

TERMS OF REFERENCE (TOR)

SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF MULTI- HAZARD IMPACT-BASED MONITORING AND EARLY WARNING SYSTEM OF QUEZON CITY DISASTER RISK REDUCTION AND MANAGEMENT OFFICE (QCDRRMO)

I. RATIONALE AND BRIEF BACKGROUND **Project Background and Context**

The Republic Act No. 10121 known as the Philippine Disaster Risk Reduction and Management Act of 2010 defines Early Warning System as the set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities and organizations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss.

A people-centered early warning system necessarily comprises four (4) key elements: knowledge of the risks; monitoring, analysis and forecasting of the hazards; communication or dissemination of alerts and warnings; and local capabilities to respond to the warnings received. The expression "end-to-end warning system" is also used to emphasize that warning systems need to span all steps from hazard detection to community response.

Given that Quezon City is highly susceptible to evolving disaster risks due to multiple hazards, it is therefore a must to continuously improve on this matter and invest on modern technologies that will promote knowledge building, awareness raising, and disaster preparedness not just for the QCDRRMO but to the citizens of Quezon City. A multi hazard localized early warning system that provides readily available information to the public would indeed further capacitate disaster preparedness of the city.

I. PROJECT DESCRIPTION

The concept of the project is to enhance the capabilities of QCDRRMO by installing weather sensors in the city equipped with high quality environmental intelligence to create an automated risk analysis or impact-based analysis at any point in Quezon City. This will enhance Command Center capabilities and will help in making critical decisions for Quezon City.

While investing in weather sensor infrastructure and high-quality environmental intelligence, the QCDRRMO plans to extend its capabilities by sharing sets of natural disaster preparedness information or early warning information to the barangays, citizens and other stakeholders via social media, web applications and messaging platforms.

Since these are critical systems for weather and natural disaster preparedness and the country is already in the severe weather season along with the COVID-19 situation, the QCDRRMO recommends a system that is already existing and proven working by other Local Government Units in Metro Manila. The QCDRRMO is aiming to have a system aligned with smart city models or solutions that are automated, faster to implement, easy to manage, and more cost effective.

System Benefits:

FOR QCDRRMO

The system will further:

- Supplement planning, monitoring and decision making of QCDRRMO through the use of additional sensors and high-quality environmental intelligence related to weather and natural disasters.

- Implement an integrated web portal for QCRRMO to analyze impacts of weather and natural disasters to any location in Quezon City.
- Implement a Barangay weather network for Quezon City's SMART CITY initiatives. The data will be used to empower barangays, citizens and stakeholders.
- Enable early detection and automatic alerting of lightning and dangerous thunderstorms that are high risk and cause flooding.
- Increase visibility for areas not covered by CCTV.
- Improve weather-broadcasting capabilities.
- Implement automated delivery of reports for daily risk analysis.

FOR BARANGAYS, CITIZENS AND OTHER STAKEHOLDERS

The system will further:

- Implement secured web-based dashboards to empower barangays, citizens and stakeholders to get impact-based risk analysis and early warning information related to weather and natural disasters.
- Enable early lightning / dangerous thunderstorm warning and automatic alerting for barangays and other stakeholders
- Improve weather broadcasting with integrated high-quality animations and updated weather data similar to what TV broadcast stations use. This will be shared thru LED boards, social media, barangay centers, other locations and more.

II. PROJECT SCOPE OF WORK



The QCRRMO plans to install smart weather sensors with cameras in 50 locations within the City (Barangay Hall, Schools, Health Centers, Hazard Areas and more). Additional environmental intelligence (supporting datasets) for weather and natural disaster preparedness such as weather forecast, nowcast, severe weather, lightning & thunderstorms, flooding, recent earthquakes, air quality, PAGASA information will be integrated with the sensors and cameras and analyzed for impact-based risk analysis at any point in Quezon City.

