

UPS&E

UNITED POWER SERVICES/ENGINEERING, CONSTRUCTION AND ELECTRICALS
STATIONERY, CONSTRUCTION, SOLAR & BACKUP SYSTEM, ELECTRICAL
SERVICES, NETWORKING, CCTV, GENERAL MAINTENANCE AND GENERAL
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BID FOR THE PROCUREMENT AND INSTALLATION OF MIDDLEWARE AND ANALYTICAL SOFTWARE AT THE NATIONAL PUBLIC HEALTH AGENCY (NPHA)

Procurement No.: Ref: 12/04/2024/WCO/EPR/002/

30th APRIL 2024.



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30th April, 2024

Head of Procurement
World Health Organization (WHO)
21A/B Riverside Drive
Off King Harman Road
Brookfield, Freetown

**Technical Proposal Procurement and installation of Middleware and Analytical Software at
National Public Health Agency (NPHA) – Ref:12/04/2024/WCO/EPR/002/.**

Dear Sir/Madam,

We are pleased to submit this technical proposal for the project titled "**Procurement and Installation of Middleware and Analytical Software at National Public Health Agency (NPHA)**" with procurement number **Ref:12/04/2024/WCO/EPR/002/**. Our team at UNITED POWER SERVICES/ENGINEERING, CONSTRUCTION, AND ELECTRICALS is excited about the opportunity to work on this transformative initiative aimed at advancing public health capabilities through the development of Middleware and Analytical Software.

We believe that our extensive experience in software development, coupled with our expertise in machine learning integration and data management, makes us well-suited to deliver a successful outcome for this project. We are committed to providing innovative solutions that meet the needs of the **National Public Health Agency (NPHA)** and contribute to the modernization of health data management systems.

Thank you for considering our proposal. We look forward to the opportunity to discuss this project further and demonstrate how our team can contribute to its success.

Yours sincerely,



Vandi Mansaray,
Marketing Manager
UPS&E, Construction, and Electricals

1. PROJECT OVERVIEW AND CONSULTANT'S ORGANIZATIONAL PROFILE

1.1 Introduction and Project Overview

The project is titled "**Procurement and Installation of Middleware and Analytical Software at National Public Health Agency (NPHA)**" with reference reference **Ref:12/04/2024/WCO/EPR/002/**. aims to revolutionize the way health data is managed and utilized by the National Public Health Agency (NPHA). By developing Middleware and Analytical Software, our goal is to seamlessly integrate the DHIS2 tool with external entities, create user-friendly applications, and implement machine learning algorithms for predictive modeling and anomaly detection. With a proud legacy spanning over a decade, UPS&E has been at the forefront of delivering exceptional solutions in software, electrical and electronic, construction, and maintenance services. Our unwavering commitment to excellence and innovation has solidified our reputation as a trusted partner in the industry.

2. OUR COMPANY OVERVIEW

2.1: Company Background

Since its establishment in 2013, United Power Services/ Engineering, Construction, and Electricals (UPS&E) has steadily grown into a premier provider of comprehensive engineering, construction, and electrical services. Our journey over the past decade has been marked by a relentless commitment to excellence and a steadfast dedication to meeting the needs of our clients.

From humble beginnings, UPS&E has evolved and expanded, driven by a vision to become a trusted partner in delivering innovative solutions to our clients' most challenging projects. Our growth trajectory is a testament to our unwavering focus on quality, reliability, and customer satisfaction. Over the years, we have honed our skills, refined our processes, and invested in cutting-edge technology to stay at the forefront of the industry.

At UPS&E, we recognize that every client is unique, with distinct requirements and objectives. We have cultivated a deep understanding of our clients' needs by actively listening, engaging, and collaborating to tailor our solutions to their specific challenges. By placing our clients at the center of everything we do, we have built lasting relationships based on trust, transparency, and mutual respect.

Our commitment to exceeding client expectations is ingrained in our company culture. We go above and beyond to deliver results that not only meet but exceed our clients' expectations. Whether it's through delivering projects ahead of schedule, optimizing costs without compromising quality, or providing exceptional after-sales support, we consistently strive for excellence in every aspect of our work.

Over the years, UPS&E has amassed an impressive portfolio of successful projects spanning various sectors and industries. From government agencies and non-governmental organizations

to educational institutions and private businesses, our projects have made a tangible impact on the communities we serve. Our diverse portfolio reflects our versatility, adaptability, and ability to deliver tailored solutions to meet the unique requirements of each project.

UPS&E prides itself on the expertise and capabilities of our team members. Our team comprises seasoned professionals with years of experience in their respective fields, including engineers, technicians, project managers, and support staff. Their collective expertise, coupled with our robust project management processes, ensures the successful execution of projects from inception to completion.

With a decade of experience in the field, UPS&E boasts a team of seasoned professionals who possess a wealth of knowledge and expertise in their respective domains. Our team comprises skilled engineers, technicians, project managers, and support staff who collaborate seamlessly to ensure the successful execution of projects from conception to completion. We have earned the trust and confidence of our clients through our proven track record of delivering projects on time, within budget, and to the highest standards of quality.

2.2: Our Services

UPS&E offers a comprehensive range of services tailored to meet the evolving needs of our clients. From electrical and electronic solutions to construction and maintenance services, we provide end-to-end solutions that address the unique requirements of each project. Our services include but are not limited to electrical and electronics, computer running services, solar and power backup systems, construction, residential and business premises wiring, wireless and local area networking, M&E services, generator and air conditioning maintenance and services, solar maintenance and services, and general supplies.

2.3: Commitment to Excellence

At UPS&E, we are driven by a relentless pursuit of excellence in everything we do. We take pride in our ability to deliver high-quality, reliable, and innovative solutions that exceed the expectations of our clients. Our commitment to excellence is reflected in our rigorous quality control processes, attention to detail, and continuous investment in technology and training. We strive to set new standards of excellence in the industry and remain dedicated to fostering long-term partnerships based on trust, integrity, and mutual respect.

2.4: Experiences

UPS&E has successfully undertaken numerous projects across various sectors, including ministries, departments, agencies, NGOs, universities, banking institutions, private sectors, and individuals. Our projects encompass a wide range of areas, from electrical and electronic installations to construction and maintenance services. We take pride in our ability to deliver effective and efficient solutions while maintaining a strong focus on customer satisfaction.

