section 7.1 (3)	Compulsory
8	Documentary Proofs as testimony for Evaluation of Technical bids as per criteria listed in Section 7.4.1	Compulsory
9	Technical Proposal as mentioned in section 7.2 PART 2 (b)	Compulsory
10	Consortium Agreement in case of consortium	Compulsory

COMMERCIAL BID

All commercial offers must be prepared online (An online form will be provided for this purpose in Online Commercial Envelope (C1), during **Online Bid Preparation** stage).

Any bidder should not quote his offer anywhere directly or indirectly in Technical Envelope (T1), failing which the Commercial Envelope (C1) shall not be opened and his tender shall stand rejected.

Note: During Online Bid Preparation stage, bidders are allowed to make any changes or modifications in the bid data uploaded by them in Technical (T1) as well as Commercial (C1) envelope.
Towards the end of Bid Preparation, once verification of EMD payment is successful, bidder completes the Bid Preparation stage by generating the Hash Values for T1 and C1. Post this, system won't allow him/her to make any further changes or modifications in the bid data.

Online Bid Submission

In this stage, bidders who have successfully completed their Bid Preparation stage are required to transfer the data, already uploaded by them during Bid Preparation stage, from their custody to department's custody.

Note: During this stage, bidders won't have any capability to make any kind of changes or editing into technical as well as commercial data.

INSTRUCTION TO BIDDERS FOR ONLINE BID PREPARATION & SUBMISSION

Bidders are required to pay Earnest Money Deposit (if applicable to them) through Online Payment modes i.e. **Net Banking, Debit Card, Credit Card and NEFT/RTGS** during Bid Preparation Stage.

If for any reason a bidder fails to make this payment through online modes, system won't allow the bidder to complete Bid Preparation stage resulting in his/her elimination from Online Bidding Process.

Hence, it is strongly recommended to bidders to initiate this payment well in advance prior to expiry of Bid Preparation stage in order to avoid elimination from Online Bidding Process on grounds of failure to make this payment.

During the activity of **Bid Preparation**, bidders are required to upload all the documents of the technical bid by scanning the documents and uploading those in the PDF format. This apart, bidders will have to quote commercial offer for the work / item, for which bids are invited, in an online form made available to them in Commercial Envelope. This activity of **Bid Preparation** should be completed within the prescribed schedule given for bid preparation.

After **Bid Preparation**, the bidders are required to complete **Bid Submission** activity within prescribed schedule without which the tender will not be submitted.

Interested contractors / bidders will have to make online payment (using credit card/debit card/net banking/Cash Card) of Rs. **1054**/- (inclusive of all taxes) per bid per tender to online service provider of e-Tendering system (Sify NexTenders) at the time of commencing **Online Bid Submission** stage of the tender schedule.

Non-payment of processing fees will result in non submission of the tender and Department will not be responsible if the tenderer is not able to submit their offer due to non- payment of processing fees to the e-tendering agency.

Detailed list of different modes of online payment to e-tendering service provider **(E-Payment Options)** has been provided under **E-Tendering Toolkit for Bidders** section of **https://maharashtra.etenders.in** .

The date and time for online preparation followed by submission of envelopes shall strictly apply in all cases. The tenderers should ensure that their tender is prepared online before the expiry of the scheduled date and time and then submitted online before the expiry of the scheduled date and time. No delay on account of any cause will be entertained. Offers not submitted online will not be entertained.

If for any reason, any interested bidder fails to complete any of online stages during the complete tender cycle, department shall not be responsible for that and any grievance regarding that shall not be entertained.

Any amendment to the tender will be placed on sub portal of the Department, who have invited the bids, on e-tendering portal of the Govt. of Maharashtra. The tenderer will not be communicated separately regarding the amendment.

OPENING OF BIDS:

The bids that are submitted online successfully shall be opened online as per date and time given in detailed tender schedule (if possible), through e-Tendering procedure only in the presence of bidders (if possible).

Bids shall be opened either in the presence of bidders or it's duly authorised representatives. The bidder representatives who are present shall sign a register evidencing their attendance. Only one representative per applicant shall be permitted to be present at the time of opening the tender.

TECHNICAL ENVELOPE (T1):

First of all, Technical Envelope of the tenderer will be opened online through e-Tendering

procedure to verify its contents as per requirements.

At the time of opening of technical bid the tenderer should bring all the original documents that have been uploaded in the Online Technical Envelope (T1) so that same can be verified at the time of opening of technical bid.

If the tenderer fails to produce the original documents at the time of opening of technical bid then the decision of the committee taken on the basis of document uploaded will be final and binding on the tenderer.

If the various documents contained in this envelope do not meet the requirements, a note will be recorded accordingly by the tender opening authority and the said tenderer's Commercial Envelope will not be considered for further action but the same will be recorded.

Decision of the tender opening authority shall be final in this regard.

The right to accept or reject any or all tenders in part or whole without assigning any reason thereof is reserved with Tender Opening Authority and his decision(s) on the matter will be final and binding to all.
The commercial bids shall not be opened till the completion of evaluation of technical bids.
The commercial Bids of only technically qualified Bidders as mentioned above will be opened.

COMMERCIAL ENVELOPE (C1):

This envelope shall be opened online as per the date and time given in detailed tender schedule (if possible), through e-Tendering procedure only,

PRICE SCHEDULE

Note: ***Commercial Offer has to be entered online only. An Online Form, similar to the Commercial format given below, will be available to the bidders in Commercial Envelope (C1) during Online Bid Preparation stage where bidders would quote their offer.***