System Output

- Command Center Visualizations for Environmental Intelligence
- Weather Broadcasting Videos 2x a day
- Secured Public Dashboards (Web-Based) displaying 24x7 Risk Analysis in all Barangays

- Smart Dissemination of Reports & Early Warning
 - Localized Risk Analysis Reports delivered via email to specific recipients
 - Email Alerts of Severe Weather delivered to specific recipients
 - SMS & Viber Alerts of Severe Weather delivered to specific recipients

Technical Specifications

| | Description | Delivery Time |
|-------|---|-----------------|
| 1 Lot | <p>I. Delivery of 50 Smart Weather Camera with mount, power adapter and solar panel(set) and accompanying 50 Internet Connectivity Devices</p> <p>Smart Weather Camera with mount, power adapter and solar panel (set)</p> <ul style="list-style-type: none"> • Fifty (50) Smart Weather Cameras <ul style="list-style-type: none"> ◦ Diameter: 6 inches (15.25 cm) ◦ Height: 5 inches (12.7 cm) ◦ Ultrawide-angle lens: 170 degree ◦ Megapixel: 2 MP ◦ Max resolution of original image: 1920 x 1072 ◦ Transmitted image size: 640 x 640 ◦ Image capture frequency: 5 minutes ◦ Upload frequency: 5 minutes • Battery <ul style="list-style-type: none"> ◦ Lithium-ion ◦ Battery operating and charging temperature range: -4°F (-20°C) to 131°F (55°C) ◦ Battery Capacity: 12V-2A ◦ Power Dissipation: 0.8V/perday ◦ Operating Time (per full charge): Up to two (2) weeks • Solar Panel <ul style="list-style-type: none"> ◦ Number: 1 ◦ Monocrystalline silicon ◦ Max Output Power: 13.5 Watt ◦ Output Voltage: 12.41 Volt ◦ Output Current: 1.088 Ampere ◦ Length: 390mm ◦ Width: 280mm ◦ Height: 29mm ◦ Battery Charging: 10 to 12 hours per week of sunlight will fully charge the internal battery. • Mounting Kit <ul style="list-style-type: none"> ◦ Length: 200mm ◦ Width: 60mm ◦ Hight: 160mm ◦ Material: Alumni Alloy • Compact, plug & play and maintenance free type • Can be installed in a fixed location, movable, or easily used for AD-HOC purposes • Weatherproof and durable construction • Easy installation • Real-time collection and transmission of images and weather | 5 Calendar Days |

| | | |
|--|---|------------------|
| | <p>data</p> <ul style="list-style-type: none"> • Take weather measurements at least every 5 minutes (24x7) • Integrated ultra-wide angle camera that take pictures at least every 5 minutes (minimum at least the whole daytime) • Battery charged with Solar Panel • Power adapter option (alternative to solar panel) • Upload images along with weather data to a cloud-based data processing system at least every 5 minutes • API availability for each Smart Weather Camera for integration to other systems • Smart control ready for Smart City applications • Can connect to a 2.4GHz Wi-Fi network with wireless communication up to 100 meters • With Online - Offline Status Checker Tools <p>Internet Connectivity Devices</p> <ul style="list-style-type: none"> • At least 50 Wi-Fi connectivity devices with triple-cut 5G sim card with six (6) months 20 GB (per month) data subscription each | |
| | <p>II. Installation of 50 Smart Weather Camera set and 50 Internet Connectivity Devices with installation of Data Processing & Display</p> <p>Installation of 50 Smart Weather Camera set and 50 Internet Connectivity Devices</p> <ul style="list-style-type: none"> • Fifty (50) Smart Weather Camera sets and Internet Connectivity shall be installed in a fixed location identified by Quezon City <p>Data Processing and Display</p> <ul style="list-style-type: none"> • Data processing and storage of all fifty (50) Smart Weather Cameras including additional supporting datasets will be in a cloud-based data management system. • Process images per Smart Weather Camera at least every 5 minutes (minimum at least the whole daytime) • Process weather measurements per Smart Weather Camera at least every 5 minutes (24x7) • Create a time-lapse per Smart Weather Camera consolidating all images and will be available every day at the end of daytime • Allow download per Smart Weather Camera for historical data of images, time lapse, and all data produced by the Smart Weather Camera • Allow data to connect to web applets to connect with web services such as Facebook, Instagram, Twitter, Gmail, etc. • Each Smart Weather Camera can be set Public or Private • Integration of additional datasets such as Weather Observations, Weather Forecast, Typhoons | 25 Calendar Days |