Below are list of similar contracts and experiences;

2.4.1: Firm's Name: Free Education Project Secretariat

Assignment Name: <i>THE PROCUREMENT, DELIVERY, AND INSTALLATION OF ICT EQUIPMENT TO UPGRADE FEPS AND MBSSE ICT INFRASTRUCTURE TO ENSURE COMPLIANCE WITH AUDIT SERVICE SIERRA LEONE (ASSL), PROCUREMENT OF 17 TABLETS FOR GRIEVANCE REDRESS COMMITTEES (GRC) AND OFFICE EQUIPMENT FOR TEAM UNDER THE SIERRA LEONE FREE EDUCATION PROJECT</i> with procurement number SL-MBSSE-379229-GO-RFQ		Country: Sierra Leone Supported / Funded By: World Bank
Location: Freetown Sierra Leone		Professional staff provided: Trained and Qualified staff that technically fit for the task
Address, Contact Person and Phone number: Mohamed Kallon, The Procurement Specialist, 126 Regent Road, SS Camp, Regent Freetown +23276646144		Number of Staff and Duration of Assignment: 8 staff for a period of 6 weeks as per contract agreement
Start Date (Month/Year): November 2023	Completion Date (Month/Year): December 2023	Approx. Value of Contract: (SLLE) NLE2,131,311 – Two million one hundred thirty-one thousand three hundred eleven new Leones
Name of Senior Staff (Project Director/Coordinator, Team Leader) Involved and Functions Performed: <ul style="list-style-type: none"> • Mohamed Mansaray: Providing technical information to clients, and proffer innovative ideas towards implementation. • Michael Foray: Provide Consulting Services to meet customers' need. • Vandi Mansaray: Project Coordinator, IT Technician and supervision role. • Titus Ansu Jusu: Project Coordinator and Installation Technician 		

2.4.2: Firm's Name: WHO/SUB CONTRACT

Assignment Name: Procurement and Installation of Network equipment and fire alarm	Country: Sierra Leone Supported / Funded By: WHO
Location: WHO country Office 21A/B Riverside Drive, Off King Harman Road, Freetown, Sierra Leone.	Professional staff provided: Trained and Qualified staff that technically fit for the task
Address, Phone number and email: FACTION CONSTRUCTION AND GENERAL SERVICES Freetown	Number of Staff-Months; Duration of Assignment: 6 staff for a period of 1 month as per contract agreement

Approx. Value of Contract: (USD) \$11,000 – Eleven Thousand United States Dollars
Name of Senior Staff (Project Director/Coordinator, Team Leader) Involved and Functions Performed: <ul style="list-style-type: none"> • Mohamed Mansaray: Providing technical information to clients, and proffer innovative ideas towards implementation. • Simeon Patrick Sowa: Provide Consulting Services to meet customers' need. • Vandi Mansaray: Project Coordinator, graphic designer and supervision role. • Timothy Senesie Installation Technician

