Terms of Reference
for

Consultancy Service for Preparation of Water Supply Master Plan for the Chattogram City with Business/Investment plan (Package: CWSIP/S2)

Chattogram Water Supply and Improvement Project (CWSIP)

Chattogram Water Supply and Sewerage Authority (Chattogram WASA)

1 Background

This Terms of Reference (TOR) sets out the scope for the preparation of a long-term **Water Supply Master Plan**, along with a **Capital Investment Plan (CIP)** and a **5-Year Rolling Business Plan** for the city of Chattogram. The objective of this assignment is to provide a strategic roadmap for ensuring equitable, safe, and sustainable water supply services over a 30 year horizon. The master plan will be developed based on a comprehensive diagnostic of the current system, projections of future demand, climate and disaster risk assessments, and investment prioritization. The TOR outlines the required technical, institutional, and consultative tasks to be undertaken by the consulting team to support this effort.

1.1 National and Local Context

Bangladesh has made commendable progress in improving access to basic water supply and sanitation services over the past two decades. However, challenges remain in ensuring universal access to safely managed services that are resilient, sustainable, and equitably distributed—particularly in rapidly urbanizing metropolitan areas. As the country strives to achieve Sustainable Development Goal 6 (SDG 6), which calls for clean water and sanitation for all by 2030, enhancing water sector planning at the city level has become increasingly critical.

Chattogram, the second largest city and principal seaport of Bangladesh, is one of the country's fastest growing urban centers. The city faces mounting pressures on its water supply infrastructure due to rapid population growth, urban sprawl, aging networks, salinity intrusion, seasonal scarcity, and the increasing risks associated with climate change. While near-universal access to improved water sources has been achieved nationally, Chattogram continues to lag in terms of safely managed water services, network reliability, and non-revenue water control, particularly in underserved and informal areas.

To address these challenges, the Government of Bangladesh has sought development financing from the World Bank (IDA), with the objective of strengthening urban water service delivery and resilience in Chattogram. Accordingly CWASA intend to appoint a Consulting firm for formulation of a comprehensive, long-term Water Supply Master Plan, along with a Capital Investment Plan (CIP) and a 5-Year Rolling Business Plan, to guide strategic infrastructure investment, institutional reform, and operational improvement for the Chattogram Water Supply and Sewerage Authority (CWASA).

This initiative is intended to complement and align with existing national sector strategies, urban resilience plans, and previously completed master plans for drainage and sanitation in the Chattogram Metropolitan Area. It also responds directly to the Government's commitment to improved urban service delivery, climate resilience, and sustainable infrastructure financing, as articulated in the sector-specific policies on water, environment, and local governance.

1.2 Sector Challenges and Opportunities in Chattogram

Chattogram, the second largest city in Bangladesh and its principal maritime gateway, faces complex challenges in delivering safe, reliable, and equitable water supply services. Rapid urbanization,

population growth, aging infrastructure, and climate-induced risks have placed immense pressure on the water supply system managed by the Chattogram Water Supply and Sewerage Authority (CWASA). Despite past investments, the city continues to experience a persistent demand-supply gap, operational inefficiencies, and service disparities across income and geographic segments.

CWASA currently supplies approximately 500 million litres per day (MLD), while projected demand already exceeds 650 MLD, with future requirements anticipated to rise significantly as urbanization accelerates.

Source vulnerability is another critical concern. While groundwater and surface water from the Halda and Karnaphuli rivers are used for supply, seasonal flow reductions and salinity intrusion, particularly during the dry season and lunar tidal cycles, have raised questions about long-term source sustainability.

Technical and commercial losses estimated at 25–30% non-revenue water (NRW). These high NRW levels not only constrain system efficiency and financial sustainability but also reduce the ability to expand coverage to unserved and underserved communities. Many parts of Chittagong don't receive consistent or adequate water pressure - residents in some areas report very low pressure during the day, often needing to wake up at night to collect water when pressure increases. Instead of a steady pressure (like 2–4 bar typical in many urban water systems globally), residents experience intermittent flow, with significant drops in pressure even to below 1 bar or no water flow at all in some areas of the city[1].

However, these challenges are matched by notable opportunities for structural transformation. The **Chattogram Water Supply Improvement Project (CWSIP)**, approved in April 2025, is supporting CWASA with infrastructure upgrades, District Metered Area (DMA) zoning, SCADA-based monitoring systems, and financial-Operational capacity strengthening.

The upcoming Master Plan provides an opportunity to build on these efforts through an integrated, forward-looking planning framework. With a focus on climate resilience, source diversification, NRW control, and utility modernization, CWASA can transition toward a more sustainable and inclusive service delivery model. There is also potential to harmonize water supply planning with existing sanitation and drainage master plans to maximize synergies and resilience co-benefits.

1.3 SDG 6 Commitments, Progress, and Gaps

Bangladesh, alongside 192 other countries, has committed to achieving SDG 6: ensuring universal, equitable, and safely managed drinking water and sanitation services by 2030. While significant strides have been made in baseline access, substantial gaps remain in quality, equity, and systems management.

[1] The average water pressure in CWASA distribution networks is estimated between 0.8-1 bar.

Nationally, while 98.5% of the population access an improved water source, only 59% have safely managed drinking water services (located on premises, available when needed, and free from microbial and chemical contamination). Similarly, although 64% have access to improved sanitation, only 31% benefit from safely managed sanitation—a substantial shortfall in terms of sewerage or safely managed on-site systems. Basic hygiene facilities at home (soap and water) are present in 62% of households. Critically, just 18% of domestic wastewater is treated, with the rest discharged untreated into the environment.

Financially, achieving SDG 6.1 (water) and 6.2 (sanitation) in Bangladesh requires an estimated additional US$9.3 billion beyond current public expenditure. Integrated Water Resource Management (IWRM) is progressing, with a national implementation score of approximately 64%, but challenges persist in coordination and real-time data monitoring.

Key Gaps in the Bangladesh Context:

- **Water Safety**: Almost 40% of urban residents still lack access to truly safe (quality-ensured) drinking water.
- **Sanitation**: More than two-thirds of households rely on sanitation systems that do not meet "safely managed" standards.
- **Wastewater Treatment**: Over 80% of domestic effluent remains untreated, affecting public health and environmental quality.
- **Financial Deficit**: Significant capital expenditure is needed to close infrastructure and service provision gaps.

Implications for Chattogram:

These national deficits reflect and exacerbate local challenges in Chattogram. The city's urban water supply system already underperforms in meeting safely managed water standards, while sanitation and wastewater treatment infrastructure remain largely undeveloped. This underlines the necessity of a comprehensive water master plan, tailored to fill these SDG 6 gaps via infrastructure enhancement, system efficiency, institutional capacity building, and financial structuring.

By addressing these challenges through prioritized investments and systematic planning, the Master Plan, Business Plan, and CIP for Chattogram will directly contribute to the country's SDG 6 agenda and the Government's policy frameworks.