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| | <p>(PAGASA, JTWC, JMA), PAGASA CAP Alerts, Earthquakes, and Air Quality, Lightning Strikes (at least 95% lightning detection efficiency of CG lightning), Dangerous Thunderstorms (up to 45min early detection of Dangerous Thunderstorms), historical weather data and indices such as mosquito activity analysis data.</p> <ul style="list-style-type: none"> • Data display web application for command center use • Data display website for community/public use • Data processing and module for automated dissemination of early warning via for SMS, Viber • Integration ready to native mobile app and smart glasses • Automated weather animations two (2) times daily containing processed data for local weather observations, weather forecast, PAGASA Radar, PAGASA GFA & TC Advisories, Mosquito Activity and Air Quality • Supporting weather & natural disaster data licenses for one (1) year | |
| | <p>III. Training</p> <ul style="list-style-type: none"> • 1 Day Equipment Operations & Maintenance Training • 1 Day System Admin Training and Installation Training • 3 Days End User Training <p>- Abovementioned trainings shall be attended by 20 QCDRRMO personnel</p> | 5 Calendar Days |
| | <p>IV. Warranty and Support</p> <ul style="list-style-type: none"> • Warranty and maintenance including replacements of all parts (including solar panel) • Replacements should be delivered within 7 Calendar days • 24/7 Offsite and Onsite Operations & Maintenance support to be provided • Warranty and Support for 3 years | |

III. AREA OF COVERAGE

The project will cover 50 locations within Quezon City and will be identified by the Emergency Operations Center (EOC) during the start of implementation. The 50 locations will have an area for the installation of smart weather cameras and power supply for the internet devices. The local risk analysis information should be generated at any (lat,long) within Quezon City and surrounding regions.

The following are the proposed location plan of the weather sensors:

| Locations | Latitude | Longitude | Districts |
|-------------|----------|-----------|-----------|
| VASRA | 14.6614 | 121.0447 | 1 |
| STO. CRISTO | 14.6608 | 121.0291 | 1 |

| | | | |
|---------------------|------------|-------------|---|
| RAMON MAGSAYSAY | 14.6591 | 121.022 | 1 |
| BAHAY TORO | 14.6648 | 121.0213 | 1 |
| VETERANS VILLAGE | 14.6535 | 121.0244 | 1 |
| PHL-AM | 14.6486 | 121.031 | 1 |
| STA. CRUZ | 14.6348 | 121.018 | 1 |
| DAMAYAN | 14.6396 | 121.0149 | 1 |
| MARIBLO | 14.6354 | 121.0176 | 1 |
| NAYONG KANLURAN | 14.6419 | 121.0259 | 1 |
| DEL MONTE | 14.6347636 | 120.9958893 | 1 |
| MASAMBONG | 14.6413 | 121.0109 | 1 |
| TALAYAN | 14.6326952 | 121.0095313 | 1 |
| STO. DOMINGO | 14.6346667 | 120.9958893 | 1 |
| SAN JOSE | 14.6391 | 120.9934 | 1 |
| MANRESA | 14.6413 | 121.0032 | 1 |
| PAG-IBIG SA NAYON | 14.6463 | 120.9969 | 1 |
| SAN ISIDRO LABRADOR | 14.622 | 120.9956 | 1 |
| PAANG BUNDOK | 14.6278 | 120.993 | 1 |
| BAGONG SILANGAN | 14.6980794 | 121.1105785 | 2 |
| BATASAN HILLS | 14.6908663 | 121.0958116 | 2 |
| COMMONWEALTH | 14.697 | 121.0876 | 2 |
| HOLY SPIRIT | 14.6843441 | 121.0764292 | 2 |
| PAYATAS | 14.6982 | 121.0949 | 2 |
| SOCORRO | 14.613 | 121.0627 | 3 |
| WEST KAMIAS | 14.6288 | 121.0475 | 3 |
| EAST KAMIAS | 14.6316 | 121.0575 | 3 |
| QUIRINO 3A | 14.6293 | 121.0623 | 3 |
| AMIHAN | 14.6337 | 121.0666 | 3 |
| MATANDANG BALARA | 14.6718 | 121.0745 | 3 |
| PANSOL | 14.651 | 121.077 | 3 |
| LOYOLA HEIGHTS | 14.6411 | 121.0734 | 3 |
| SAN ROQUE | 14.6184 | 121.0635 | 3 |
| MASAGANA | 14.6193 | 121.0669 | 3 |
| VILLA MARIA CLARA | 14.6166 | 121.0697 | 3 |
| WHITE PLAINS | 14.6063 | 121.0722 | 3 |
| UGONG NORTE | 14.5976 | 121.07 | 3 |
| BAGUMBAYAN | 14.6085 | 121.0826 | 3 |
| BLUE RIDGE A | 14.6229 | 121.0751 | 3 |
| BLUE RIDGE B | 14.6184381 | 121.0782615 | 3 |
| ST. IGNATIUS | 14.613 | 121.0733 | 3 |
| ESCOPA 3 | 14.6278 | 121.0724 | 3 |