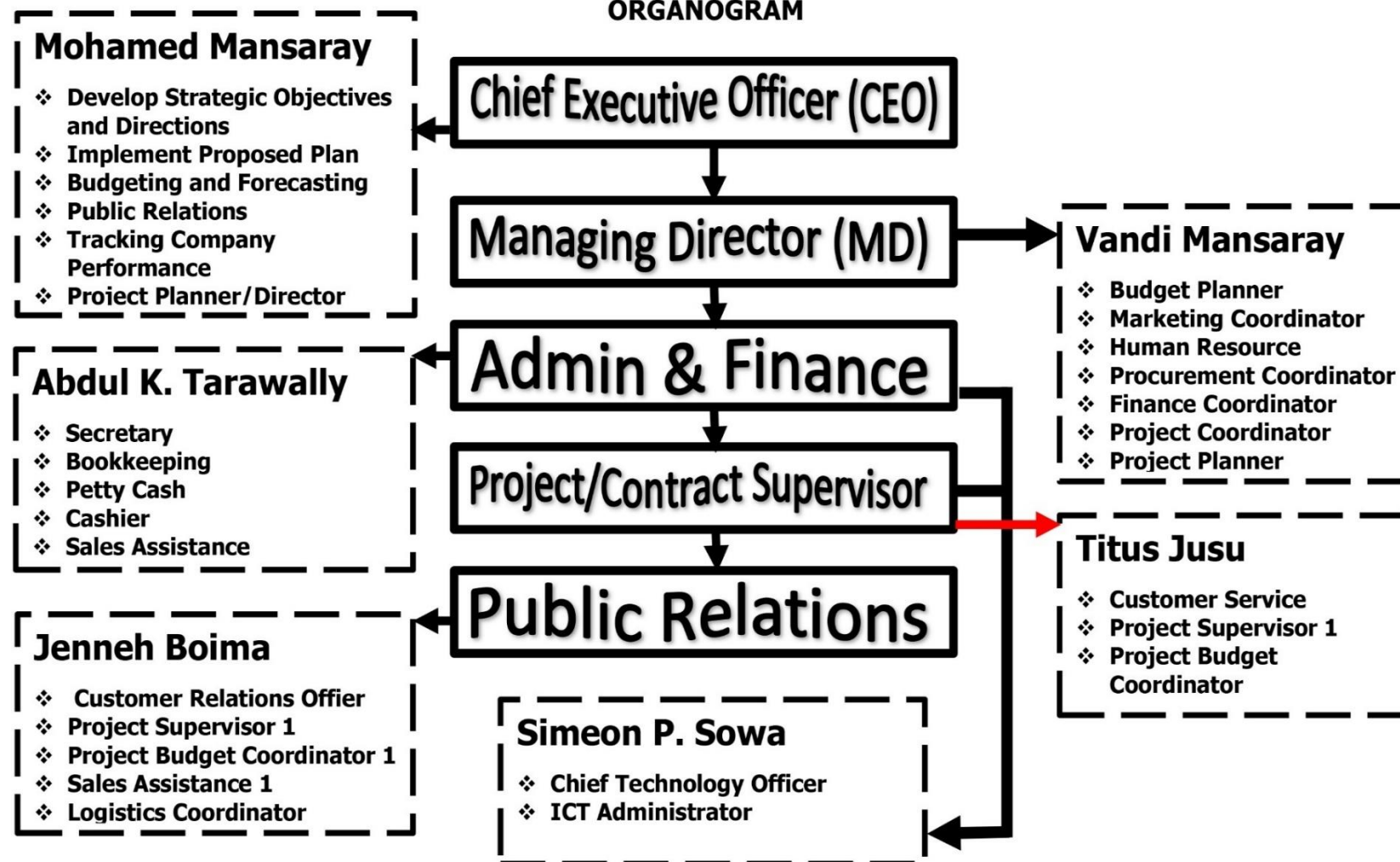
2.4.3: Firm's Name: Ministry of Finance

Assignment Name: PROVISION OF MAINTENANCE AND SERVICE SUPPORT TO THE MINISTRY OF FINANCE'S TIER III DATA CENTRE		Country: Sierra Leone Supported / Funded By: Government of Sierra Leone
Location: Freetown		Professional staff provided: Trained and Qualified staff that technically fit for the task
Address, Phone number and email: 51 Regent Road Hill Station, Freetown, +23277855951		Number of Staff-Months; Duration of Assignment: 8 staff for a period of 11 months as per contract agreement
Start Date (Month/Year): February 2023	Completion Date (Month/Year): December 2023	Approx. Value of Contract: (SLLE) NLE433,987.60 –Four hundred thirty-three thousand Leones
Name of Senior Staff (Project Director/Coordinator, Team Leader) Involved and Functions Performed: <ul style="list-style-type: none"> • Mohamed Mansaray: Providing technical information to clients, and proffer innovative ideas towards implementation. • Simeon Patrick Sowa: Provide Consulting Services to meet customers' need. • Vandi Mansaray: Project Coordinator, graphic designer and supervision role. • Titus Ansu Jusu: Project Coordinator 		

2.5: Our Structure

United Power Services/Engineering, Construction and Electricals (UPS&E)

ORGANOGRAM



3. PROJECT DETAILS

3.1: Project Background

In light of the changing requirements of the National Public Health Agency (NPHA), United Power Services/ Engineering, Construction, and Electricals (UPS&E) presents a comprehensive solution aimed at the development of Middleware and Analytical Software. This proposal is in harmony with the delivery of robust software solutions that optimize data management procedures, bolster data security, and facilitate predictive analytics to improve decision-making within the realm of public health.

3.2: Value Proposition

Our value proposition lies in our ability to develop robust software solutions that streamline data management processes, enhance data security, and enable predictive analytics for better decision-making in public health.

In an era where data is increasingly recognized as the lifeblood of effective decision-making, our value proposition centers on delivering robust software solutions tailored to the unique needs of public health management. At the heart of our proposition are three core pillars: streamlining data management processes, enhancing data security, and enabling predictive analytics.

1. Streamlining Data Management Processes

Efficient data management is crucial for any public health agency striving to meet the evolving demands of modern healthcare. Our software solutions are designed to streamline data collection, storage, and analysis, ensuring that valuable insights are accessible at the click of a button. By automating tedious manual processes and implementing intuitive user interfaces, we empower healthcare professionals to focus their efforts on delivering high-quality care rather than grappling with data management challenges.

2. Enhancing Data Security

Protecting sensitive health data is paramount in an age of increasing cybersecurity threats and stringent regulatory requirements. Our software solutions incorporate state-of-the-art security measures, including encryption, access controls, and regular audits, to safeguard data integrity and confidentiality. By instilling confidence in the security of their data, we enable public health agencies to leverage the full potential of digital technologies without compromising patient privacy or regulatory compliance.

3. Enabling Predictive Analytics

Harnessing the power of data analytics is essential for proactive decision-making and effective resource allocation in public health management. Our software solutions

leverage advanced analytics techniques, including machine learning algorithms, to uncover meaningful patterns and trends hidden within vast datasets. By enabling predictive analytics, we empower public health agencies to anticipate future healthcare needs, identify emerging threats, and allocate resources strategically, ultimately leading to improved health outcomes for communities.

3.3 Project Aims and Objectives

The key aims and objectives of the project include:

- Establishing a Health Data Repository for efficient management of health-related data.
- Developing Middleware, Analytical Software, and Web-Based/Mobile Applications for data capture and analysis.
- Integrating machine learning algorithms for predictive modeling and anomaly detection.
- Provision of dedicated server hosting, laptops, and data storage solutions.
- Formulation of backup and recovery plans to ensure data integrity and availability.
- Providing comprehensive training for ICT staff to effectively operate and manage the implemented systems.
- Documentation of the entire development process for future reference and maintenance.

3.4: Rationale and Benefits

The proposed solution offers the following key benefits:

- Improved data management efficiency and accuracy.
- Enhanced data security and compliance with data protection laws.
- Predictive analytics capabilities for early detection of health threats.
- Streamlined data capture processes through user-friendly applications.
- Empowerment of ICT staff through comprehensive training and documentation.

4. TECHNICAL DETAILS

4.1 Description of Our Proposed Solution

Our proposed solution is a comprehensive software ecosystem designed to revolutionize health data management for the National Public Health Agency (NPHA). It encompasses three main components:

1. **Health Data Repository:**

- The first component of our solution is the development of a robust Health Data Repository. This repository serves as the cornerstone of the system, providing a centralized platform for the identification, classification, and secure management of health-related data.
- We will work closely with NPHA to identify the various types of health data to be managed within the repository, ensuring comprehensive coverage of all relevant datasets.
- Our team will develop a data classification matrix based on sensitivity, confidentiality, and usage requirements, facilitating efficient data organization and access control.
- Using industry-leading tools such as Entity Framework (EF Core) and SQL Server Data Tools, we will create a scalable and efficient database schema tailored to NPHA's specific needs.
- To ensure compliance with data protection laws, we will implement security measures such as Transparent Data Encryption (TDE) in MS SQL Server to encrypt the entire database, safeguarding sensitive information from unauthorized access.