1.4 Justification for a Fresh Master Planning Approach

Chattogram's rapid urban growth, rising service demand, and growing climate-related risks have outpaced existing water supply planning frameworks. The most recent comprehensive master plan dates back over two decades and no longer reflects the city's population dynamics, environmental pressures, or infrastructure realities. With the metropolitan population exceeding 5.2 million and non-

revenue water levels persistently high, CWASA faces growing challenges in ensuring reliable[2] i.e. 24/7 supply, equitable, and safe water services.

While projects have introduced operational improvements—such as DMA zoning, SCADA, and pilot NRW programs—these remain fragmented and lack integration into a long-term, phased capital works strategy. A fresh master plan is now essential to provide CWASA with a spatially informed, climate-resilient, and financially sustainable roadmap for infrastructure development, institutional reform, and service expansion aligned with SDG 6 target.

1.5 Linkages to Existing Sanitation, Drainage, and Urban Plans

The proposed Water Supply Master Plan is designed to align with and complement Chattogram's existing planning frameworks in sanitation, drainage, and urban development. The city has already developed a Sanitation Master Plan which outlines the phased establishment of centralized sewerage systems, on-site sanitation management, and fecal sludge treatment facilities targeting full coverage by 2035.

These sectoral plans provide critical inputs for integrated infrastructure design and investment prioritization. The water supply system's expansion and rehabilitation will require careful coordination with proposed drainage corridors, sanitation network alignments, and land-use zoning to ensure engineering compatibility, cost-efficiency, and environmental sustainability. In addition, the plan must account for urban growth projections from the national Urban Development Master Plan (UDMP) and municipal spatial strategies led by the Chattogram Development Authority (CDA), ensuring alignment with long-term urban form, density, and service delivery models.

An integrated planning approach will enable CWASA and relevant agencies to pool resources, avoid duplication, and maximize co-benefits across the WASH and urban sectors. This Master Plan will serve as a critical interface for harmonizing water infrastructure investments with broader urban resilience and public health goals.

2 Objectives of the Assignment

2.1 Overall Objective

The overall objective of the assignment is to prepare a comprehensive and forward-looking Water Supply Master Plan for Chattogram, covering a planning horizon of 30 years, supported by a Capital Investment Plan (CIP) for the short to medium term (5–15 years), and a Rolling 5-Year Business Plan. This integrated package will provide a strategic framework to guide infrastructure investments, institutional reform, and operational improvements for the Chattogram Water Supply and Sewerage Authority (CWASA), with the aim of achieving universal, equitable, and climate-resilient access to safely managed water supply services in alignment with national development priorities and SDG 6 targets.

[2] Reliable water supply refers to predictable water supply of known quantity, timing, and number of hours of supply.

2.2 Specific Objectives

a) To assess the current status of water supply infrastructure (mapped on GIS base map), service levels (Quality and quantity), demand–supply gap, operational efficiency, and institutional arrangements within CWASA's jurisdiction.
b) To forecast future population, water demand across residential, commercial, industrial, and institutional sectors, and identification of sustainable and resilient water sources to meet projected needs.
c) To evaluate system performance through hydraulic modelling, assess non-revenue water, and identify infrastructure gaps and service delivery bottlenecks.
d) To propose and evaluate development scenarios based on cost-effectiveness, climate risk mitigation, and service coverage expansion.
e) To prepare a long-term Water Supply Master Plan with phased implementation strategies aligned with ongoing sanitation, drainage, and urban development plans.
f) To develop a short-to-medium term Capital Investment Plan (CIP), including prioritization of projects, costing, and financing strategies.
g) To Prepare Detail Engineering design and Preparation of Bid document for priority investments
h) To formulate a 5-year Rolling Business Plan that strengthens CWASA's financial sustainability, institutional capacity, and operational efficiency.
i) To support stakeholder engagement, capacity building, and institutional coordination to enable effective implementation and periodic updating of the master plan.

2.3 Key Results and Expected outcomes

The assignment is expected to deliver the following key results:

- A GIS-based Water Supply Master Plan that is spatially detailed, climate-informed, and responsive to future service needs.
- A phased Capital Investment Plan (CIP) to guide infrastructure development and financing decisions.
- A Rolling 5-Year Business Plan addressing CWASA's financial strategy, institutional strengthening, operational planning, and tariff reform.
- Engineering Design, Drawings and Bid Document for for priority investments.
- Strategic recommendations for Non-revenue water reduction, utility modernization, and source diversification.
- Improved institutional coordination and planning systems within CWASA to enable the periodic updating and operationalization of the master plan.
- Alignment of water supply planning with broader urban resilience including urban development plans, public health, and environmental sustainability goals.

3 Detailed Scope of Services

The Consultant shall be responsible for the end-to-end preparation of a long-term Water Supply Master Plan (30 years), a medium-term Capital Investment Plan (5–15 years), and a Rolling 5-Year Business Plan for CWASA. The scope of services will include technical, institutional, environmental, social, and financial assessments necessary to establish a strategic roadmap for equitable, resilient, and sustainable water supply service delivery in Chattogram. This will involve reviewing existing infrastructure and plans, conducting field surveys and hydraulic modelling, identifying investment priorities, proposing development scenarios, and formulating phased implementation strategies. The Consultant shall ensure that all activities are aligned with national policies, SDG 6 targets, and ongoing sectoral initiatives, while incorporating best practices in urban water management and climate resilience.

3.1 Assessment of Existing Conditions

The Consultant shall begin by conducting a comprehensive review of all relevant existing documentation, including previous feasibility studies, master plans, investment program documents, infrastructure inventories, and operational records maintained by CWASA and other relevant agencies. This includes reviewing materials prepared under past and ongoing projects.

The Consultant shall assess the current configuration, design standards, and operational performance of the entire water supply system—covering source works, intake structures, treatment facilities and operational efficiency, transmission mains, storage reservoirs and capacity assessment, pumping stations, distribution networks, status of water metering and customer service connections including stakeholder consultation. Special attention shall be given to evaluating the condition and capacity of existing assets, identifying service gaps, areas of low pressure or intermittent supply, and infrastructure prone to leakage or failure.

Available demographic, spatial, and economic development data relevant to water service planning shall also be reviewed, including existing and projected land use plans, urban development strategies, population growth trends, institutional mandates and assessment of reuse of treated wastewater potential in industrial area to reduce the stress of fresh water demand. The Consultant shall identify data gaps and propose strategies for supplemental data collection to support evidence-based planning.

All findings from the review shall be compiled into a comprehensive status report that will serve as the foundation for scenario development and subsequent planning tasks.

3.2 Review and Benchmarking of Design Standards

The Consultant shall review existing design standards, technical specifications, and engineering practices currently applied by CWASA and relevant authorities for the planning, design, and operation of water supply infrastructure. These shall be benchmarked against international best practices and relevant standards (e.g., WHO, ISO, AWWA etc.).

The Consultant shall identify deviations or limitations in existing standards—especially those affecting resilience, efficiency, cost-effectiveness, energy usage, service quality, and sustainability. Based on this analysis, the Consultant shall provide detailed recommendations to update or adapt design standards and specifications that will guide future infrastructure development under the Master Plan.

