

**TERMS OF REFERENCE
(TOR)**

**PROCUREMENT OF THE AIR QUALITY RISK ANALYSIS SYSTEM AND MAINTENANCE OF
AIR QUALITY MONITORING SENSORS IN QUEZON CITY**

I. RATIONALE AND BRIEF BACKGROUND

Section 36 of Republic Act No. 8749, known as the Philippine Clean Air Act of 1999, states that "Local Government Units (LGUs) shall share responsibility in the management and maintenance of air quality within their territorial jurisdiction."

With the development of the Air Quality Management (AQM) Plan and the implementation of AQM Project Phase I, Quezon City has strategically deployed reference equipment with non-reference air quality sensors in different areas of the City to continuously monitor air pollutants, specifically Particulate Matter_{2.5}, and gather sufficient data for analysis and development of intervention in compliance with government regulations.

To further enhance the City's air quality monitoring capabilities, there is a need for a comprehensive system to efficiently maintain the air quality monitoring network as well as acquire, consolidate, and analyze data to facilitate better-informed decision-making, promote public health, and support environmental sustainability efforts.

II. PROJECT DESCRIPTION, OBJECTIVE AND AREA OF COVERAGE

The Quezon City Local Government through the Climate Change and Environmental Sustainability Department (CCESD) intends to engage the services of a qualified Service Provider with the appropriate expertise, experience, and capacity to maintain the existing non-reference air quality monitoring sensors and enhance the City's air quality monitoring capabilities through the integration of an Air Quality Risk Analysis System which will provide efficient automated report generation, real-time alert notifications, and reliable data for evaluating policies and formulating effective air quality related strategies.

The project will cover the development of an Air Quality Risk Analysis System by utilizing the datasets generated by the reference equipment and non-reference air quality monitoring sensors provided in the attached Annex A - List of Reference Equipment and Non-Reference Air Quality Sensors. In addition, the project shall also cover the renewal of the license subscription of thirty (30) non-reference air quality sensors indicated in Annex A.

III. PROJECT SCOPE OF WORK

The following are the minimum activities to be undertaken in this Project:

1. Develop the Air Quality Risk Analysis System
 - a. Integrate the datasets from the reference equipment and non-reference air quality monitoring sensors (raw, corrected, and Air Quality Index) into an Air Quality Risk Analysis System with an activated perpetual software license complete with administrator-level account credentials to the Quezon City CCESD, that is capable of collecting and transmitting continuous, automated, and real-time and averaged data over a given period for each measured parameter, with the following features:
 - A cloud-based system that can process and store raw and corrected air quality data (PM_{2.5}) with at least 75% data capture rate and available meteorological data
 - Provide real-time transmission of air quality data from the equipment/sensors to Quezon City CCESD system through an online dashboard (web and mobile) and/or an Application

Programming Interface (API) to the CCESD servers or website with no additional subscription cost

- Automated data checking and health check of every sensor
 - Data Display of GIS analysis overlaying, table, graph and Threat Matrix of real-time and historical air quality data (raw, corrected, and AQI), 3-D level and Spatial air quality analysis of existing and new air quality data (raw, corrected, and AQI) with color-coding based on established threshold as per DENR-EMB Philippine AQI guidelines, protocols, and thresholds, and Menu and Settings to display clustered and individual sensor views
 - Reports facility to assign automated email reports per location and its recipients (sub-daily, daily, weekly, and monthly), allows analysis of trends and summaries based on user-defined data consolidation preferences, facilitates insight extraction based on historical and existing datasets, and supports email delivery in HTML format
 - Alerts facility that provides real time SMS notifications to CCESD personnel based on the specified thresholds alerts for each parameter/device status
- b. Conduct at least two (2) comprehensive training programs (4-8 hours per session), with provision for additional training as requested, for the end-user (15 personnel) to equip them with the skills and capacity needed to undertake the daily operation, data handling and analysis, etc.
- c. Provide two (2) years technical support, including system upgrades, enhancements, improvements, and maintenance for the entire system without additional cost to the City Government.
2. Renew license subscription, maintenance, and warranty of the existing thirty (30) non-reference air quality monitoring sensors as indicated in Annex A for two (2) years in coordination with the CCESD and provide the following:
- Submit monthly air quality monitoring data for PM2.5 with at least 75% Data Capture Rate
 - Submit reports of the conducted maintenance check, calibration undertaken, and corrective measures implemented, among others
 - All operational expenses relative to the installation, operation and maintenance of the AQM sensors, including but not limited to the following expenses: mounting accessories, unit and parts replacement, maintenance checks, etc.
 - Standby and emergency in-house personnel to immediately conduct service maintenance or troubleshoot the AQM sensors to mitigate loss operation time
 - Standby, ready-to-deploy AQM sensors, of the same specification, at the expense of the Service Provider, in times of prolonged downtime of the AQM sensor
 - Minimum of two (2) year warranty period which shall cover removal, replacement, or repair of the non-reference air quality monitoring sensors and accessories