2. **Middleware, Analytical Software, and Web-Based/Mobile Applications:**

- The second component of our solution focuses on the development of Middleware, Analytical Software, and Web-Based/Mobile Applications to enhance data capture flexibility and streamline processes.
- We will develop APIs to consume data from the DHIS2 tool and other existing systems, enabling seamless data integration.
- Utilizing Visual Studio.NET as the primary IDE, we will design and develop custom dashboards and web applications for capturing data from external sources.
- Our team will implement intuitive interfaces and features such as customizable dashboards and admin panels to facilitate efficient data capture and management.
- To ensure security and compliance, we will enforce secure communication using HTTPS, implement authentication mechanisms using JSON Web Tokens (JWT), and integrate role-based access controls.

3. Machine Learning Integration:

- The third component of our solution focuses on integrating machine learning functionalities to enhance predictive modeling and anomaly detection capabilities.
- We will procure a Machine Learning Cloud Server with high-performance specifications, including NVIDIA GeForce RTX 3090 GPU, Intel Core i9-11900K CPU, and 64 GB DDR4 RAM, to support complex machine learning tasks.
- Leveraging programming languages such as Python and established frameworks like TensorFlow and Keras, we will develop algorithms for predictive modeling aimed at detecting potential outbreaks and diseases.
- Our team will implement a robust testing methodology for machine learning models to ensure accuracy and reliability, incorporating feedback loops for continuous improvement based on real-world performance.
- Security will be paramount throughout the machine learning integration process, with a focus on handling sensitive health data securely and complying with government regulations.

4.2 Scope of Work and Deliverables

4.2.1 Design and Development of a Health Data Repository

Tasks:

- i. Conduct meetings with NPHA stakeholders to identify health-related data types and requirements.
- ii. Develop a data classification matrix based on sensitivity, confidentiality, and usage requirements.
- iii. Create an Entity-Relationship Diagram (ERD) to visualize the database schema.
- iv. Utilize Entity Framework (EF Core) to design and develop a scalable database schema.
- v. Deploy the database schema using SQL Server Data Tools.
- vi. Implement security measures such as Transparent Data Encryption (TDE) in MS SQL Server.
- vii. Test and validate the Health Data Repository for functionality and compliance with data protection laws.

Deliverables:

- i. Data classification matrix.

- ii. Entity-Relationship Diagram (ERD).
- iii. Scalable database schema implemented using Entity Framework.
- iv. Deployed Health Data Repository with implemented security measures.
- v. Test reports and validation documentation.

4.2.2 Development of Middleware, Analytical Software, and Web-Based/Mobile Applications for Data Capture

Tasks:

- i. Develop APIs to consume data from DHIS2 and other existing systems.
- ii. Design and develop custom dashboards using Power BI and ASP.NET.
- iii. Implement web-based applications for capturing data from external sources.
- iv. Create an admin panel for managing and configuring projects.
- v. Implement secure communication using HTTPS and JSON Web Tokens (JWT).
- vi. Develop mobile applications supporting online/offline data capture.
- vii. Generate API documentation using Swagger/OpenAPI.

Deliverables:

- i. Functional APIs for data integration.
- ii. Custom dashboards and web-based applications.
- iii. Admin panel for project management.
- iv. Secure communication implementation.
- v. Mobile applications for data capture.
- vi. Comprehensive API documentation.

4.2.3 Machine Learning Integration

Tasks:

- i. Procure a Machine Learning Cloud Server with specified hardware requirements.
- ii. Develop machine learning algorithms for predictive modeling.

- iii. Leverage TensorFlow and Keras for model building and training.
- iv. Implement testing methodology for model accuracy and reliability.
- v. Integrate machine learning functionalities with Middleware and Analytical Software.
- vi. Ensure compliance with data protection laws and security measures.

Deliverables:

- i. Machine Learning Cloud Server setup.
- ii. Developed machine learning algorithms.
- iii. Trained machine learning models.
- iv. Integrated machine learning functionalities with software.
- v. Security compliance documentation.

4.2.4 Provision of Dedicated Servers Hosting, Laptops, and Data Storage Solution

Tasks:

- i. Procure and install necessary hardware and software resources.
- ii. Set up a Dedicated Server hosting environment with specified specifications.
- iii. Configure MSSQL database support and implement security measures.
- iv. Purchase necessary software licenses.
- v. Review and enhance security protocols.
- vi. Enable Transparent Data Encryption (TDE) within MS SQL Server.
- vii. Configure Firewall with inbound and outbound rules.

Deliverables:

- i. Installed hardware and software resources.
- ii. Configured Dedicated Server hosting environment.
- iii. Implemented security measures and encryption.
- iv. Purchased software licenses.
- v. Enhanced security protocols documentation.
- vi. Configured Firewall settings.

4.2.5 Formulation of Backup and Recovery Plans

Tasks:

- i. Implement regular backup schedules for critical data and configurations.
- ii. Develop and test a comprehensive disaster recovery plan.
- iii. Ensure real-time data replication from virtual to physical servers.
- iv. Document backup and recovery procedures.
- v. Conduct training sessions for ICT staff on backup and recovery processes.

Deliverables:

- i. Implemented backup schedules.
- ii. Tested disaster recovery plan.
- iii. Real-time data replication setup.
- iv. Documented backup and recovery procedures.
- v. ICT staff training documentation.

4.2.6 Training for ICT Staff

Tasks:

- i. Lead comprehensive training sessions for ICT staff.
- ii. Focus on Microsoft Power BI skills and machine learning integration.
- iii. Facilitate knowledge transfer on developed source code and APIs.
- iv. Conduct hands-on sessions for practical application.
- v. Provide training on database management and administration.

Deliverables:

- i. Training sessions schedule.
- ii. Training materials and documentation.
- iii. Hands-on practical sessions.
- iv. Source code and API knowledge transfer documentation.
- v. Database management training documentation.

4.2.7 Documentation

Tasks:

- i. Document the developed software comprehensively.
- ii. Ensure clarity in documenting code structure and API functionalities.
- iii. Prioritize documentation for knowledge transfer to end-users and developers.
- iv. Collaborate with technical writers to enhance documentation quality.
- v. Facilitate sessions for source code usage and best practices.

