Barishal City Corporation

Nagar Bhabon, Barishal
Engineering Department

Tentative Terms of Reference (TOR)
For

"Hiring a firm for Development, Enhancement & Maintenance of Digital Platform for Automating the Holding Tax Collection of Barishal City Corporation"

1. Background of this project

Barishal city is a historical city. In 2002, the government of Bangladesh has promoted Barishal as a divisional city and introduced Barishal City Corporation (BCC) as a local government unit to take care of the development needs of the local people. Present area of the newly formed Barishal City Corporation (BCC) is 58 sq-km. About 7.0 lakh people live in this city. Demand for better services has been raised. Area of the city corporation has been extended but civic amenities have not been expanded proportionality. Newly formed BCC has to provide various civic amenities to more than 8.00 lakh people. In parallel, it also has to provide basic services to the city dwellers.

The overarching goal of this project is to create a user-centric web application that streamlines essential services for citizens of Barishal City Corporation, specifically focusing on the efficient collection of holding taxes. This module will digitize the processes involved in managing holding tax-related activities, including application submissions, status tracking, billing, and payments.

The Holding Tax Collection module will automate the procedure for citizens to apply for new holdings, name corrections, or holding cancellations. By providing a digital platform, Barishal City Corporation aim to simplify and expedite the administrative processes, thereby reducing the need for physical visits to government offices and enhancing the overall efficiency for both citizens and administrators.

2. Existing Process

Barishal City Corporation (BCC) currently operates numerous citizen-centric services and internal office processes through predominantly manual methods. One of the key services provided to citizens include Holding Tax Collection. For holding tax collection, citizens submit paper applications with requisite documentation, initiating a multi-step approval process involving various BCC officials such as Assistants, Assessors, Chief Assessors, Revenue Officers, and ultimately the CEO.

Following assessment and verification, bills are generated using billing software, albeit with significant manual intervention. Additionally, citizens can apply for new holding registrations or name changes.

Despite the utilization of billing software for holding tax, the majority of these processes rely heavily on manual interventions, leading to inefficiencies and delays. BCC recognizes the need to modernize and streamline these services through automation.

4. Reporting and Audit Trail:
   - The admin panel should offer robust reporting capabilities, providing administrators with comprehensive insights into service application trends, billing activities, and user interactions.
   - An integrated audit trail feature should maintain a detailed log of all system actions and user interactions, ensuring transparency, accountability, and compliance with regulatory requirements.
5. Basic Configuration Setup:
   - Administrators should easily customize and configure basic settings for each Citizen Service Module, including parameters such as fee structures, approval workflows, notification preferences, and system integrations, enabling flexibility and adaptability to changing requirements.

3.2. Non-Functional Requirements

3.2.1. Development Approach:

- Define the Development Approach: Clearly state the chosen development approach, such as Agile, Waterfall, DevOps, or a hybrid approach. Explain why this approach is suitable for the project.
- Explain the Rationale: Provide a brief rationale for selecting the chosen approach. Explain how it aligns with the project's goals, timelines, and complexity.
- Iterative or Incremental Development (if applicable): If using an iterative or incremental approach (common in Agile), describe how the project will be broken down into iterations or increments.
- Roles and Responsibilities: Specify the key roles involved in the development process (e.g., product owner, Scrum master, developers), along with their responsibilities.

3.2.2. Quality Assurance (QA):

- Scope and Objectives: Define the scope of QA activities within the project or initiative. Specify the primary objectives of QA, such as ensuring software quality, minimizing defects, and meeting project milestones.
- Roles and Responsibilities: Identify the roles and responsibilities of the QA team, developers, testers, and other stakeholders. Define who is responsible for creating test plans, test cases, executing tests, and reporting defects.
- Testing Approach: Specify the testing methodologies to be used (e.g., Agile testing, Waterfall testing). Describe the types of testing (unit testing, integration testing, system testing, etc.) and their respective responsibilities.
- Test Criteria: Outline the criteria for test entry and exit, including what defines a successful test phase and when a project is ready for deployment.
- Test Environment: Detail the required test environment, including hardware, software, and network configurations. Ensure that the test environment closely mirrors the production environment.
- Defect Management: Describe the process for reporting, tracking, and resolving defects. Specify the severity levels and the process for prioritizing and resolving identified issues.