| | | | |
|-------------------------------|------------|-------------|---|
| MARILAG | 14.6249 | 121.0694 | 3 |
| OBRERO | 14.6285 | 121.0317 | 4 |
| ROXAS | 14.6281 | 121.0216 | 4 |
| SOUTH TRIANGLE | 14.6376 | 121.0374 | 5 |
| IMMACULATE CONCEPCION | 14.6227 | 121.0435 | 4 |
| SAN MARTIN DE PORRES | 14.6172 | 121.0492 | 4 |
| BAGONG LIPUNAN | 14.6053 | 121.0517 | 4 |
| VALENCIA | 14.608 | 121.0396 | 4 |
| TATALON | 14.6231 | 121.0133 | 4 |
| KRISTONG HARI | 14.6247 | 121.0251 | 4 |
| DAMAYANG LAGI | 14.62 | 121.0194 | 4 |
| MARIANA | 14.6171 | 121.0371 | 4 |
| DONA IMELDA | 14.6152 | 121.0179 | 4 |
| GALAS | 14.6118 | 121.0092 | 4 |
| DON MANUEL | 14.6164 | 121.0045 | 4 |
| SAN VICENTE | 14.6533 | 121.0569 | 4 |
| TEACHERS VILLAGE EAST | 14.6457 | 121.0608 | 4 |
| PINYAHAN | 14.6344 | 121.0473 | 4 |
| SIKATUNA VILLAGE | 14.6358 | 121.0591 | 4 |
| U.P CAMPUS | 14.6476 | 121.0653 | 4 |
| GREATER LAGRO | 14.726 | 121.0666 | 5 |
| GULOD | 14.7168 | 121.0404 | 5 |
| PASONG PUTIK PROPER | 14.7285 | 121.0559 | 5 |
| FAIRVIEW | 14.6995659 | 121.0641361 | 5 |
| APOLONIO SAMSON | 14.6554 | 121.0115 | 5 |
| BAESA | 14.6747 | 121.0135 | 5 |
| BALOMBATO | 14.6651 | 121.0038 | 5 |
| CULIAT | 14.6679 | 121.0567 | 5 |
| PASONG TAMO | 14.6748 | 121.0484 | 5 |
| TANDANG SORA | 14.6819 | 121.0323 | 5 |
| UNANG SIGAW | 14.6586 | 120.9997 | 6 |
| TALIPAPA | 14.6877 | 121.0255 | 6 |
| QC DRRMO BUILDING | 14.6471157 | 121.0520394 | 5 |
| QC REGIONAL EVACUATION CENTER | 14.7006844 | 121.0635826 | 5 |
| SOUTH TRIANGLE | 14.6375903 | 121.0374319 | 5 |
| LA MESA DAM | 14.7120649 | 121.0755568 | 5 |
| KALIGAYAHAN | 14.7382924 | 121.05095 | 5 |
| NAGKAISANG NAYON | 14.719264 | 121.028708 | 5 |
| NOVALICHES PROPER | 14.7212647 | 121.0395928 | 5 |
| SAN AGUSTIN | 14.7297365 | 121.0386955 | 5 |

| | | | |
|---------------|------------|-------------|---|
| SAN BARTOLOME | 14.7007986 | 121.0348889 | 5 |
| STA LUCIA | 14.7056704 | 121.0544101 | 5 |
| STA MONICA | 14.725219 | 121.0434097 | 5 |

