TERMS OF REFERENCE FOR CONSULTANTS

A.   Indicative Consulting Services

1.   Consulting services for this assignment will be contracted by the Asian Development Bank (ADB) to a firm that will be engaged for 82 person-months over 3 years. One national individual water supply information system expert will be also recruited for 26 person-months to support implementation and quality control. All consultants, both firm and individual, will be recruited in accordance with ADB's Guidelines on Use of Consultants (2013, as amended from time to time).

2.   Table 1 shows the experts required and indicative person-months.

Table 1: Summary of Consulting Services

Position	Person-Months
Firm	
1. Team Leader and Water Utility and Smart Water Management Expert (International)	12
2. Water Resource and Flood Management Expert (International)	6
3. Deputy Team Leader and Water Utility and Smart Water Management Expert	26
4. Water Resource and Flood Management Expert	6
5. Disaster Risk Management and Planning Expert	4
6. Climate Change Resilience Expert	3
7. Community Engagement and Development Expert	4
8. Water Supply Network Expert	5
9. Hydrologist and Flood Modelling Expert	3
10. Instrumentation, Control, and SCADA Expert	4
11. IT Expert	6
12. GIS Expert	3
Individuals	
13. Water Supply Information Systems Expert	26

GIS = geographic information system, IT = information technology, SCADA = supervisory control and data acquisition.
Source: Asian Development Bank.

B.   Outline Scope of Work

SI.No	Expected Outputs	Expected Activities
1	Strengthen central-, state-, and district-level smart water management and water quality monitoring systems for drinking water supply in West Bengal	(i) Finalize the objectives in consultation with key stakeholders (ii) Assess processes, outputs, and outcome (iii) Assess existing institutional structure, roles, and responsibilities of each position; and relations between functional groups including field-level units (iv) Review the internal monitoring and management process of PHED and suggest improvements (v) Identify the strategy to fully integrate management and monitoring data and information in decision making tools for the PHED at the state and district levels (vi) Evaluate existing information technology and instrumentation usage to suggest technological

SI.No	Expected Outputs	Expected Activities
		interventions in terms of applications and their deployment considering felt needs
		(vii) Develop an approach to smart water and smart water workflows and data requirements
		(viii) Develop a system architecture that leverages existing information technology, and introduces the new architecture and data management required to deliver the smart water and flood warning systems
		(ix) Define system scope, functional requirements, and specifications needed in establishing centralized smart water management systems, ensuring compatibly of the system with the equipment and monitoring tools to be procured for gram panchayats under a separate assistance.
		(x) Assess information technology hardware requirements including computers, networking and peripheral hardware, instrumentation, and water and flow meters
		(xi) Develop a comprehensive procurement plan and estimate resource requirements
		(xii) Prepare specification, cost estimate, and bid documents for establishing the comprehensive smart water management systems to manage real-time monitoring systems in a bulk water supply infrastructure
		(xiii) Procure (following ADB procedures and involving PHED in selection process), install, and run the smart water management system
		(xiv) Oversee the implementation of the smart water management system
		(xv) Provide a direct, day-to-day interface between the PHED and the project
		(xvi) Examine the design of the new water supply systems and identify locations for smart water instrumentation and feedback loops
		(xvii) Supervise the work on a day-to-day basis and report to the PHED on operational project matters as required, making improvements or adjustments as needed
		(xviii) Identify training requirements in the use of smart water management system applications
		(xix) Identify external training institutes, trainers, and training modules for different target groups
2	Improve flood forecasting, early flood warning, and community response system for East Medinipur district	(i) Carry out needs assessment, both process- and system-based, on the scenario maps of climate change and inundation maps (surges and rainfall)
		(ii) Carry out Bathymetry surveys
		(iii) Identify the locations for real-time RTDAS telemetry and GPRS network for rainfall stations
		(iv) Examine and analyze the nature and cause of flooding in the project area to determine the hydrology of the floodplain in this location
		(v) Design a flood warning and flood response system based upon this analysis for merging with existing systems
		(vi) Procure LiDAR maps
		(vii) Prepare instruments and equipment requirements for flood forecasting and early flood warning systems

SI.No	Expected Outputs	Expected Activities	
		(viii)	Procure equipment to be set up in flood control rooms for communication and information management systems
		(ix)	Develop real-time flood forecasting models and spatial decision support systems
		(x)	Link models and make the system live on a real-time basis
		(xi)	Calibrate model and run the smart water management system for 6 months
		(xii)	Suggest institutional arrangements for running the system
		(xiii)	Prepare a plan for strengthening the community response system
		(xiv)	Conduct comprehensive community awareness and participation programs to improve the effectiveness of the community response system
		(xv)	Carry out on-the-job capacity building and training
3	Capacity of agencies involved in water services provision and water quality monitoring in Ministry of Drinking Water and Sanitation and West Bengal, particularly of PHED and local authorities, on climate change resilience and disaster management strengthened; and community awareness plan covering above aspects prepared and implemented	(i)	Identify training needs in a technical training plan to be prepared, covering usage of smart water management system applications, flood forecasting, and early flood warning systems
		(ii)	Develop training modules
		(iii)	Identify external training institutes, trainers, and training modules for different target groups
		(iv)	Provide on-the-job training on usage of smart water management systems, flood forecasting, and early flood-warning systems
		(v)	Support the rollout of training plan through necessary coordination with training service providers
		(vi)	Track training outcomes, and feedback and update training modules
		(vii)	Prepare separate community engagement plans for the smart water management system and for the flood warning and response system to be discussed in a workshop participated in by team members
		(viii)	Identify potential community leaders
		(ix)	Undertake door-to-door visits among households in selected areas to establish rapport and elicit required information such as perceived problems related to water and climate change
		(x)	Organize a series of meetings with other community members like elders living in the area, social workers, and elected representatives to elicit their cooperation in the implementation of the program, and solicit their help and cooperation in making the community participate in the program
		(xi)	Develop information, education, and communication materials
		(xii)	Structure and implement championship programs focusing on water conservation, monitoring, and community flood response systems