Key focus areas shall include, but not be limited to: Treatment process design, pipe sizing, pressure zoning, storage capacity norms, hydraulic parameters, metering and SCADA systems, material selection, and climate-resilient engineering features.

3.3 Water Demand Forecasting and Scenario Development

The Consultant shall develop robust forecasts of future water demand for the planning horizon of 30 years, disaggregated by major consumer categories, including residential, commercial, institutional, and industrial users. The projections shall be based on historical consumption data, population growth trends, urban expansion patterns, economic activity forecasts, and planned zoning or land use changes obtained from relevant authorities.

The demand assessment shall account for per capita consumption norms, variations in demand by income level and service area, Non-Revenue Water (NRW) and peak demand factors. The Consultant shall also assess the impact of demand-side management options, including water conservation, leakage reduction, tariff-based usage incentives, and reuse/recycling measures particularly for industrial and irrigation use.

Based on the demand forecasts, the Consultant shall develop multiple development scenarios to inform the master plan. These scenarios shall consider variables such as different population growth rates, climate change impacts, water resource availability, operational efficiency in terms of continuous supply, Non-Revenue Water (NRW) and institutional reform pathways. Each scenario shall be evaluated for feasibility, cost-effectiveness, resilience, and shall serve as the basis for defining strategic investment options and service expansion priorities under the master plan.

3.4 Assessment of Current and Alternative Water Sources

The Consultant shall assess the current raw water sources utilized by CWASA, including groundwater and surface water abstractions from the Halda and Karnaphuli river. The analysis shall include source yield, reliability, seasonal variability, water quality characteristics, environmental flow requirements, and competing uses. Historical production data, treatment performance, and risks from upstream land use and pollution shall be reviewed in detail.

The Consultant shall review the viability of alternative water sources that have been previously identified or are under consideration, and may support CWASA in identifying additional source options, where appropriate. These may include new surface water intakes, deep aquifers, treated wastewater reuse, rainwater harvesting, desalination, artificial groundwater enrichment or inter-basin

transfers etc. Each option shall be evaluated in terms of technical and financial feasibility, water quality, treatment needs, environmental and social implications, and regulatory acceptability.

All assessments shall explicitly consider the potential impacts of climate change, including increased frequency of droughts, shifts in rainfall patterns, sea level rise, salinity intrusion, and temperature-related changes in water quality and availability. The Consultant shall incorporate climate risk and vulnerability factors in the screening and prioritization of water source options.

Based on this analysis, the Consultant shall support CWASA in formulating a long-term, climate-resilient, and diversified water sourcing strategy that ensures reliable and sustainable supply across the 30-year planning horizon.

3.5 Assessment of Water Quality and Health Risks

The Consultant shall assess the quality of raw and treated water across the existing water supply system and evaluate associated public health risks. This includes a review of historical and current water quality monitoring data maintained by CWASA and relevant regulatory agencies, covering key physical, chemical, and microbiological parameters at source, treatment, distribution, and consumer endpoints particularly after the service delivery point i.e. water meter at private ground/elevated tanks/underground reservoir where bacteriological contaminations are likely affecting public health. Transition from intermittent to continuous supply makes private tanks obsolete and increases the water quality at customer tap points.

The assessment shall identify locations and conditions associated with water quality deterioration, such as low-pressure zones, intermittent supply areas, cross-contamination risks, or poorly maintained assets. The Consultant shall evaluate the adequacy of CWASA's current water quality monitoring systems, laboratory capabilities, sampling protocols, and regulatory compliance mechanisms.

Health risks associated with microbial contamination (e.g., E. coli, total coliforms), chemical contaminants (e.g., iron, arsenic, salinity), and disinfection by-products shall be examined in accordance with national drinking water quality standards and WHO guidelines. The Consultant shall also assess the potential for contamination due to flooding, sewage ingress, and source vulnerability under climate change scenarios.

Based on these findings, the Consultant shall recommend improvements to the water quality monitoring and risk management system, including enhancements in sampling coverage, laboratory procedures, early warning systems, and protocols for public health response. Recommendations shall also address water safety planning and strengthen the institutional framework for ensuring compliance with drinking water quality standards including for private ground and elevated tanks at customer end.

3.6 Hydraulic Modelling and System Optimization

The Consultant shall develop and calibrate a comprehensive hydraulic model of the existing and future water supply network using software acceptable to CWASA[3] The model shall include all critical system components—source intakes, treatment facilities, transmission mains, reservoirs, pumping stations, and distribution zones—based on available data and verified through field investigations.

To support model development and calibration, the Consultant shall identify and carry out necessary field surveys, including flow and pressure monitoring, reservoir level measurements, and pipeline condition assessments in coordination with CWASA. Where existing GIS and network mapping data are incomplete or outdated[4], the Consultant shall propose and execute topographic or route surveys to ensure modeling accuracy.

The model shall be used to assess current hydraulic performance and simulate future network behavior under varying demand, population growth, and climate scenarios. It shall identify low-pressure zones, undersized or overburdened mains, areas of high friction losses, and vulnerability to service disruptions. Based on these simulations, the Consultant shall optimize the layout and configuration of the future network, including flow and pressure zones, pumping regimes, DMA boundaries, and storage requirements.

Where new or expanded facilities are required—such as booster stations, elevated reservoirs, treatment plants, or service reservoirs—the Consultant shall specify the recommended location, minimum land area, functional layout requirements, and basic site specifications, including elevation, accessibility, and utility proximity. The Consultant shall ensure that land requirements are clearly defined to support investment planning and feasibility assessment.

All hydraulic model files, calibration datasets, and operating manuals shall be submitted to CWASA, and hands-on training shall be provided to designated staff to ensure independent future use and model updating[5].

3.7 Integration of Public Health Data and Epidemiological Trends

The Consultant shall review and analyze available public health data—including epidemiological records from the Ministry of Health, Chattogram City Corporation health units, and WHO/UNICEF Joint Monitoring Programme reports—to assess the relationship between water supply inadequacies and incidence of waterborne diseases (e.g., diarrhea, cholera, typhoid). This shall include a spatial overlay of disease incidence with low-pressure zones, intermittent supply areas, or informal

[3] EPANET, WaterGEMS or equivalent is acceptable for CWASA.

[4] Under Karnaphuli Water Supply Project Phase 2, CWASA laid 692 kilometers of distribution pipeline that has GIS data. CWASA currently operates a total of 965 kilometers of distribution pipeline.

[5] The required measurement equipment (flow meters, pressure loggers, data loggers, etc.) will be provided by the consultant only for the project and no equipment will be handed over to CWASA.

settlements using GIS tools. The Consultant shall coordinate with health authorities to validate patterns, identify high-risk areas, and integrate these findings into the Master Plan's prioritization framework. Recommendations for targeted infrastructure or service improvements in health-vulnerable areas shall be included in the strategic planning.