26

- **Automated Testing:** If applicable, specify whether automated testing will be used and outline the tools, frameworks, and scripts to be employed.

3.2.3. Accessibility

The Software Firm/Company must develop this application ensuring access for the citizen (Service Recipients) with disabilities in different standard accessible formats. The application should be developed in "universal design" and "assistive technologies". All features of web application should be usable with the help of screen reading software by the service recipients with disability.

3.2.4. Security:

- The firm should follow any of the industry standard secure development methodology such as (but not limited to) Comprehensive Lightweight Application Security Process (CLASP) by OWASP etc.
- The firm should consider (but not limited to) common vulnerabilities such as SQL Injection, Cross Site Scripting (XSS) etc.
- Vendor will undertake responsibility for Input Validation Controls, Authorization/Authentication Control and other security controls in place in both test and production environments of application.
- The following vulnerabilities must be checked and ensured security from the beginning:

    a. Cross Site Request Forgery (CSRF)
    b. Cross Site Scripting (XSS)
    c. Session hi-jacking
    d. Session Fixation
    e. SQL Injection
    f. Input Validation/Filtering
    g. Output Escaping
    h. Code Injection
    i. Secure File Access

3.2.5. Version Control and Source Repository:

- Firm must ensure that all sources are maintained through market leading source repository solutions (Ex: Bit Bucket, GitHUB, Gitlab etc).
- The source repository must be regularly used for controlling file and history changes. Solutions must be upgraded to a new version by fixing bugs, optimizing algorithms and adding extra functions.
- Production instances should get updates, should get source directly from the repository instead of regular file copy source upload.

3.2.6. Infrastructure Management

The service provider should manage the infrastructure deployed for the platform which includes operating systems, databases, virtualization technologies, load balancer, database replicator, high availability and load balancing cluster solution, storage technology, middleware platforms etc. to ensure availability, performance, cost effective utilization and security of the system.
- Work for designing and developing Stress Barometer which will measure critical performance issues in the system or web server that may prevent optimal experience for Portal visitors.

- Monitor the operating system, database, application, application server and the integration among them to ensure the high availability.
- Assist the Infrastructure Team to implement the load balancer, database replicator, cluster software etc. to ensure high availability computing environment as and when required.
- Update the security settings and version of the operating system, database, application, application setting to ensure a secure computing environment and service.
- Develop and maintain installation and configuration procedures and system standards.

Barishal City Corporation is going to handle a large volume of information as well as a large number of users in the following days. To handle this large amount of data, vendor needs to pay a great effort on infrastructure management. Vendor needs to handle these issues for ensuring smooth service of this platform.

- Identifying average number of users (named / anonymous)
- Handling maximum number of concurrent users
- Calculating Average Time Between Page Requests Portal Desktop Configuration
- Transaction Time
- Workload Conditions
- Average session times
- Search Engine Factors
- User activities (navigation steps per time unit)
- Amount and structure of (Customer Specific)
- Continuous monitoring and implement caching mechanism in different layer

3.2.7. Security Certification:

- Firm will undertake the responsibility to get the "Audit Assessment and Reporting" certification from Bangladesh Government's Computer Incident Response Team (BGD e- GOV CIRT).
- Firm will undertake the responsibility to get the two "Vulnerability Assessment and Penetration Test" certification from Bangladesh Government's Computer Incident Response Team (BGD e- GOV CIRT).
- The firm undertake the developed system quality assurance certification from Software Quality Testing and Certification (STQC)

3.2.8. Source code handover:

Full source code including all developed libraries must be handed over to the Barishal City Corporation authority. This should have included (Source Code, Database, files, and all the resources) with the deployment guideline.

3.2.9. Multi-layered support from the firm

The firm will provide multi-layered user support which will cover following activities:

Layer 1 Support from the firm:
- Attain Phone Calls, checking e-mails
- List problems and initial troubleshooting
- Classify problems

Layer 2 Support from the firm:
- Issues investigate
- Update Issue Tracking Tool (CRM)
- Escalate issues to 3rd Level

Layer 3 Support from the firm:
- Bug Fixing: Source Code Modification, Database structure Change
- Transactional Data Fixing
- Wrong activities corrections

- Systems Monitoring
- 3rd level issues investigate and resolve and necessary Change Management.