Deliverables:

- i. Comprehensive software documentation.
- ii. Clear insights into code structure and API functionalities.
- iii. User-friendly manuals for end-users.
- iv. Quality documentation aligned with industry standards.
- v. Source code usage and best practices documentation

4.3 Hardware and Software Requirement Specifications

4.3.1 Hardware Requirements:

1. **Dedicated Servers:**

- Quantity: 2
- Specifications:
 - CPU: Intel Xeon Processor (or equivalent)
 - RAM: Minimum 64 GB DDR4 ECC RAM
 - Storage: SSD Storage (Minimum 1 TB)
 - Network: Gigabit Ethernet Connection
 - Redundancy: RAID Configuration for Data Protection
 - Operating System: Windows Server 2019 Datacenter Edition

2. **Laptops:**

- Quantity: 10
- Specifications:

- CPU: Intel Core i7 Processor (or equivalent)
- RAM: Minimum 16 GB DDR4 RAM
- Storage: SSD Storage (Minimum 512 GB)
- Operating System: Windows 10 Pro

3. **Data Storage Solution:**

- Network Attached Storage (NAS) or Storage Area Network (SAN)
- Specifications:
 - Minimum Storage Capacity: 10 TB
 - Redundancy: RAID Configuration for Data Protection
 - Connectivity: Gigabit Ethernet

4.3.2 Software Requirements:

1. **Operating Systems:**

- Server OS: Windows Server 2019 Datacenter Edition
- Client OS: Windows 10 Pro

2. **Database Management System:**

- Microsoft SQL Server 2019 Enterprise Edition
- SQL Server Management Studio (SSMS) for database administration

3. **Development Frameworks and Tools:**

- Microsoft Visual Studio 2019 Enterprise Edition
- ASP.NET Core for web application development
- Entity Framework Core for database interactions
- Power BI Desktop for data visualization and reporting

4. **Machine Learning Frameworks:**

- TensorFlow 2 for machine learning model development
- Keras for building and training neural networks
- Python 3.11 programming language for machine learning implementation

5. **Web Server:**

- Internet Information Services (IIS) for hosting web-based applications

6. Security Tools:

- HTTPS Encryption Certificate
- Firewall Software (e.g., Windows Defender Firewall)
- Antivirus Software (e.g., Windows Defender Antivirus)

7. Backup and Recovery Tools:

- Microsoft Azure Backup for cloud backup
- SQL Server Backup and Restore functionality
- Windows Server Backup for local backup

8. Documentation Tools:

- Microsoft Word for document preparation
- Microsoft Visio for diagramming and visualization
- Swagger/OpenAPI for API documentation

9. Collaboration Tools:

- Microsoft Teams for team communication and collaboration
- SharePoint for document sharing and collaboration.

10. Version Control:

- Git for version control management
- GitHub or Azure DevOps for code repository hosting and collaboration

These hardware and software requirements are designed to ensure the scalability, security, and performance of the proposed solution for the health data management system.

5. PROJECT DEVELOPMENT METHODOLOGY

5.1 Project Development Methodology

Our proposed project development methodology is based on Agile principles, which prioritize flexibility, adaptability, and collaboration throughout the project lifecycle. The Agile approach allows us to respond effectively to changing requirements, deliver high-quality software incrementally, and foster close collaboration between the development team and stakeholders.

Benefits:

1. **Flexibility:** Agile methodologies allow for changes to be incorporated at any stage of the project, ensuring that the final product meets evolving business needs.
2. **Iterative Development:** The project is divided into small, manageable iterations or sprints, each delivering a potentially shippable product increment. This enables early feedback from stakeholders and ensures that the project stays on track.
3. **Collaboration:** Close collaboration between cross-functional teams, including developers, stakeholders, and end-users, promotes transparency and ensures alignment with project objectives.
4. **Adaptability:** Agile methodologies emphasize adapting to changing requirements and priorities, enabling the project team to respond quickly to market dynamics and customer feedback.
5. **Continuous Improvement:** Regular retrospectives allow the team to reflect on their processes and identify areas for improvement, leading to ongoing optimization of project delivery.

5.2 Development Process:

1. **Project Kickoff:** The project starts with a kickoff meeting involving key stakeholders to align project goals, scope, and deliverables. The Agile team is introduced, and the project backlog is reviewed.
2. **Sprint Planning:** The Agile team conducts sprint planning meetings to select user stories from the backlog for implementation during the upcoming sprint. Tasks are assigned, and sprint goals are defined.
3. **Sprint Execution:** Development work begins with the team working collaboratively to implement the selected user stories. Daily stand-up meetings are held to track progress, identify any impediments, and ensure alignment within the team.

4. **Sprint Review:** At the end of each sprint, a sprint review meeting is held to demonstrate the completed functionality to stakeholders. Feedback is gathered, and any necessary adjustments are made to the product backlog.
5. **Sprint Retrospective:** Following the sprint review, a retrospective meeting is held to reflect on the sprint process and identify areas for improvement. Action items are created to address any issues or challenges encountered during the sprint.
6. **Continuous Integration and Delivery:** Continuous integration and delivery practices are followed to ensure that changes are integrated into the main codebase frequently and that the software is always in a deployable state.
7. **Customer Feedback Loop:** Throughout the project, customer feedback is solicited and incorporated into the development process to ensure that the final product meets the needs and expectations of end-users.

6: DELIVERABLES AND TIMELINE

6.1 Project Work Breakdown Structure

Task Description	Duration (days)
Design and Development of a Health Data Repository:	
Identify various types of health-related data	1
Develop data classification matrix	1
Create Entity-Relationship Diagram (ERD)	2
Develop database schema using EF Core	2
Design and deploy database schema using SQL Server Data Tools	2
Implement security measures	3
Utilize Transparent Data Encryption (TDE) in MS SQL Server	1
Development of Middleware, Analytical Software, and Web-Based/Mobile Applications:	
Develop APIs for data consumption from the DHIS2 tool and other systems	2
Create APIs for exposing data to other systems	2
Develop custom dashboard and web app using Power BI and ASP.NET	4
Develop custom mobile application for data capture	6
Create web application for capturing data	4
Design and build admin panel	3
Implement intuitive interfaces for data capture	3
Machine Learning Integration:	
Procurement of Machine Learning Cloud Server	2
Develop predictive modeling algorithms	8
Utilize TensorFlow and Keras for model development	6
Implement testing methodology for models	4
Incorporate functionality for continuous model training	4
Establish feedback loop for model monitoring and refinement	3
Provision of Dedicated Servers Hosting, Laptops, and Data Storage Solution:	
Procure necessary hardware and software resources	7
Set up Dedicated Server hosting environment	3
Configure MSSQL database support and security measures	4
Enable Transparent Data Encryption (TDE)	2
Configure encryption keys and certificates	2
Manage encryption keys securely	2
Formulation of Backup and Recovery Plans:	
Implement regular backup schedules	2
Develop and test disaster recovery plan	4
Implement real-time data replication	3
Conduct training sessions for ICT staff on backup and recovery	2
Training for ICT Staff:	

Lead comprehensive training sessions	5
Facilitate knowledge transfer	4
Documentation:	
Document-developed software comprehensively	4
Include detailed information on the software's architecture	3
TOTAL	47

7: PROJECT IMPLEMENTATION METHODOLOGY

7.1 Hosting Plan:

Hosting Plan Overview: For hosting the proposed solution, we recommend a combination of dedicated servers and cloud services to ensure scalability, reliability, and security.

