Supply, Delivery & Installation of Flood Monitoring Sensors and Flood Risk Analysis System

I. RATIONALE AND BRIEF BACKGROUND

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.

Flooding occurs most commonly from heavy rainfall when natural watercourses lack the capacity to convey excess water. Various climatic and non-climatic processes can result in different types of floods: riverine floods, flash floods, urban floods and other factors. 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 CDRRMO but to the citizens of Quezon City.

Enhancing the current systems for flood risk would indeed further capacitate disaster preparedness of the city.

II.   PROJECT DESCRIPTION

The concept of the project is to enhance the capabilities of CDRRMO by increasing the number of flood sensors installed in the city and combining it with a science-based data driven analysis system to improve decision making and early warning to the public. This will enhance Command Center capabilities and will help in making critical decisions for Quezon City.

While investing in additional flood sensor infrastructure, the CDRRMO plans to extend its capabilities by creating a consolidated data endpoint that can be shared to other agencies promoting a community-based approach in flood risk assessment.

Since these are critical systems for disaster preparedness and the country is already in the severe weather season along with the COVID-19 situation, the CDRRMO recommends a system that is already existing and proven working by other Local Government Units in Metro Manila. The CDRRMO 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.

III.   PROJECT SCOPE OF WORK
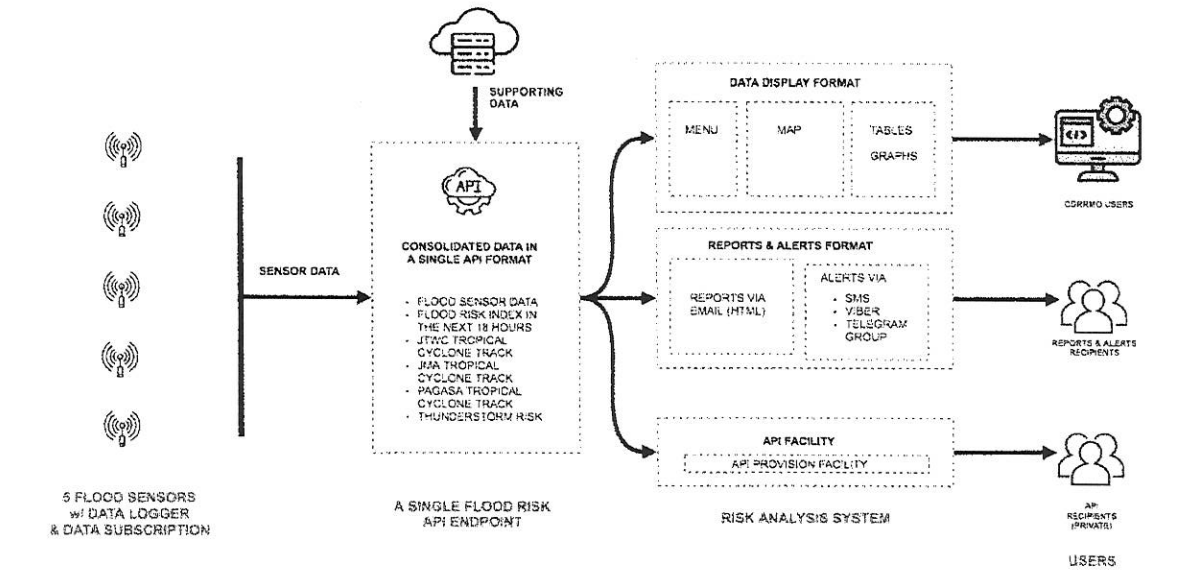
The system will be composed of (a) Flood Sensors (b) Flood Risk API Endpoint (c) Flood Risk Analysis System

The CDRRMO plans to install five (5) flood sensors within the City identified by CDRRMO. Additional supporting datasets such as Tropical Cyclone from PAGASA, JTWC & JMA, Dangerous Thunderstorms, Flood Risk Index and existing rain intelligence by CDRRMO will be included to implement the full system.

System Output

- Operational Flood Sensors (6)
- Flood Risk API Endpoint
- Flood Risk Analysis System
  - Data Display Portal
  - Reports & Alerts Facility
  - API Facility

Technical Specifications

1 Lot	Description	Delivery Time
1 Lot	**1. Five (5) Flood Sensors** - Water Level Monitoring (Telemetered) - Cost effective climate monitoring solution - DOST's Project NOAH certified equipment - Power supply through solar - Plug and play - No programming and complex wiring - Data Logger (Onset) - Real-time access to data from any web browser - Enables to monitor data 24/7 via web browser or	30 Calendar Days

	smartphone. • Alarm capabilities via text/email • LCD display for easy field deployment • Cloud-based data access • Smart Sensor Connectors: 10 inputs. • Logging Rate: Configurable for as low as one (1) second. • Optimum Range: 33 ft. (10 m) • Case Material: 316 stainless steel or PVC • Max Range: 50 ft. (15.2 m) Resolution • Digital: 0.0135 in. (0.3438 mm) • Analog steps: 4099 (0-10 VDC), 3279 (4-20 mA) • Interface: RS485	
	2. Sensor Service Maintenance, Warranty and Data Subscription Quarterly checking of station such as: • Water Level Sensor • Data logger • Battery • Solar Charge Controller • Solar Panel • 3-yrs coverage Replacement of devices and accessories such as: • Water Level Sensor • Data logger • Battery • Solar Panel	30 Calendar Days