3.8 Climate Risk, Disaster Resilience and Source Vulnerability Assessment

The Consultant shall assess the vulnerability of Chattogram's water supply system to climate-related hazards and natural disasters, including flooding, salinity intrusion, drought, riverbank erosion, and cyclonic storm surges. The assessment shall be based on historical climate records, national and international climate projections, disaster risk mapping, and relevant hydro-meteorological datasets from Bangladesh Meteorological Department, Bangladesh Water development Board, and other government agencies. The Consultant shall also integrate risk factors linked to future urban expansion, encroachment into hazard-prone areas, and degradation of upstream catchments.

The analysis shall cover both water sources (e.g., Halda and Karnaphuli rivers, deep aquifers) and infrastructure assets (e.g., intake points, treatment plants, reservoirs, pipelines). It shall identify physical, operational, and institutional vulnerabilities and assess their impact on water availability, quality, and service continuity across the 30-year planning horizon. Risks from sea level rise and salinity intrusion—particularly affecting dry season flows—shall be analyzed using secondary data, geospatial overlays, and stakeholder consultations.

To support this work, the Consultant shall review existing flood hazard maps and conduct targeted field surveys where required, including elevation profiling of critical sites, flood exposure assessments of key facilities, and consultations with local disaster management bodies.

Based on this assessment, the Consultant shall propose risk mitigation, climate adaptation, and disaster-resilient design measures, including relocation or elevation of vulnerable assets, redundancy in supply systems, protection of intake zones, and flood-resilient siting of new infrastructure. For proposed new facilities, the Consultant shall recommend preferred locations, land area requirements, and siting criteria that minimize exposure to flood and climate risks. As in earlier tasks, CWASA shall remain responsible for land identification and acquisition, but planning inputs provided by the Consultant shall guide pre-feasibility screening and investment readiness.

3.9 Strategic Options Development and Cost-Benefit Analysis

Based on the findings from demand forecasting, hydraulic modelling, source assessment, and risk analysis, the Consultant shall formulate a set of strategic development options for expanding, upgrading, and optimizing the water supply system in Chattogram over the 30-year planning horizon. These options shall be structured into phased investment packages aligned with short-, medium-, and long-term objectives, and should consider infrastructure, institutional, operational, and financial dimensions.

Each option shall be assessed in terms of its technical feasibility, capital and operating costs, environmental and social impacts, resilience to climate risks, and potential to improve service coverage, equity, and system efficiency. The Consultant shall conduct a comparative cost-benefit analysis (CBA) or cost-effectiveness assessment using internationally accepted methodologies. Also Economic internal rate of return (EIRR) or Net Present Value (NPV) calculations shall be presented to support prioritization and decision-making.

The assessment shall also consider implementation risks (e.g., land acquisition, institutional capacity, procurement complexity), funding availability, and sequencing requirements. The Consultant shall consult closely with CWASA and relevant stakeholders to ensure that the strategic options are realistic, locally appropriate, and aligned with sectoral goals.

For any proposed infrastructure requiring new land, the Consultant shall provide location-specific guidance on the spatial requirements, layout considerations, and basic technical criteria for site selection.

3.10 Preparation of the Long-Term Water Supply Master Plan (30 years)

The Consultant shall prepare a comprehensive and phased **Water Supply Master Plan for Chattogram**, covering a 30-year planning horizon. The Master Plan shall provide an integrated roadmap for system expansion, rehabilitation, optimization, and institutional strengthening to ensure universal access to safely managed water services, in alignment with SDG 6 and national policy objectives.

The Master Plan shall be spatially detailed, based on GIS datasets, and structured in three implementation phases: short-term (0–5 years), medium-term (6–15 years), and long-term (16–30 years). It shall incorporate outputs from all preceding technical tasks, including demand forecasts, source analysis, climate risk assessments, hydraulic modelling, cost-benefit evaluations, and stakeholder consultations.

The plan shall define and map the recommended infrastructure interventions—covering sources, treatment facilities, storage, pumping, transmission, and distribution—along with associated institutional and operational reforms. It shall also include proposals for utility modernization (e.g., SCADA, DMA expansion), service delivery improvements (e.g., pressure zoning, NRW control), and environmental and Social safeguards.

For each major infrastructure component proposed in the Master Plan, the Consultant shall provide indicative site guidance, land area requirements, and relevant planning criteria to inform future land acquisition by CWASA. The Consultant shall coordinate with CDA and other relevant agencies to ensure alignment with existing urban, sanitation, and drainage master plans, and shall ensure that cross-sectoral linkages are reflected in the spatial and investment planning framework.

The Master Plan shall be presented in a format that enables CWASA to periodically update key components—such as demand projections, investment phasing, and performance benchmarks—and adapt to future changes in financing, governance, and climate conditions.

All infrastructure proposals included in the Master Plan shall be based on updated or recommended design standards validated through the benchmarking review. The Consultant shall ensure that these standards are contextually adapted to Chattogram while aligning with international norms and donor requirements.

3.11 Capital Investment Planning (0–15 years)

The Consultant shall prepare a **Capital Investment Plan (CIP)** for the short-term (0-5 years) and medium-term (6-15 years) implementation phases i.e. for a 15-year time horizon, derived from the phased recommendations of the 30-year Master Plan. The CIP shall identify infrastructure and system interventions that are technically ready, financially viable, institutionally implementable, and responsive to urgent service delivery needs.

For each proposed investment, the Consultant shall provide key information including scope, location, preliminary design, Drawings, estimated capital and O&M costs, indicative procurement packaging, and implementation timelines. The prioritization shall be based on a multi-criteria framework that considers cost-effectiveness, service coverage improvement, climate resilience, risk reduction, institutional capacity, and alignment with donor and government funding strategies.

The Consultant shall also propose a financing strategy that identifies potential funding sources (e.g., government budget, development partner financing, public-private partnerships) and tariff structure and explores possible phasing or bundling of investments for efficient resource mobilization. Where appropriate, public health and gender-related benefits shall be integrated into the justification of selected projects.

For infrastructure requiring new land, the Consultant shall indicate estimated land area requirements, costs and to support CWASA in securing appropriate locations.

The CIP shall be structured in a format suitable for internal budgeting, donor alignment, and future investment planning, and shall be accompanied by summary maps, investment schedules, and a monitoring framework.

3.12 Detail Engineering design and Preparation of Bid document for priority investments

In connection with the CIP, the Consultant will prepare detailed designs and bidding documents for the priority water supply investments considering the short-term implementation phase i.e. for immediate priorities which need to be implemented within short-term time horizon. This will include, but not necessarily be limited to the following:

a. Prepare and submit detailed feasibility and engineering design of identified and proposed priority investment for immediate development of water supply and provide drawings in connection with the priority of investments;

b. Prepare procurement documents complete with engineering design, drawings, estimates, BOQ, etc. in complying with procurement guidelines of the World Bank, PPR 2025 and PPA 2006 of Bangladesh for the works recommended under priority investment for improvement of water supply;

c. Prepare construction plan and implementation program of priority investments.

3.13 Preparation of a 5-Year Rolling Business Plan

The Consultant shall prepare a detailed and implementable Rolling 5-Year Business Plan to support CWASA in operationalizing the Master Plan and Capital Investment Plan. The Business Plan shall focus on translating strategic infrastructure and institutional priorities into actionable annual and multi-year programs with clear resource, performance, and financing frameworks.