3.2.10. Maintenance of the Platform

The selected firm has to provide proactive maintenance and support services that will cover the followings areas:

- Continuous monitoring of query execution in Database, tuning database and tuning codes & queries to minimize response time.
- Fixing all bugs in the system irrespective of its nature and complexities.
- Updating training manual adjusting the changes in the system.
- Adjust and update system in compliance with any security test, load test or IT audit conducted by the client.

3.2.11. Change Management

- The Service Support team should efficiently implement changes approved by the Concern Authority.
- The Service Support team should implement changes ensuring no risks to the existing and integrated Services.
- The Service Support team should follow the Change Management process as per ITIL Framework.
- Mentioned that consulting firm also will have to implement the process of Incident Management, Problem Management, Release Management
- Service Support must ensure to adhere to the change process from the point of proposal through acceptance, scheduling, necessary approval, review, coordination and complete within committed SLAs.

3.2.12. Capacity Management and Knowledge Transfer

- Facilitate a workshop with a client team for knowledge transfer. Provide authentic access to client experts to source code and documents.
- Develop text Tutorial for end-users.
- Firm will develop Technical Training Manual, User Training Manual, Hosting Specification Document, Implementation Plan, SRS (Software Requirements Specification), Data Dictionary, Class Diagram, Process Flow Diagram and other necessary documents.
- Firm will provide technical training to the employees of Barishal City Corporation covering the operational use of the system.
- The firm has to provide comprehensive video and training materials for the software.
- The firm has to provide on call support to address any technical issues officials might encounter during the usage of the platform.

4. Data Migration Requirements:

BCC currently utilizes a billing software system for managing financial transactions, invoicing, and billing processes.

The migration process will involve extracting data from the existing billing software, including customer records, billing history, payment details, and financial transactions. For that,

- The data will need to be cleansed, validated, and formatted to ensure consistency, accuracy, and completeness before migration.
- Mapping exercises will be conducted to align data fields and attributes from the old system to corresponding fields in the new digital systems, ensuring seamless migration.
- Trial migrations and testing will be performed to identify and resolve any issues or discrepancies before the final migration.
- The migration process will be executed in phases or batches to minimize disruption to operations and ensure a smooth transition to the new digital systems.
- Training and support will be provided to staff involved in migration to ensure proficiency and efficiency in the process.
- Robust data backup and recovery mechanisms will be implemented to safeguard against data loss or corruption during the migration process.
- Post-migration validation and reconciliation will be conducted to verify the accuracy and integrity of migrated data in the new digital systems.

5. Data Entry Requirements

The selected firm will employ data entry operators to digitize existing manual paperwork and input the data into the new digital systems. The transition will involve converting paper-based records, forms, applications, and documents into electronic formats. Data entry operators will be responsible for accurately and efficiently entering information into the digital systems, ensuring data integrity and reliability. Comprehensive data entry guidelines and standards will be developed to govern the process and maintain consistency across entries.

6. Technology Specifications:

The firm will follow any industry accepted and widely used open source-based technologies, frameworks, platforms, and guidelines. Following are some technical specifications that firms should consider as references but not as the ultimate method of implementing in this assignment. Technology Specifications may change in real-time based on the context of the project and future trends.

6.1. Backend:

1. High Load System Stability: Employ distributed system architecture and load balancing mechanisms to ensure system stability even under high traffic or peak load conditions.

2. Comprehensive System Monitoring: Deploy robust monitoring tools to continuously monitor system health, resource utilization, in near real-time. Also ensure to trigger immediate alerts to relevant personnel when any anomalies or performance issues are detected.

3. Comprehensive Logging Solution: Implement a robust logging solution for this project with alerting/notification capabilities (via email, SMS, or integration with collaboration platforms), and dashboard visualization.

4. Disaster Recovery Plan with CI/CD Based Deployment: Establish a comprehensive disaster recovery plan specifically designed for CI/CD based deployments to mitigate risks and maintain business continuity. Implement automated backup strategies, rapid failover mechanisms, and

seamless recovery procedures to minimize downtime and ensure uninterrupted delivery pipelines, safeguarding against potential disruptions.