	• Solar Charge Controller • 3-yrs coverage Data Connectivity Subscription • 3 years coverage	
	3. Flood Risk API Endpoint Centralize API in JSON Format that includes • Sensor Data • PAGASA Current & Forecasted Tropical Cyclone Track • JTWC Current & Forecasted Tropical Cyclone Track • JMA Current & Forecasted Tropical Cyclone Track • Dangerous Thunderstorm from at least 2 reliable sources that cover greater Metro Manila (at least 45min early detection) • Flood Risk Index in the next 18 hours (Processed Data) • Inclusion of existing Alternative Rain Radar data to be provided by QCDRRMO	30 Calendar Days
	4. Flood Risk Analysis System Data Display • Private online portal	30 Calendar Days

	• Menu & Settings per sensor, cluster or barangay • GIS Display overlaying data from the the Flood Risk API Endpoint • Tables and Graph format displaying analysis from the the Flood Risk API Endpoint Report • Report Facility to assign automated email reports containing analysis from the the Flood Risk API Endpoint • Email (HTML) Format Alerts • Alert Facility to provide monitoring and early warning alerts containing data from the Flood Risk API Endpoint • SMS/Viber alerts for individual alerts at least 500,000 credits per year • Telegram alerts for group alerts API Facility • Online portal to gain access to the Flood Risk API Endpoint for purposes of 3rd party integration	

	Supporting Data Subscription • 3 years coverage	
	5. Sensor Installation • 5 Locations • Site Survey • Installation and Calibration • Engineering works	30 Calendar Days
	6. Training • 1 Day Sensor Maintenance Training • 1 Day System Admin Training • 1 Day Data API Training • 3 Days End User Training • 10 QCDRRMO Personnel	6 calendar days

IV. AREA OF COVERAGE

The sensor installation will cover 6 locations within Quezon City and will be identified by the Emergency Operations Center (EOC) during the start of implementation. The six locations will have an area for the installation that is suited for the sensors. The following are the proposed locations:

1. Brgy. Tatalon

2. Bagong Silangan

3. Batasan Hills

4. Roxas

5. Apolonio Samson

6. Dona Imelda

The risk analysis system information should be generated by sensor location and at any (lat,long) within Quezon City and surrounding regions.

V.   PROJECT STANDARDS AND REQUIREMENTS

Bidders should have completed, a single contract that is similar to this Project or related to Supply, Installation and Maintenance of meteorological devices and data processing systems, equivalent to at least fifty percent (50%) of the ABC three (3) years from the date of submission and receipt of bids, a contract similar to the Project.

Bidders should have at least 3 field staff for the installation and 3 years on-going support and maintenance of 5 sensors.

Bidders should have demonstrated experience and capacity to manage internet based devices in a highly urbanized city (HUC) in Metro Manila.

Bidders should have 1 Meteorologist and/or 1 Data Science resource for Training and continuous consultation within the project as this is a science-based data driven project.

VI.   PROJECT DURATION

Delivery of the Goods and Services is required by Thirty (30) calendar days upon receipt of Notice to Proceed. Below is the project timeline that the Bidder needs to complete.

Item	Duration
Delivery & Installation of Five (5) Flood Sensors set with Data Logger, Solar Panel and Data Connectivity	30 calendar days
Delivery Flood Risk API Endpoint	30 calendar days
Delivery of Flood Risk Analysis System	30 calendar days
Training	6 calendar days
TOTAL	**30 CALENDAR DAYS**

VII.   APPROVED BUDGET FOR THE CONTRACT

TOTAL: 16,000,000

VIII. BASIS OF PAYMENT

Below are the deliverables that will be used as the basis for full payment.

Item	Deliverables
Delivery & Installation of Five (5) Flood Sensors set with Data Logger, Solar Panel and Data Connectivity	Project Acceptance Document: Receipt, Inventory, Installation Completion and Maintenance & Warranty Certificate
Delivery Flood Risk API Endpoint	Project Acceptance Document: Fully delivered system and documentation
Delivery of Flood Risk Analysis System	Project Acceptance Document: Fully delivered system and documentation
Training	Training Certificate

IX. PENALTIES FOR BREACH OF CONTRACT

Incomplete and delayed delivery will result in penalties based on standard Government implementing rules and regulations.

X. CANCELLATION FOR OR TERMINATION OF CONTRACT

Incomplete and delayed delivery and non-performance of services will result in penalties and termination of contract based on standard Government implementing rules and regulations.

Prepared By:

Marie Hope G. Capicenio
LDRRMO II
QCDRRMO

Recommended By:

Cherry Blessing M. Gutierrez
Admin and Finance Section Chief
QCDRRMO

Noted By:

Ricardo T. Belmonte, Jr.
Secretary to the Mayor and
OIC, QCDRRMO