The plan shall include revenue and expenditure projections, tariff scenarios, and long-term O&M cost estimates linked to proposed system expansions, service targets, and efficiency improvements. It shall define key performance indicators (KPIs) across technical (including NRW reduction), financial, and customer service domains and establish baselines and annual improvement targets.

The Consultant shall review CWASA's current institutional structure, staffing, asset management practices, customer service systems, and financial management tools. Based on this review, the Business Plan shall include recommendations for utility modernization, staff capacity development, digital systems (e.g., billing, SCADA integration), and organizational reforms necessary to meet operational goals.

The Consultant shall also assess funding and cash flow requirements, including donor support, government budget allocations, and potential for public-private participation. Risks to implementation—including tariff policy, institutional coordination, and procurement bottlenecks—shall be identified along with corresponding mitigation strategies.

The Business Plan shall be structured for annual updating and rolling implementation, enabling CWASA to adapt to changes in financing, project readiness, and policy direction. The Consultant shall ensure consistency between the Business Plan, the CIP, and the long-term Master Plan.

3.14 Institutional Review and Capacity Development Recommendations

The Consultant shall undertake a comprehensive review of CWASA's institutional framework, operational procedures, and human resource capacity to identify key strengths, weaknesses, and gaps that may affect the successful implementation of the Master Plan, Capital Investment Plan, and Business Plan. This review shall include an assessment of organizational structure, departmental functions, staffing levels and skills, decision-making processes, coordination mechanisms, and internal performance monitoring systems.

The Consultant shall also review CWASA's financial management systems, asset management practices, customer service protocols, and digital tools (including GIS, billing systems, and SCADA platforms), with a view to identifying areas for modernization and integration. Regulatory

compliance, stakeholder engagement practices, and inter-agency coordination with entities such as CDA and CCC shall also be examined.

Based on this analysis, the Consultant shall propose a set of targeted institutional development and capacity building measures, including restructuring needs, training and skill enhancement, digital transformation, process reengineering, and improvements to internal controls and performance management. These recommendations shall be phased and prioritized in line with the investment and business planning cycle, and should be realistic, implementable, and aligned with ongoing reforms supported by development partners.

The Consultant shall also recommend a framework for ongoing institutional performance monitoring and capacity tracking, to enable CWASA to sustain improvements over time and adjust to evolving service demands and regulatory expectations.

3.15 Strategic Environmental and Social Assessment

The Consultant shall conduct a high-level Strategic Environmental and Social Assessment (SESA) of the proposed interventions under the Master Plan and Capital Investment Plan to identify potential environmental and social risks, impacts, and opportunities associated with the planned system expansion and infrastructure development over the 30-year horizon.

The SESA shall be aligned with national environmental regulations and relevant international standards, including the World Bank Environmental and Social Framework (ESF) and applicable safeguard policies of other development partners. The assessment shall screen proposed interventions—such as new water treatment plants, intake structures, pipelines, reservoirs, and pumping stations—for potential impacts on land, ecosystems, livelihoods, cultural heritage, and vulnerable groups.

The Consultant shall assess socio-environmental impacts including Public Health, economic benefits through better water supply etc.[6] and recommend land acquisition, mitigation and protective measures and resettlement action necessary to implement the Master Plan. Recommendations shall also address environmental sustainability aspects such as sludge management, water source protection, energy efficiency, and climate adaptation co-benefits.

The SESA findings shall inform the finalization of infrastructure phasing, site selection, and stakeholder engagement strategies, and shall be integrated into the Master Plan documentation and investment prioritization framework.

3.16 Stakeholder Engagement and Participatory Planning

The Consultant shall design and implement a structured stakeholder engagement process to ensure that the Master Plan, Capital Investment Plan, and Business Plan reflect the needs, priorities, and

[6] This assessment will also include positive effects on public health through safe water supply as well as positive effects on economy through better water supply. Also reduced cost on customer side for private tanks, pumps and home treatment of water shall be considered.

concerns of key stakeholders, including government agencies, development partners, service users, vulnerable groups, and civil society organizations.

The Consultant shall prepare a Stakeholder Engagement Plan (SEP) at the outset of the assignment, identifying key actors, engagement objectives, consultation methods, and a communication schedule. Engagement activities may include focus group discussions, technical workshops, bilateral consultations, and public information sessions. Efforts shall be made to ensure inclusive participation, particularly from women, low-income communities, and other underrepresented groups.

Consultations shall be conducted at critical stages of the assignment, including during the baseline assessment, scenario development, prioritization of investments, and validation of final outputs. The Consultant shall document all stakeholder inputs and demonstrate how they have been considered in the planning and decision-making process.

The Consultant shall also recommend institutional mechanisms to support ongoing stakeholder dialogue and inter-agency coordination beyond the life of the assignment, particularly during the implementation of capital projects and updates to the Master Plan. This may include proposals for multi-agency steering committees, grievance redress mechanisms, and participatory monitoring frameworks.

Relevant health institutions and epidemiological surveillance bodies shall be included as key stakeholders to validate public health linkages and ensure alignment with urban health strategies.

3.17 GIS Mapping and Digital Asset Inventory

The Consultant shall develop a comprehensive and geo referenced GIS-based digital asset inventory of the existing and proposed water supply infrastructure in Chattogram. This shall serve as a foundational decision-support tool for CWASA and form an integral component of the Master Plan, Capital Investment Plan, and Business Plan.

The Consultant shall collect, validate, and digitize spatial data for all key system components, including water sources, treatment plants, pumping stations, transmission and distribution pipelines, storage reservoirs, valves, meters, and customer connections. Existing GIS data maintained by CWASA[7] and other agencies shall be collected, reviewed and integrated, with 100% field validation to ensure accuracy and completeness.

Where data gaps exist—particularly for undocumented assets or informal network extensions—the Consultant shall propose and implement targeted surveys using GPS-enabled mapping tools. All data shall be compiled in a standardized; interoperable GIS format that can be integrated with CWASA's existing or planned MIS, SCADA, and billing systems.

[7] Under Karnaphuli Water Supply Project Phase 2, CWASA laid 692 kilometers of distribution pipeline that has GIS data. CWASA currently operates a total of 965 kilometers of distribution pipeline.

For all proposed infrastructure interventions under the Master Plan, the Consultant shall prepare GIS-based planning maps on city master plan and or maps developed by Survey of Bangladesh (SB) indicating locations, service coverage, spatial phasing, and land requirements. These maps shall support spatial prioritization, coordination with urban and drainage plans, and screening of environmental and social risks.

The Consultant shall deliver to CWASA a complete set of GIS shape files, metadata, and map products, along with training and operational guidance to ensure that the system can be maintained, updated, and expanded by CWASA in the future.

4 Expected Deliverables and Timeline

The Consultant shall be responsible for preparing and submitting a comprehensive set of reports, plans, and technical outputs that align with the scope of services and support CWASA in long-term planning and implementation. All deliverables shall be prepared in English, professionally formatted, and submitted in both digital (i.e. Word, Excel, PDF, dwg, shp etc.) and printed form. Draft versions shall be submitted for review and comments, and finalized versions shall incorporate feedback from CWASA and relevant stakeholders.