IV. EXPECTED OUTPUT

Given the above-mentioned Scope of Work, the Service Provider under this Project is expected to submit the following:

1. Project Acceptance Document: Fully delivered system and documentation
2. Renewal of License Certificate
3. Maintenance and Warranty Certificate
4. Training Certificates

V. PROJECT STANDARDS & REQUIREMENTS

Minimum Qualifications and Requirements

Track Record

1. The Service Provider should have developed at least one system pertaining to air quality data gathering and monitoring systems in the last three (3) years.
2. The Service Provider should have deployed at least twenty (20) air quality sensors/equipment in the last three (3) years.
3. The Service Provider should have a single largest similar completed contract within the last three (3) years which must be at least fifty percent (50%) of the Approved Budget for the Contract.

The Service Provider must execute a statement of all its ongoing and completed government and private projects, including client feedback relative to this project as part of the Technical Requirements.

Organization

1. The Service Provider must assign one (1) project manager to serve as project implementation focal person.
2. The Service Provider must have at least three (3) field technical personnel for the installation and two (2) year support and maintenance to the monitoring network system, to ensure urgent response, and to mitigate loss of operation time;
3. The Service Provider must have at least one (1) Meteorologist and one (1) IT-Data Science Resource to facilitate training and continuous consultation during the project duration as this relies on data-driven methodologies. Said personnel must be available 24/7, even weekends, with a response time of 1 to 2 hours to provide necessary support to the CCESD especially during high pollution incidents for informed decision-making; and
4. The Service Provider must have an office in Metro Manila, or an affiliate office or company that can facilitate coordination for the delivery and installation of instruments and can provide direct technical assistance or stand-by instruments/systems in case of malfunction.

The Service Provider shall submit the complete list of Key Personnel and Support Staff with their corresponding qualifications accompanied/supported with the following documentary requirements as part of the Technical Requirements:

- Original copy of Resume or Bio-data
- Photocopy of Diploma
- Photocopy of Professional License (if applicable)

Detailed Work Plan

A Detailed Work Plan shall be submitted by the Service Provider as part of the Technical Requirements. It should contain significant information, necessary resources, timelines, activities, and strategies to be undertaken in accomplishing the Project objectives and scope of work.

Data Risk Analysis System

The Service Provider shall provide the components for the system as provided in the project scope of work of the Terms of Reference.



Acceptance Criteria of Air Quality data

Data Capture Rate must be at 75% or higher, for purposes of interpretation, the measured data should have at least 18-hours of continuous valid data in a day and 23 days of recorded data for its monthly equivalent for particulate matter consistent with the prescribed averaging times under the National Ambient Air Quality Guideline Values of the Philippine Clean Air Act and the EMB MC 2021-07 on the 'Adoption of the Manual on Data Handling Protocols for Criteria Air Pollutants.'

Acceptable data shall not include irregular data such as negative data, among others. Data accuracy should be calibrated based on the standard instrument calibration procedure performed by the Service Provider. Missing data or exceedingly high or low data must be flagged to the CCESD, with data flags that provide indication of reason for the flagged data (e.g., power interruption, for confirmation of site manager, etc.)

VI. PROJECT IMPLEMENTATION AND DURATION

The delivery of the expected output as stated in this TOR shall be for a period of sixty (60) days upon issuance of the Notice to Proceed (NTP) to the Service Provider.

The timeline for the implementation of the Terms of Reference and Expected Output is as follows:

Scope of Work	Expected Output	Delivery Schedule
Delivery of Air Quality Risk Analysis System	Project Acceptance Document: Fully delivered functional system and documentation	Within sixty (60) calendar days from the issuance of Notice to Proceed (NTP)
Renewal of License	License Renewal Certificate	Starting January 1, 2025
Air Quality Sensor Service Maintenance and Warranty	Maintenance and Warranty Certificate	
Conduct of Capacity Building Activities	Training Certificates	Within sixty (60) calendar days from the issuance of Notice to Proceed (NTP)

VII. APPROVED BUDGET FOR THE CONTRACT AND BASIS OF PAYMENT

The Approved Budget for the Contract is **Sixteen Million One Hundred Thousand Pesos only (Php 16,100,000.00)** inclusive of all government taxes/fees. The Service provider shall be paid based on the following tranches:

Tranches	Description
15%	Upon submission and receipt/acceptance of Project Acceptance Document: Fully delivered functional system and documentation
50%	Upon submission and receipt/acceptance of License Renewal, Maintenance and Warranty Certificates
35%	Upon submission and receipt/acceptance of Training Certificates

VIII. CANCELLATION OR TERMINATION OF CONTRACT


The City may, without prejudice to other remedies against the Service Provider, unilaterally cancel or terminate the Contract, in whole or in part, due to default, insolvency or for justifiable cause or on any ground which it deems inimical to the City's or public's interest, which includes but is not limited to the following:

1. Failure of the Service Provider to provide/meet the necessary requirements as stated in this TOR and in other bidding/contract documents;
2. Violation or non-performance of the other terms and conditions of the Contract, which may include substantial or continuous delay of submissions as well as responses required under this TOR; and
3. Other acts inimical to public interest.