Server Selection:

1. Dedicated Server:
 - Dual Xeon Gold 6148 with 2TB NVMe (4 X 2TB - Raid 1) for data storage.
 - 80 Cores CPU and 256 GB RAM for optimal performance.
 - Windows Operating System for compatibility with the proposed solution.
2. Cloud Services:
 - Utilize cloud services for backup, disaster recovery, and additional computing resources as needed.

Configuration Details:

1. Dedicated Server:
 - Configure MS SQL Server for database management.
 - Implement Transparent Data Encryption (TDE) for enhanced security.
 - Set up firewall rules to control inbound and outbound traffic.
 - Install necessary software tools such as MS SQL Management Studio and Visual Studio.
2. Cloud Services:
 - Implement automated backup schedules for data redundancy.
 - Configure real-time data replication for disaster recovery purposes.
 - Utilize encryption for data transfer and storage security.
 - Enable monitoring and alerting systems for proactive maintenance.

7.2 Training Plan:

Training Plan Overview: The training plan aims to empower ICT staff with the skills and knowledge required to effectively operate, manage, and troubleshoot the proposed solution.

Training Materials:

1. Customized training manuals and guides for each component of the solution.
2. Interactive tutorials and demonstrations for hands-on learning.
3. Online resources and documentation for continuous learning.

Delivery Methods:

1. On-site training sessions conducted by experienced trainers.
2. Virtual training sessions for remote staff members.

Training Topics:

1. Database Management with MS SQL Server.
2. Application Development with ASP.NET and Power BI.
3. Machine Learning Integration.
4. System Administration and Maintenance.
5. Security Best Practices.
6. Backup and Recovery Procedures.

7.3 Implementation and Maintenance Plan:

7.3.1 Implementation Plan

The implementation plan outlines the step-by-step process of deploying the solution and ensuring its smooth integration into existing infrastructure.

Implementation Steps:

1. Requirement Gathering and Analysis:
 - Collaborate with stakeholders to define project requirements and objectives.
2. Solution Design and Development:
 - Design the database schema, APIs, and user interfaces.
 - Develop custom software components and machine learning algorithms.
3. Testing and Quality Assurance:
 - Conduct rigorous testing to ensure functionality, performance, and security.
 - Address any identified issues or bugs before deployment.

4. Deployment and Integration:

- Deploy the solution on the dedicated server and cloud services.
- Integrate with existing systems and data sources.

5. Training and Knowledge Transfer:

- Conduct training sessions for ICT staff on system operation and maintenance.
- Provide documentation and resources for ongoing support.

7.3.2 Maintenance Plan

The maintenance plan focuses on ensuring the long-term reliability, performance, and security of the deployed solution.

Maintenance Activities:

1. Regular Monitoring and Performance Optimization:

- Monitor server health, database performance, and application responsiveness.
- Optimize system configurations for efficiency and scalability.

2. Security Updates and Patch Management:

- Implement timely security updates and patches to mitigate vulnerabilities.
- Conduct regular security audits to identify and address potential risks.

3. Backup and Disaster Recovery:

- Maintain regular backup schedules for data and system configurations.
- Test and validate disaster recovery procedures to ensure readiness.

4. User Support and Troubleshooting:

- Provide ongoing user support and troubleshooting assistance.
- Address user inquiries, issues, and feedback in a timely manner.

5. Continuous Improvement:

- Gather feedback from users and stakeholders to identify areas for improvement.
- Incorporate user feedback and technological advancements to enhance the solution over time.

This comprehensive plan ensures the successful implementation, operation, and maintenance of the proposed solution, maximizing its value and effectiveness for United Power Services/Engineering, Construction, and Electricals.

8: TEAM COMPOSITION OF PROJECT STAFF

1. **Name:** Simeon Patrick Sowa

Position: Project Manager

Responsibilities;

- ✓ Simeon Patrick Sowa holds a bachelor's degree in Networking and Administration. He has proficiency in network design, troubleshooting, and security, backed more than 5 years of experience in leading network projects
- ✓ Simeon Patrick Sowa will serve as our Project Manager (Lead) for the implementation of this project. His responsibilities include spearheading the strategic acquisition of hardware and software tools and components, ensuring compatibility and scalability. He will oversee the coordination of deliverables and deployment. Additionally, he manages the procurement process, and guides server configuration.

2. **Name:** xxxxxxxxxxxx

Position: Software Developer

Responsibilities;

- ✓ xxxxxxxx holds a bachelor's degree in information systems from the University of Sierra Leone.
- ✓ With over 3 years of experience in web technologies, and SQL development, he will serve as the lead developer. His responsibilities in this project include leading the development of the Middleware software.

3. **Name:** xxxxxxxxxxxx

Position: Machine Learning Specialist

Responsibilities;

- ✓ xxxx holds a Higher National Diploma in Computer Science from Njala University with a Python specialization from Coursera.
- ✓ He will be a machine learning developer in this project. He will be responsible for developing the machine learning model

4. **Name:** xxxxxxxxxxxx

Position: ICT Training Specialist

Responsibilities;

- ✓ xxxx is well versed in ICT and emerging technologies with a Bachelor of Science in Information Technology from the University of Siera Leone and 2 years of ICT technology implementation.

- ✓ He will serve as the lead trainer for the project and will be responsible for training the ICT staff of NPHA on the middleware software, data repository, and management and the use of the tools and software.