4.1 Key Deliverables

The expected deliverables include, but are not limited to, the following:

D-1. **Inception Report**: outlining detailed work plan, methodology, data requirements, stakeholder engagement strategy, and revised timelines.

D-2. **Baseline Assessment Report**: establishment of baseline data for the proposed master plan including but not limited to historical population data, existing water supply and sewerage infrastructure condition and NRW levels, economical profile of city, review of existing Master plan for other services such as sewerage, transport, housing and institutional and industrial development etc., current institutional arrangements of CWASA, and identification of stakeholders and assessment for stakeholder inputs.

D-3. **Population Projections, Water Demand and Source Assessment Report**: Population projections, Water demand assessment and projections, source viability assessments, and climate risk implications.

D-4. **Topographical Survey, GIS base mapping, Hydraulic Model and Technical Diagnostic Report**: including integration of existing water supply network and other infrastructure and development of DMA model files, pressure management including calibration results, and system performance analysis.

D-5. **Strategic Options Report**: presenting phased development scenarios and optimization of cost and investment including cost-benefit analysis outcomes.

D-6. **Draft Master Plan** (30-year horizon): with GIS-based infrastructure layout, development phasing, and land requirements.

D-7. **Draft Capital Investment Plan (0–15 years)**: including project prioritization, costing, and financing strategy.

D-8. **Draft Detail Design, Drawing and Bid Documents of Priority Investments**

D-9. **Draft Rolling 5-Year Business Plan**: including operational, financial, and institutional improvement measures.

D-10. **Strategic Environmental and Social Assessment (SESA)** Report.

D-11. **Stakeholder Engagement Summary Report**: documenting process, feedback received, and how inputs were addressed.

D-12. **GIS Database and Digital Asset Inventory**: including all shape files, metadata, and system documentation.

D-13. **Final Reports including Final Master Plan, Capital Investment Plan and Rolling 5-Year Business Plan and Detail Design, Drawing and Bid Documents of Priority Investments**: incorporating CWASA's and stakeholder feedback, and submitted with all annexes, data tables, and modeling tools.

4.2 Timeline and Delivery Schedule

The overall duration of the assignment is expected to be 24 months from the date of contract signing. An indicative schedule for key deliverables is as follows:

Sl. No.	Deliverable	Timeline from Start Date
D-1	Inception Report	02 months
D-2	Baseline Assessment Report	06 months
D-3	Population Projections, Water Demand and Source Assessment Report	08 months
D-4	Topographical Survey, GIS base mapping, Hydraulic Model and Technical Diagnostic Report	12 months
D-5	Strategic Options Report	15 months
D-6	Draft Master Plan	18 months
D-7	Draft Capital Investment Plan	20 months
D-8	Draft Detail Design, Drawing and Bid Documents of Priority Investments	22 months
D-9	Draft Rolling 5-Year Business Plan	22 months
D-10	Strategic Environmental and Social Assessment (SESA) Report	23 months
D-11	Stakeholder Engagement Summary Report	23 months
D-12	GIS Database and Digital Asset Inventory	23 months
D-13	Final Reports	24 months

5 Study Area and Coverage

5.1 Administrative Boundaries and Service Area

The study area for this assignment shall encompass the entire service area under the jurisdiction of CWASA, including the Chattogram City Corporation and other urban and peri-urban areas identified for current or future service expansion within the Chattogram Metropolitan Area (Preferably Detailed Area Plan Area of Chattogram Development Authority). The Master Plan shall take into account population growth trends, land use changes, and urban development projections over the 30-year planning horizon.

5.2 Relevant Infrastructure and Stakeholder Institutions

The Consultant shall consider all existing and planned water supply infrastructure assets, including raw water intake locations, treatment plants, transmission and distribution networks, pumping stations, reservoirs, and customer connections. In addition to core urban zones, the assessment shall include low-income settlements, fringe areas, and areas likely to be absorbed into the service coverage zone through future expansion or densification.

The study shall also address inter linkages with sanitation, drainage, and flood management infrastructure, particularly in areas where integration of planning and investments will enhance resilience, cost-efficiency, and service sustainability. Coordination with the Chattogram Development Authority (CDA), Chattogram City Corporation, and other relevant agencies shall be undertaken to ensure consistency with approved urban and spatial development plans.

Where expansion of services or development of new infrastructure is proposed, the Consultant shall provide recommendations on Land Identifications, technical suitability, land requirements, and hazard exposure etc.

6 Technical and Planning Framework

The preparation of the Master Plan, Capital Investment Plan, and Business Plan shall be guided by a coherent and forward-looking technical and planning framework. This framework shall ensure that the recommendations are evidence-based, climate-resilient, financially sustainable, and operationally feasible, while also enabling CWASA to adapt to future challenges and service demands over the 30-year horizon.

6.1 Phased Development Strategy

The Consultant shall adopt a phased approach to planning, dividing the 30-year horizon into short-term (0–5 years), medium-term (6–15 years), and long-term (16–30 years) periods. This phasing shall inform investment prioritization, institutional readiness, and resource allocation, enabling implementation to proceed in a structured and manageable manner.

6.2 Demand Management and Source Diversification

The plan shall incorporate strategies for water demand management—such as leakage control, customer awareness, and tariff structuring—alongside the development of diversified and climate-resilient water sources. Both supply- and demand-side measures shall be evaluated in terms of efficiency, cost-effectiveness, and environmental impact.

6.3 NRW Reduction and Utility Modernization

The framework shall integrate CWASA's ongoing and planned efforts to reduce non-revenue water through DMA creation, pressure zoning, reduction of physical losses including unauthorized consumption, metering improvements, and SCADA-based monitoring. The Consultant shall prepare a NRW Reduction Strategy including proposed realistic, phased targets for NRW reduction, supported by institutional and operational strengthening. NRW reduction strategy should also consider other types of commercial losses, such as meter tampering, bypasses, illegal connections, other types of physical losses, such as reservoir overflows, as well as a reduction of unbilled authorized consumption, which includes CWASA internal consumption (e.g., reservoir cleaning, pipe flushing) and free-water for certain customer groups (e.g. religions and governmental buildings).

6.4 Climate Resilience and Risk Mitigation

Climate change risks—including flooding, drought, salinity intrusion, and sea level rise—shall be addressed through resilient infrastructure design, redundancy in supply systems, and risk-informed spatial planning. The framework shall align with national climate policies and the World Bank's climate resilience standards.

6.5 Application of International Good Practices and Tools

The Consultant shall apply proven international best practices in water utility planning, hydraulic modelling, economic prioritization, and GIS-based infrastructure mapping. The framework shall emphasize sustainability, cost recovery, inclusive service delivery, and digital transformation in utility operations.