The guidelines contained in RA 9184 and its revised IRR shall be followed in the termination of any contract. In the event the City terminated the Contract due to default insolvency, or for cause, it may enter into negotiated procurement pursuant to Section 53 (d) of RA 9184 and its IRR.


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ANNEX A - LIST OF REFERENCE EQUIPMENT AND NON-REFERENCE AIR QUALITY MONITORING SENSORS

Number	Device ID	Location
1	ADZGTKDX	Novaliches Wet and Dry Market, Quirino Highway, Brgy. Novaliches Proper
2	A7H746PY	Quirino Highway corner Mindanao Avenue, Brgy. Talipapa
3	AC9MGQG3	Quezon City General Hospital, Brgy. Bahay Toro
4	A0JFVK7V	Sto. Domingo Church, Brgy. Sto. Domingo
5	A8ZJRQ1S	Cubao Arayat Market, Brgy. San Martin de Porres
6	AK39NGR9	Obrero Street corner Calle Industria, Brgy. Bagumbayan
7	ALJ49WM9	Quezon City Public Library, Brgy. Central
8	AD538NJK	Commonwealth Barangay Hall
9	A59HQJ85	La Loma Police Station 1, Mayon St., Brgy. NS Amoranto
10	AM795YTJ	E. Rodriguez Sr. Avenue, Brgy. Dofia Josefa
11	A5QFJZ7C	Silangan Barangay Hall
12	AXDJX5PD	Pansol Barangay Hall
13	AN5K1TZS	Barangay Kalusugan Health Center
14	ABH6B3L8	N. Domingo Street, Brgy. Valencia
15	AKP3GF6R	Susano Road, Brgy. San Agustin
16	ASJ8GDBC	Balintawak Cloverleaf, Brgy. Balingasa
17	A2LZK9LS	Quirino Highway corner St. Dominic Drive, Brgy. Baesa
18	AVGFMZHR	Batasan Hills Barangay Hall
19	AP1B3MD6	Kaligayahan Elementary School, Brgy. Kaligayahan
20	ATCMYX3V	Korea-Philippines IT Training Center - Quezon City University, Brgy. San Bartolome
21	A7JJRKNR	Sgt. Esguerra Footbridge (HiTop) Quezon Avenue, Barangay West Triangle
22	A9KVKK9F	Jose Rizal High School, Brgy. Commonwealth
23	ACVGFCCCT	Holy Spirit Elementary School, Brgy. Holy Spirit
24	ARL4WM7G	Pearl Drive Footbridge, Commonwealth Avenue, Barangay Fairview (Northbound Lane)
25	AL6NNXCN	Tandang Sora Brgy. Hall Footbridge (Southbound Lane)
26	A9QPJFW3	St. Peter Parish Shrine of Leader Footbridge (Northbound Lane) Barangay Batasan Hills
27	A643RJLF	Libis Barangay Hall Footbridge (Northbound Lane)
28	AHTHPHJ4	Payatas Controlled Disposal Facility, Barangay Payatas
29	A6RPRQG9	Tomas Morato Avenue corner Scout Fernandez Street, Barangay Laging Handa
30	A9FYK9X3	Timog Avenue corner EDSA, GMA 7 Footbridge, Brgy Sacred Heart
31	AHWMQKMT	FEU Diliman, Sampaguita Avenue, Barangay Pasong Tamo
32	ARKLTPNL	Lagro High School, Barangay Greater Lagro
33	AL676R3Q	Maligaya Elementary School, Barangay Pasong Putik
34	A7HWMYVP	New Era University, Barangay New Era
35	A4RTL9KG	Old Balara Elementary School, Barangay Matandang Balara
36	ATJLNJMF	P. Dela Cruz Street, Barangay Nagkaisang Nayon
37	A3R4FTM9	Pasong Tamo Elementary School, Barangay Pasong Tamo (South)
38	AYRK7HHQ	Payatas Super Health Center, Barangay Payatas
39	AYNKW6ML	Baluyot Satellite Hall, Barangay Sauyo
40	AQ4T44VR	San Isidro Labrador Parish Church, Barangay Bagong Silangan

Note: Highlighted sensors (Numbers 1-30) shall be covered by the renewal of license subscription.

Reference Equipment

Korea-Philippines IT Training Center - Quezon City University, Brgy. San Bartolome