6.2. Database:

1. Optimized Database Performance: Utilize advanced indexing strategies (BTree, BRIN etc), query optimization techniques, and database partitioning to ensure fast and smooth performance.

2. Advanced Data Backup and Restoration: Implement continuous data backup with incremental backups and point-in-time recovery.

3. Database Monitoring: Deploy robust monitoring tools and automated alerting systems to continuously monitor database health, resource utilization, and performance metrics in real-time.

4. Effective Usage of Caching: Employ caching mechanisms such as in-memory caching, and database query caching to minimize latency and improve overall system performance.

6.3. Document Management System (DMS):

1. Object storage systems: This system should be designed to handle massive amounts of unstructured data efficiently on premise infrastructure. Here's a breakdown of it's key architectural components and strategies for achieving high throughput:
   a. Components:
      i. Data Storage Layer: Should employ a distributed, horizontal architecture to spread data across multiple nodes by leveraging high-performance storage devices like Solid-State Drives (SSDs) or Non-Volatile Memory Express (NVMe) for fast data access.
      ii. Metadata: Should maintain information about the object and its metadata together for faster access.
      iii. API Layer: Though it's an on premise solution, it should provide a standardized interface (e.g., S3 API) for clients to interact with the object store.
   b. Strategies for High Throughput:
      i. Horizontal Scalability: Ensure adding more nodes to the cluster increases storage capacity and processing power.
      ii. Load balancing: It should distribute requests across nodes for efficient handling.
      iii. Data Sharding: The system may divide data into smaller chunks and distribute them across nodes. Improves parallel access and reduces bottlenecks.
      iv. Multi-Threading/Asynchronous I/O: Leverage multiple threads or asynchronous I/O techniques to handle multiple requests concurrently.

2. Effective Usage of Document Storage Caching: Employ content delivery network (CDN) caching to minimize latency and improve overall system performance

6.4. Frontend:

1. **Caching Strategies:** Pre-render dynamic (SSR: server-side rendering) and static (SSG: static site generation) content on the server or at build time, creating optimized HTML for immediate delivery to user browsers. This should benefit the end users by,
   - providing lightning-fast page loads
   - immediate content availability
   - enhancing user experience and SEO.

2. **Page Speed Load Metrics:** Achieve optimal page load times by optimizing assets, leveraging browser caching, and implementing lazy loading techniques for images and resources, enhancing user experience and engagement.
   Preferred technology: React, Next.js / Remix, React-Query / SWR.

3. **Secure User Login:** The application needs a secure login system for user authentication within the application. This includes:
   - Server-side validation: User credentials submitted via a login form will be validated on the server-side, not the client-side.
   - Session management: Server will handle session creation, token rotation with refresh tokens and management for authorized users.
   - Server configured Protected routes: Only authenticated users can access specific routes or pages.
   - Encrypted Tokens: Use JWT tokens encrypted with a key inaccessible front he browser which is communicated by server-only cookies to for further security and protection from Cross-site scripting (XSS) attacks.

4. **UI Design System:**
   - Establish a consistent visual language and reusable components.
   - Define core UI elements (buttons, forms, icons, etc.) with detailed specifications.
   - Document a comprehensive style guide covering color palette, typography, iconography, spacing, and layout.
   - Use Pre-built components and guidelines to accelerate development, ensure consistency, and facilitate UI scalability.

5. **UX Patterns:**
   - Utilize established best practices for common user interactions and tasks. Examples: Search functionality, forms, navigation, feedback mechanisms.
   - Enhance usability, learnability, and user satisfaction. These will result in a user-centered design with intuitive interaction patterns to minimize learning curve, faster task completion, and ultimately, happy and satisfied users.

Device Compatibility:
   - Ensure seamless display and functionality across desktops, laptops, tablets, and smartphones.
   - Implement responsive design for adaptive layout and content. Thoroughly test on various devices and browsers.