7 Team Composition and Qualification Requirements

7.1 Key Experts and Profiles

Expert No.	Position	Minimum Educational and Professional Qualifications	Experience	Input (Person-Months)
KE-1	Team Leader	Master's degree in Civil Engineering / Sanitary/ Environmental Engineering; he must be fluent in English and must have proven team management skills.	**General experience:** Minimum 20 (Twenty) years of professional experience in water supply projects, with a minimum 10 years as Team Leader on international	24

Expert No.	Position	Minimum Educational and Professional Qualifications	Experience	Input (Person-Months)
			assignments and experience with international development partner funded projects. **Specific Experience:** Experience as Team Leader in least 02 (two) Projects of water supply Master Plan of Large/ Medium cities (with minimum 3 Million inhabitants).	
KE-2	Water Treatment Specialist	Master's degree in Civil Engineering/ Environmental Engineering/Sanitary Engineering/Hydraulic Engineering	**General experience:** Minimum 15 (Fifteen) years of experience in Water Supply Projects especially in designing of water treatment plants/Process. **Specific experience:** Experience as Water Treatment Specialist in at least 02 (two) Water Treatment plant Projects with a minimum capacity of 200 Mld each. Working as a Water Treatment Specialist in any Water Supply Master Planning Project would be an added advantage.	06
KE-3	Hydraulic Modelling Expert	Master's degree in Civil Engineering/ Environmental Engineering/Sanitary Engineering/Hydraulic Engineering	**General Experience:** Minimum 15 (Fifteen) years of professional experience of water supply projects as Hydraulic Modelling Expert. **Specific Experience:** Experience as a Hydraulic Modelling Expert in at least 02 (two) Urban Water supply Network Project with minimum pipeline length of	08

Expert No.	Position	Minimum Educational and Professional Qualifications	Experience	Input (Person-Months)
			300 km each. Working as a Hydraulic Modelling Expert/Hydraulic Modeller in any Water Supply Master Planning of Large/medium cities (with minimum 3 Million inhabitants) would be an added advantage.	
KE-4	NRW Specialist	Master's degree in Civil Engineering/ Environmental Engineering/Sanitary Engineering/Hydraulic Engineering	**General experience:** Minimum 15 (Fifteen) years of professional experience of water supply projects as NRW Specialist. **Specific experience:** Experience as NRW Specialist in at least 02 (two) Urban water distribution projects in of Large/medium cities (with minimum 3 Million inhabitants).	04
KE-5	Pipeline Specialist	Masters in Civil Engineering/ Environmental Engineering/Sanitary Engineering.	**General experience:** Minimum 15 (Fifteen) years of experience of designing Water Network including Transmission and Distribution systems. **Specific experience:** Experience as a Pipeline specialist/Pipeline designer in at least 02 (two) projects with minimum pipeline length of 300 km each. Working as a Pipeline Specialist in any Water Supply Master Planning of Large/medium cities (with minimum 3 Million inhabitants) would be an added advantage.	08

Expert No.	Position	Minimum Educational and Professional Qualifications	Experience	Input (Person-Months)
KE-6	GIS Expert	Bachelor's degree in Civil Engineering/Urban and Regional Planning/ Geo informatics / GIS /Remote Sensing/related field	**General experience:** Minimum of 15 (fifteen) years professional experience in implementing GIS based water supply systems. **Specific experience:** Experience as GIS Expert in at least 02 (two) projects in Design/Implementation of GIS system of water supply system consist of minimum 300 km pipeline. Worked as a GIS Specialist/Expert in any Water Supply Master Planning project of Medium/ Large cities (with minimum 3 Million inhabitants) would be an added advantage.	08
KE-7	Finance Expert	Master's in Economics / Finance/ Business Administration/relevant field.	**General experience:** Minimum 15 (Fifteen) years of experience in Public utility finance, cost recovery, and investment planning. **Specific experience:** Experience as Finance Expert/Specialist in at least 02 (Two) Water Supply Master Plan Projects of Medium/ Large cities (with minimum 3 Million inhabitants)	03
KE-8	Institutional/Water utility expert	Master's in Engineering /Public Administration / Institutional Development / Management/Business Administration	**General experience:** Minimum 15 (Fifteen) years of experience in public utility management reform and institutional Reform. **Specific experience:** Experience as Institutional/Water utility	03

Expert No.	Position	Minimum Educational and Professional Qualifications	Experience	Input (Person-Months)
			expert in at least 02 (two) Water Supply Master Plan Project of Medium/Large cities (with minimum 3 Million inhabitants)	
National KE-1	Deputy Team Leader	Bachelor degree in Civil/ Sanitary/Environmental Engineering	**General experience:** Minimum 15 (fifteen) years of professional experience in the implementation of Water Supply Projects. **Specific experience:** Experience as Deputy Team Leader/Water Infrastructure Specialist in at least 02 (two) Water Supply Master Plan Project of Large/Medium cities (with minimum 3 Million inhabitants)	18
National KE-2	Water Supply Infrastructure Design Engineer	Bachelor degree in Civil Engineering/Sanitary Engineering/Environmental Engineering	**General experience:** Minimum 15 (fifteen) years of experience in water supply infrastructure design, including Water treatment Plant, transmission and distribution system design. **Specific experience:** Experience as Water Treatment Specialist/Water Infrastructure Specialist in at least 02 (two) Water Supply Master Plan Project of Large/Medium cities (with minimum 3 Million inhabitants)	06

Non-key Experts & Support staff

In addition to the key experts described above, the Consultant shall mobilize sufficient non-key experts and support personnel. The following only provides some indications for possible such non-key positions and support staff (listing is not complete). The Consultant is not bound by this compilation, and is free to come up with the necessary non-key experts and support staff, as the consultant deems best suited to meet the objectives of this assignment.

Examples for possible International non-key experts:

Sl. No.	Name of Post	Minimum inputs (Person/Man-Month)	Educational Qualification and experiences required
1.	Mechanical Engineer	03	**Educational Qualifications:** The Mechanical Engineer should have Bachelor degree. in Mechanical Engineering; he must be fluent in English. **General Experience:** Minimum 12 (Twelve) years of professional experience in the design & installation of mechanical equipment and experience in supervision of mechanical-electrical components of water treatment plants. **Specific experience:** Experience of 02 (two) projects as mechanical Engineer for design and construction supervision of mechanical equipment of Water Treatment Plant with a minimum capacity of 140 MLD within the last 10 years.
2.	Electrical Engineer/SCADA Expert	03	**Educational Qualifications:** The Electrical Engineer should have minimum Bachelor degree in Electrical Engineering, Electronics Engineering, Instrumentation & Control, Mechatronics, or Computer Engineering; he must be fluent in English. **General experience:** Minimum 12 (twelve) years of professional experience in the design & installation of electrical equipment and experience in supervision of electrical components of water treatment plants and Pump Stations. Minimum of 10 (ten) years of experience in SCADA systems for water supply utilities, including planning and design of automation systems for treatment plants and distribution networks, and prior experience in water supply master planning or similar strategic

Sl. No.	Name of Post	Minimum inputs (Person/Man-Month)	Educational Qualification and experiences required
			studies. **Specific experience:** Experience of 02 project as Electrical Engineer/SCADA Expert in design and construction supervision of electrical equipment of Water Treatment Plant with a minimum capacity of 140 MLD plus proven experience of 02 (two) projects as SCADA Expert in SCADA planning, design, or system expansion.