5. **Name:** xxxxxxxxxxxx

Position: Database Specialist

Responsibilities;

- ✓ xxxx holds a bachelor's in information technology with 3 years of experience in database administration.
- ✓ With about 3 years of experience in Project Management, he will serve as the database specialist responsible for supporting the development of the data repository and management of data within the repository.

9: BUDGET

SN	Budget Description	Qty	Unit Cost	Total Cost
1	Development of Web Based and Mobile Application	1	1,200,000.00	1,200,000.00
2	Development of the of Middleware and Analytical Software	1	2,300,000.00	2,300,000.00
3	Kaspersky Antivirus for computers (100 users)	1	250,000.00	250,000.00
4	Microsoft 365 (100 users)	1	350,000.00	350,000.00
5	Purchase of Security Tools	1	480,000.00	480,000.00
6	Hosting of Middleware and Analytical Software on Cloud	3	500,000.00	1,500,000.00
7	Hosting of Machine Learning Models on Cloud	3	500,000.00	1,500,000.00
8	Purchase of MS SQL Management Studio	2	450,000.00	900,000.00
9	Purchase of Visual Studio 2022 Enterprise Edition license	2	310,000.00	620,000.00
10	Purchase of PowerBi Software	5	50,000.00	250,000.00
11	2TB Backup Drives	10	9,000.00	90,000.00
12	Dell XPS 13 (9310), 13.4- inch FHD+ Touch Laptop - Intel Core i7-1185G7, 16GB 4267MHz LPDDR4x RAM, 512GB SSD, Iris Xe Graphics, Windows 10 Pro - Platinum Silver with Black Palmrest	5	40,000.00	200,000.00
13	Dell XPS 13 9320 Plus Laptop (2022) 13.4" FHD+ Touch Core i7 - 2TB SSD - 32GB RAM 12 Cores @ 4.7 GHz - 12th Gen CPU Win 11 Pro	1	65,000.00	65,000.00
14	Maintenance and supports	1	670,000.00	670,000.00
15	Training, Printing and Material Cost	1	800,000.00	800,000.00
				7,675,000.00

Please Note:

- Total Budget Cost is Seven Million six Hundred and Seventy-Five Thousand Leones.
- All costs provided are in New Leones (SLL).

9: APPENDICES

Power Of Attorney

THIS POWER OF ATTORNEY made the 26th day of October

In the year of our Lord Two Thousand and Twenty-Three by me **MOHAMED MANSARAY** of No.14^A Hill Cut Road, Freetown in the Western Area of the Republic of Sierra Leone **Chief Executive Officer (CEO) of United Power Services/Engineering (UPS & E)** situated at the following addresses: No.1 Dougan Street, Freetown, No.2 Leicester Road, and No.14 Dillet Street, Freetown in the Western Area of the Republic of Sierra Leone.

NOW THIS DEED WITNESSETH THAT I MOHAMED MANSARAY hereby appoints my wife **NEIMA MANSARAY**, and my son **VANDI MANSARAY** both of No.14^A Hill Cut Road, Freetown in the Western Area of the Republic of Sierra Leone my lawful Attorneys to act for me and on my behalf as follows:-

1. To act and sign on my behalf as and when the need arises in all my business transactions of **United Power Services/Engineering (UPS & E)**.
2. I hereby undertake to ratify and confirm whatever the said Attorneys shall lawfully do or cause to be done in this connection.
3. This Power of Attorney remains in effect until specifically revoked by a Deed of Revocation.

IN WITNESS WHEREOF WE HAVE hereunto set my Hand and seal this day and year first above written.



DATED THE 26th DAY OF October 2023.

MOHAMED MANSARAY

799 / 2023

TO

NEIMA MANSARAY

AND

VANDI MANSARAY

Volume 159 Page 121

POWER OF ATTORNEY

SERRY-KAMAL & CO.

69 CAMPBELL STREET

FREETOWN.

SOLICITORS CONVEYANCERS ETC.

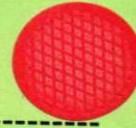
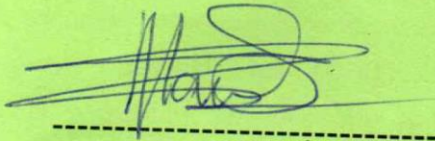
Amount 200 Cent
PROCESSED As above
DATE 26/10/23
RECEIPT NO LBCB005

INSTRUMENT IS REGISTERED AT
PAGE 121 VOLUME 159
BOOK OF 9 ATTORNEY
OFFICE OF THE REGISTRAR
FREETOWN

799 / LBCB005 / 2023
THIS INSTRUMENT WAS PROVED AND SUBSCRIBED BY
THE TESTATOR Mohamed Mansaray
Kerfob
ON 26 DAY
OF OCT 2023
IN THE Presence



SIGNED SEALED AND DELIVERED
by the within-named



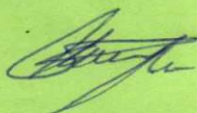
MOHAMED MANSARAY


In the presence of:-

NAME: Ibrahim Kuybo

ADDRESS: 69 Campbell Street
Freetown

OCCUPATION: solicitor's clerk

SIGNATURE: 



SIERRA LEONE
BNRC /

Certificate of Business Names Registration
Act No 18/2007

I hereby certify that the following Business Name has been registered under the
above-mentioned Act. as..... **TIN 1049209-2** *.....*

viz..... **U P S & E CONSTRUCTION & ELECTRICALS** *.....*

Dated this..... **06th** *.....* *day of.....* **NOVEMBER** *.....* **20..13.....**


Registrar-General



1.1.2 Business Registration


SIERRA LEONE

B. R. FORM B
No. **1022**

No. **102** / **20** / **13**
CRBR/12

THE BUSINESS REGISTRATION ACT
NO. 18/2007

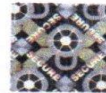
CERTIFICATE OF BUSINESS REGISTRATION

I, **Deputy JOSEPH G. FOFANAH**
Registrar General for the Republic of Sierra Leone, HEREBY CERTIFY
that the proprietors of the Business known as **UNITED POWER SERVICES**
& ENGINEERING, CONSTRUCTION AND ELECTRICAL (UPS&E)
Business of General Merchandise carried on at No.
1 Dougan Street, Brookfields - Freetown.
Business is registered as a Business Enterprise in Sierra Leone.
GIVEN under my Hand and Official stamp at Freetown in the Western Area of the
Republic of Sierra Leone this **06th** **day of** **NOVEMBER**
in the year of our Lord Two Thousand and Thirteen.