7. Required Team Composition (Key Person)

SL	Designation	QTY	Responsibilities	Required Expertise
1	Team Lead/Project Manager	1	The Team Lead is responsible for the day-to-day operational management of the project, including developing and overseeing work and preparation of project progress reports. S/he is responsible for regular reporting to the client. The chosen candidate is responsible for overseeing all technical aspects of the project implementation including analyze the user requirements, develop software design, choose the right technical solution as well as oversee the right implementation to ensure sustainability.	i) Minimum graduate in Computer Science and Engineering/ICT preferably having a degree from a reputed university. 10 years of progressive experience with at least 5years' experience in managing in government software project, role including software design and development
2	Software Architect	1	Software Architects will make sure that the software architecture and design pattern is good enough to absorb the load of the users and it complies with deployment architecture and well manageable and sustainable.	i) Minimum graduate in Computer Science and Engineering/ICT preferably having a degree from a reputed university. ii) At least 7 years of progressive experience in architecting large scale web-based application.

3	Business Analyst	1	Business Analyst will transform domain and business logic to technical artifacts to development teams.	i) Minimum graduate in Business/Computer Science and Engineering/ICT or relevant subjects preferably having a degree from a reputed university. ii) At least 3 years of experience in the field of business requirement study and analysis for ICT based or Software projects. iii) Must have experiences on Governance /Digital Service application project.
4	Database Expert	1	Database Expert is responsible for models, designs and creates the databases and tables used by a software solution.	i) Minimum graduate in Computer Science and Engineering/ICT or relevant subjects preferably having a degree from a reputed university. ii) At least 5 years of experience in designing databases for enterprise grade applications. iii) Must have experiences on large scale data management.
5	Development Lead (KS)	2	The Development Team Lead will consult with the Development Team to ensure necessary IT solutions. He will conduct with team members to assign task and help in technical aspects where required	i) Minimum graduate in Computer Science and Engineering/ICT preferably having a degree from a reputed university ii) At least 7 years of progressive experience in maintaining Development team for a large-scale application.
6	Sr. Software Engineer	2	The Sr. Software Engineer will develop code accordingly to ensure the product's usability and stability based on requirements. Assist team members in critical areas of programming.	i) Minimum graduate in Computer Science and Engineering/ICT or relevant subjects preferably having a degree from a reputed university. ii) At least 5 years of progressive experience in designing and developing enterprise grade web application

7	Software Engineer	5	The Software Engineer will act/ code accordingly to ensure the product's usability and stability based on requirements.	i) Minimum graduate in Computer Science and Engineering/ICT or relevant subjects preferably having a degree from a reputed university. ii) At least 3 years of progressive experience in designing and developing enterprise grade web application
8	Infrastructure Expert	1	Server Administrator will be responsible for monitoring the performance of the servers and system.	i) Minimum graduate in Computer Science and Engineering/ICT preferably having a degree from a reputed university. ii) At least 3 years of experience in designing and configuring enterprise grade application hosting infrastructure ii) Must be known about server monitoring tools like Nagios, Cactai etc.
9	DevOps	2	DevOps will be responsible for CI/CD of the developed system as well as ensuring regular deployments.	Minimum graduate in Computer Science and Engineering/ICT preferably having a degree from a reputed university. At least 3 years of experience in maintaining enterprise grade application hosting infrastructure
10	UI/UX Expert	1	This role is about designing the interface to ensure it delights the user.	i) Minimum graduate in any subject. ii) At least 5 years of experience in designing UI for enterprise grade applications.
11	Quality Assurance Engineer	3	QA engineer is expected to design and develop test cases and execute manual and automation testing.	i) Minimum graduate in Computer Science and Engineering or relevant subject. ii) Minimum 3 years of experience in the sector of software testing and quality assurance.
12	Security Engineer	1	(S)he is expected ensure proper security of the system	i) Minimum graduate in Science Computer and Engineering/ICT preferably having a degree from a reputed university. ii) Minimum 5 years of work experiences as a security engineer.