IV. **PROJECT STANDARDS AND REQUIREMENTS**

The following are the minimum qualifications and requirement of the Bidders:

Track Record:

- Bidders should have completed, a single contract that is similar to this Project or related to Supply, Installation and Maintenance of Internet-connected devices, equivalent to at least fifty percent (50%) of the ABC five (5) years from the date of submission and receipt of bids, a contract similar to the Project.
- Bidders should have demonstrated experience and capacity to manage internet-based devices of at least one (1) highly urbanized city (HUC) in Metro Manila.

Organization:

- Bidders should be coming from a Hardware/Software Technology company in the Philippines and have demonstrated experience and capacity to manage internet based devices in a highly urbanized city (HUC) in Metro Manila.

Manpower:

- Bidders should have at least five (5) field staff for the installation and three (3) years on-going support and maintenance of fifty (50) smart weather stations. The field staff are hardware technicians that are responsible for the uptime and service level of the fifty (50) smart weather stations

Trainings:

- Bidders should have at least one (1) Meteorologist and three (3) Data Scientist resources for Training and continuous consultation within the project as this is a science-based data driven project. The resources should be Philippine-based and full time employees of Bidder. Bidders should present proof of prior experience.

V. PROJECT DURATION

Delivery of the Goods and Services is required thirty-five (35) calendar days upon issuance of Notice to Proceed. Below is the project timeline that the Bidder needs to complete:

| Item | Duration |
|---|-------------------------|
| Project Implementation Plan | 5 calendar days |
| Delivery of 50 Smart Weather Camera with mount, power adapter and solar panel(set) and accompanying 50 Internet Connectivity Devices | 10 calendar days |
| Installation of 50 Smart Weather Camera set and 50 Internet Connectivity Devices with installation of Data Processing & Display | 20 calendar days |
| Training of QCDRRMO personnel | 5 calendar days |
| TOTAL | 35 CALENDAR DAYS |

VI. APPROVED BUDGET FOR THE CONTRACT

The source of fund for this project is Local Disaster Risk Reduction and Management Fund under Trust Fund. The Approved Budget for the Contract is at **Seventeen Million Two-Hundred Fifty Thousand Pesos (PhP 17,250,000.00)**.

The project cost shall be fixed and there shall be no price adjustments applicable for the duration of the contract except when operations costs are increased by more than 10% as a result of extraordinary circumstances as determined by National Economic Development Authority (NEDA). Pursuant to the provisions of RA 9184 and its IRR on contract price escalation, all contract price escalation shall be approved by the Government Procurement Policy Board (GPBB).

VII. BASIS OF PAYMENT

The contract price shall be the amount proposed by the winning bidder for the project. Payment shall be based on the following schedules:

| Activities | Duration | Percentage of Payment |
|--|-------------------------|--------------------------|
| Project Implementation Plan | 5 calendar days | 15% |
| Delivery and Installation of 50 Smart Weather Camera with mount, power adapter and solar panel (set) and 50 Internet Connectivity Devices | 25 calendar days | 65% |
| Training of QCDRRMO personnel | 5 calendar days | 20% |
| TOTAL | 35 CALENDAR DAYS | 100% Payment made |


VIII. PENALTIES FOR BREACH OF CONTRACT

Failure to deliver the services according to the standards and requirement set by the City shall constitute an offence and shall subject the Contractor to penalties and/or liquidated damages pursuant to RA 9184 and its revised Implementing Rules and Regulations.

IX. CANCELLATION FOR OR TERMINATION OF CONTRACT

The guidelines contained in RA 9184 and its revised IRR shall be followed in the termination of any service 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) RA 9184 and its IRR.

Prepared By:


Marie Hope G. Capicenio
LDRRMO II
QCDRRMO


Noted By:


Edward N. Castillo
Chief, Operations and Warning
QCDRRMO

Approved By:


Karl Michael E. Marasigan
Head
QCDRRMO 

Recommended By:


Ricardo T. Belmonte, Jr.
Secretary to the Mayor
Admin and Finance Supervisor, QCDRRMO 