Registrar-General

UPS&E Business Documents.
1.2 NRA Clearance Certificate

ISSUING TAX OFFICE	SMO/GC
DATE	17/14/2024



AMOUNT PAID
Le.



NATIONAL REVENUE AUTHORITY
DOMESTIC TAX CLEARANCE CERTIFICATE

DTD Z 25797

Name: UNITED POWER SERVICES CONSULTING & ENGINEERING TIN: 1000091007

Address: 1 Dougan Street Freetown Purpose of Application: Business purpose

We can confirm from our records for the past two years and current year the following:

- i. Payments Made and Returns Submitted for Corporation Tax/Individual Income Tax is up to date
Yes ☒ No ☐ N/A ☐
- ii. Payments Made and Returns Submitted for Goods and Services Tax is up to date
Yes ☐ No ☐ N/A ☒
- iii. Payments Made and Returns Submitted for Pay As You Earn (PAYE) Tax is up to date
Yes ☐ No ☐ N/A ☒
- iv. Payments Made and Returns Submitted for all Withholding Tax(es) is up to date
Yes ☐ No ☐ N/A ☒
- v. Payments Made and Returns Submitted for is up to date
Yes ☐ No ☐ N/A ☒

Below is the summary of the payment profile for the period <u>2023-2024</u>			
Tax Type	Tax Payable (Le.)	Tax Paid (Le.)	Tax Outstanding (Le.)
Corporation Tax / Individual Income Tax	11,000	7,000	4,000
Goods and Services Tax			
Pay As You Earn Tax (PAYE)			
All Withholding Tax(es)			
Others			

Below is the summary of the return profile for the period			
Tax Type	Expected Returns	Returns Submitted	Returns Outstanding
Corporation Tax / Individual Income Tax			
Goods and Services Tax			
Pay As You Earn Tax (PAYE)			
All Withholding Tax(es)			
Others			

We therefore issue this certificate which is valid up to



UPS&E Business Documents.
1.3 NASSIT Clearance Certificate



FORM SS 8
REPUBLIC OF SIERRA LEONE
NATIONAL SOCIAL SECURITY AND INSURANCE TRUST
ACT NO. 5 (2001)
CLEARANCE CERTIFICATE



I hereby certify that

U P S AND E CONSTRUCTION AND ELECTRICALS
W01E2016025

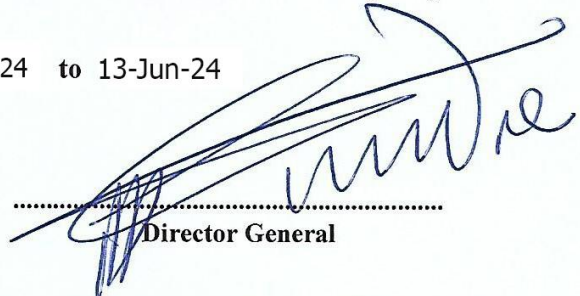
has complied with the National Social Security and Insurance Trust Act No. 5 (2001)

This Certificate is valid from 13-Mar-24 to 13-Jun-24

Certificate ID: W01E2403132406131


Security ID: 143386

Date Printed: 10303/2024


.....
Director General

UPS&E Business Documents.

1.4.1 FREETOWN MUNICIPAL TRADING CERTIFICATE

 **FCC18199**

FREETOWN CITY COUNCIL

Certificate of Licence

Certificate No. FCC

0050972

Rec. No.

UPS & E

We certify that:

ELECTRICALS ENGINEERING


1 DOUGAN STREET - FREETOWN

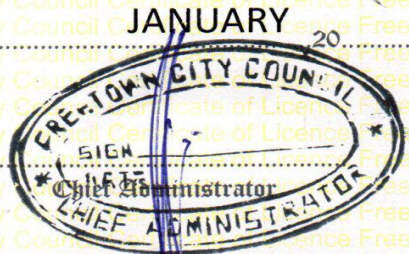
of

has been granted a business licence under Section 56 of the LOCAL GOVERNMENT



ACT 2004 for the period 1ST JANUARY 2024 to 31ST DECEMBER 2024

Given under our hand this 17TH day of JANUARY 2024

 **City Treasurer**

 **Chief Administrator**

1.4.2 KENEMA DISTRICT COUNCIL TRADING CERTIFICATE

GOVERNMENT OF SIERRA LEONE		KENEMA DISTRICT COUNCIL	
			
KENEMA DISTRICT COUNCIL		KENEMA DISTRICT COUNCIL	
EASTERN PROVINCE		Wandeyama Road - Kenema	
		Email: kendistrictcouncil@yahoo.com	
		Republic Of Sierra Leone	
COMPANY'S CERTIFICATE KDC / 1454			
We certified that: UNITED POWER SERVICES & ENGINEERING, CONSTRUCTION AND ELECTRICAL (UPS&E)			
<i>A Company has been granted this registration certificate under the Local Government Act 2022 (Assumption of Functions/ Regulations)</i>			
Date of Issue: 20th November, 2023.			
Address: 30 Sumaila Street. Kenema City			
Given under our hand: 20th November, 2023.		Valid till: 20th November, 2024	
FINANCIAL STATUS: PREMIER			
APPROVED BY: CHIEF ADMINISTRATOR			
NOTE: This certificate is to be renewed annually upon submission of an Annual progress report of the organization's Activities (TO BE COMPLETED IN DUPLICATE)			

1.4.3 BO MUNICIPAL TRADING CERTIFICATE

BO CITY COUNCIL



BCC/BE/11/2023

REGISTRATION CERTIFICATE

This is to certify that

UNITED POWER SERVICES/ ENGINEERING CONSTRUCTION
AND ELECTRICAL BUSINESS

OF

12 KARIMU STREET, BO CITY

Is Registered with the Bo city council as a

BUSINESS ENTERPRISE



[Signature]

CHIEF ADMINISTRATOR

Date of Issued: 16TH NOVEMBER, 2023

To be renewed annually