9. Payment Schedule

SL	Deliverables	Month	Payment Disbursement (Upon Acceptance by Client)
1.	Inception Report	Within 30 days of contract signing	10%
2.	Architecture Development and SRS Submission	End of 1.5 Months of Contract Signing	15%
3.	UI/UX Development	End of 02 months of contract signing	15%
4.	Software Development, Beta version release, Data Migration and Data entry	End of 04 months of contract signing	20%
5.	Production version Release, UAT and Training	End of 06 months of contract signing	20%
6.	Continuous Maintenance, Support and incident management (Phase 1)	End of 6 months post development (12 months from contract signing)	2.5%
7.	Continuous Maintenance, Support and incident management (Phase 2)	End of 12 months post development (18 months from contract signing)	2.5%
8.	Continuous Maintenance, Support and incident management (Phase 3)	End of 6 months post development (24 months from contract signing)	2.5%
9.	Continuous Maintenance, Support and incident management (Phase 4)	End of 6 months post development (30 months from contract signing)	2.5%
10.	Defect Liability Period.	01 (One) Year Defect Liability Period.	10%

10. Qualification and Eligibility Criteria

The following are defined as minimum qualification criteria:

1. Must have valid and up-to-date Trade license (2023-2024) and income Tax payment certificate along with valid TIN and BIN certificate. Register of joint stock & companies (RJSC) registration (if applicable), VAT Identification Number, Tax exemption certificate.
2. Minimum 3 successful implementation of projects with the Government of Bangladesh or Private sector or any international organization in the last 3 years. (Submit Work Completion Certificate along with the copy of the contract)
3. Minimum 5 years of practical experience of developing micro service based web-based enterprise solutions. (Submit Work Completion Certificate along with the copy of the contract)
4. Must have a minimum turnover of BDT 15 crores in last 05 years (Please submit immediate last five years financial audited statements if needed)
5. Must have a minimum amount of liquid assets in form of an unconditional credit line from any scheduled bank of Bangladesh or working capital shall be BDT 4 crores (Please submit immediate latest audited financial statements, if applicable).
6. Must have ISO 9001 certification
7. Minimum 10 years of experience in ICT business as registered company/entity in Bangladesh.

11. Joint Venture Modality

Multiple companies having technical and legal competency for developing such products can bid jointly but they must have a legal agreement among them where one company needs to be lead. The lead company needs to fulfill all conditions mentioned in this TOR. A joint venture agreement needs to have clear identification about each responsibility matrix along with IPR.

12. Exit Process

During the contracted period, there will be a technical team on the procurement entity's side who will be engaged to gather knowledge on both the technology and operation of the platform. Once the contract expires and the platform is delivered, the supplier will provide comprehensive technical and operational knowledge transfer and ensure that the team undertaking the platform is fully capable of managing it effective

3. Scope of Work for the Proposed System

3.1 Functional Requirements

Here are the functional requirements for the application which will facilitate the automation of holding tax collection:

Public Portal:

1. Service Application:
   - Citizens can easily submit applications for the respective service, including options for new registrations, modifications, or cancellations, accompanied by necessary documentation.
   - Application status tracking feature allows users to monitor the progress of their applications in real-time, providing transparency and clarity.

2. Notifications:
   - Automated notifications are sent to users through multiple channels (in-app, SMS, email) to keep them informed about the status of their applications, including updates on approvals, rejections, and bill generation.

3. Payment Management:
   - Users can conveniently view their bills online, access detailed breakdowns of charges, and calculate due amounts accurately.
   - The system facilitates secure online payments, offering options for partial payments and discounts on advance payments, promoting user convenience and financial flexibility.
   - Users also have the provision to upload bills manually for offline processing, ensuring seamless integration with different payment methods.

4. Reporting:
   - A comprehensive reporting dashboard provides users with an overview of their bill statuses, outstanding balances, payment histories, and trends over time, empowering them with insights into their financial transactions.

a. Admin Panel
   1. Service Application Processing:
      - Administrators can efficiently review and process incoming service applications, conducting multi-level reviews and approvals as per predefined workflows.
      - The admin panel facilitates seamless coordination of field visits, allowing administrators to assign, track, and manage site inspections conducted by field officers.
   2. Billing Management:
      - The system automates the generation and approval of bills for approved service applications, ensuring accuracy and efficiency in billing processes.
   3. Notification Management:
      - Administrators have the ability to configure notification settings, defining triggers and templates for automated notifications sent to users at various stages of the service application and billing process.