Examples for possible National non-key experts:

Sl. No.	Name of Post	Minimum Inputs (Person-Month)	Educational Qualification and experiences
1.	Survey/GIS Specialist	09	**Educational Qualifications:** Minimum Bachelor degree in Civil Engineering/Urban and Regional Planning (URP)/Geography or related field; he must be fluent in English. **General experience:** Minimum 12 (Twelve) years of professional experience as Survey/GIS Specialist. **Specific experience:** Experience of 02 (two) projects as GIS Expert in GIS mapping works of water supply system.
2.	Mechanical Engineer	03	**Educational Qualifications:** Minimum Bachelor degree in Mechanical Engineering; he must be fluent in English. **General experience:** Minimum 15 (fifteen) years of professional experience in the design & installation of mechanical equipment

Sl. No.	Name of Post	Minimum Inputs (Person-Month)	Educational Qualification and experiences
			and experience in supervision of mechanical-electrical components of water treatment plants/Pump Stations. **Specific experience:** Experience of 02 (two) projects as Mechanical Engineer in design and supervision of Mechanical-Electrical equipment of a Water Treatment Plant (WTP).
3.	Electrical Engineer	03	**Educational Qualifications:** Minimum Bachelor Degree in Electrical and/or Electronics Engineering; he must be fluent in English. **General experience:** Minimum 15 (fifteen) years of professional experience in the design & installation of electrical equipment and experience in supervision of mechanical-electrical components of water treatment plants and SCADA System. **Specific experience:** Experience of 02 (Two) projects as Electrical Engineer for the installation supervision of mechanical-electrical equipment for a Water Treatment Plant and SCADA system.
4.	Senior Hydrologist	04	**Educational Qualifications:** Minimum Bachelor degree in Water Resources Engineering / Civil Engineering / Hydrology/relevant field. **General experience:** Minimum 15 (Fifteen) years as Hydrologist for water resource assessment with focus on source sustainability. **Specific experience:** Experience of 01 (one) project as Hydrologist in water resource assessment with focus on source sustainability

Sl. No.	Name of Post	Minimum Inputs (Person-Month)	Educational Qualification and experiences
			preferably in any water supply master planning project of large/medium cities. Experience in Familiarity with Halda and Karnaphuli river systems will be preferred.
5.	Contract Specialist	04	**Educational Qualifications:** Minimum Bachelor degree in Engineering, Must be fluent in English. **General experience:** Minimum of 15 (Fifteen) years working experience in civil engineering construction projects as Contract Specialist. **Specific experience:** Experience of 02 (Two) large scale infrastructure projects (International/Local) as Contract Specialist. Must have working experience in FIDIC contracts and Multilateral Development partner funded projects.
6.	Institutional/Environmental Specialist (Legal and Regulatory issues)	03	**Educational Qualification:** Minimum Master's in Law/Engineering/Environmental Science/related field. **General experience:** Minimum 15 (Fifteen) years of experience as Institutional/Environmental Specialist. **Specific experience:** Experience of 02 (two) construction project as Institutional/Environmental Specialist with focus on environmental compliance, local permitting and Regulatory issues.
7.	Quantity Surveyor	04	**Educational Qualification:** Minimum Bachelor's degree in Civil Engineering, Must be fluent in English.

Sl. No.	Name of Post	Minimum Inputs (Person-Month)	Educational Qualification and experiences
			General experience: Minimum of 15 (Fifteen) years working experience in civil engineering construction projects as Quantity surveyor. **Specific experience:** Experience of 02 (Two) large scale infrastructure projects (International/Local) as quantity surveyor.
8.	Junior Engineer	24	**Educational Qualification:** Minimum Bachelor's degree in Civil Engineering, Must be fluent in English. **General experience:** Minimum 8 (Eight) Years of experience in any large scale construction Project. **Specific experience:** Experience of 01 (one) water supply project as Junior Engineer.

The consultant shall ensure sufficient support staffs with logistics including but not limited to the following disciplines:

- CAD operator;
- Secretary/Office Manager;
- Accountant
- Office Assistant

8 Reporting Arrangements

The Consultant shall prepare and submit all reports, plans, and technical deliverables as outlined in Section 4 of this TOR. All reports shall be professionally formatted, written in English, and submitted in both editable digital and hard copy formats. Each deliverable shall follow the agreed outline, include relevant annexes, and be presented clearly and concisely to facilitate technical and managerial review.

The consultants shall report to the Project Director, CWSIP . However, for their day-to-day operation, they will contact Deputy Project Director/concerned Executive Engineer responsible for this particular package of consultancy.

Upon receipt of the reports from the consultants the reports will be reviewed by a Review Committee of CWASA. The Consultant shall maintain detailed records of comments received and how they were addressed in each version of the deliverables. All presentations and workshop materials shall be shared in advance with CWASA and the Consultant shall facilitate technical discussions during each review event. CWASA/ PMU will endeavor to provide consolidated comments/ observations on the reports.

Draft Final Master Plan, Capital Investment Plan, Draft Detail Design, Drawing and Bid Documents of Priority Investments and 5 year rolling Business Plan shall be presented at a formal Draft Final Review Workshop, organized jointly with CWASA and stakeholders. Based on feedback received during the workshop and subsequent written comments, the Consultant shall incorporate necessary adjustments and submit the Final Reports. The Final Master Plan and associated deliverables shall be presented and validated at a Final Workshop.

9 Institutional Arrangements and Client Support

9.1 Role of CWASA and Partner Institutions

CWASA shall serve as the principal counterpart agency for the assignment and shall be responsible for day-to-day coordination with the Consultant. As the designated implementing agency, CWASA shall ensure alignment of the assignment with its operational priorities and strategic objectives, and facilitate engagement with relevant stakeholders.

CWASA shall provide the Consultant with access to all available reports, GIS databases, technical studies, project documents, operational records, and financial statements relevant to the assignment. In addition, CWASA shall support the Consultant in:

- Facilitating access to existing infrastructure and operational sites;
- Coordinating meetings with internal departments, partner agencies, and key stakeholders;
- Liaising with the Chattogram Development Authority (CDA), LGED, DPHE, and other institutions to enable cross-sectoral integration;
- Supporting the organization of stakeholder workshops, technical reviews, and validation sessions.

Other partner institutions, including line ministries, utility regulators, and donor representatives, shall be consulted by the Consultant as required, under the guidance of CWASA.

9.2 Facilities, Data Access, and Logistical Support

Consultant shall be responsible for arranging/establishing their own office and logistics, CWASA will assist with:

- Providing letters of introduction or coordination with local authorities where required;
- Facilitating timely access to infrastructure sites for surveys, inspections, and assessments;
- Supporting mobilization of CWASA field staff to accompany the Consultant on technical inspections and data validation visits;
- Coordinating data sharing with other agencies such as BMD, BWDB, CDA, Department of Environment (DoE), Surveyor of Bangladesh etc.