



**PROJECT IMPLEMENTATION UNIT (PIU)
PUNJAB URBAN LAND SYSTEMS
ENHANCEMENT (PULSE)
Punjab Land Records Authority (PLRA)
Government of the Punjab**



TERMS OF REFERENCE

PUNJAB URBAN LAND SYSTEM ENHANCEMENT (PULSE)

**ISLAMIC REPUBLIC OF PAKISTAN
PUNJAB PROVINCE**

**HIRING OF MANAGED SERVICES FOR THE LAND
ADMINISTRATION AND MANAGEMENT PORTAL (LAMP)**

April 2026

1. Project Background and Objectives

The Punjab Land Records Authority (PLRA), under the PULSE (Punjab Urban Land Systems Enhancement) initiative, has developed and is implementing the Land Administration and Management Portal (LAMP), the first fully parcel-based land administration system in the region. This marks a transformative shift from the legacy khewat–khasra based record structure to a modern, GIS-integrated parcel-centric framework, where each land unit is uniquely identified, spatially mapped, and digitally linked with ownership, rights, and transaction history. The system is deployed through a robust private cloud infrastructure, ensuring centralized data management, high availability, scalability, and secure service delivery across PLRA’s operational footprint.

Under PULSE, services are being disseminated through Arazi Record Centers and PLRA-owned sites, while integration with strategic partners such as the Punjab Information Technology Board (PITB), the National Database and Registration Authority (NADRA), financial institutions, and other government agencies has been further strengthened. These integrations are enabled through secure APIs and web services, allowing real-time verification, data exchange, and transactional interoperability. The system also supports controlled direct access for authorized entities to facilitate institutional workflows, including revenue administration, financial due diligence, and regulatory compliance.

2. Scope of Services

To ensure transparency and citizen facilitation, land records and parcel information are made accessible through the Land Administration and Management Portal (LAMP) as a public-facing web application, which operates separately from the core production environment and is supported by a read-only replicated database to ensure data integrity and system performance. In addition to the web portal, mobile applications are maintained to enhance service accessibility and are expected to be expanded across both Android and iOS platforms under the project scope. The PULSE initiative thus represents a comprehensive digital transformation—transitioning from a fragmented, paper-based, and share-based legacy system to an integrated, GIS-driven, parcel-based digital land administration ecosystem aligned with international best practices.

A summary of the expected number of users and sites is given below here for a reference:

Sr	Category	Number of Sites
1	Arazi Record Centers	230+
2	NADRA E-Sahulat & Franchise	5000
3	Commercial Banks	27
4	Foreign Missions	20
5	Premium Services Clients	100
6	Online Users (Mobile App + Web Portal)	Publicly Accessible

7	Board of Revenue	Spread over 160 tehsils
8	Mobile Apps	Publicly Accessible
9	E-Registration & ESORS	Publicly Accessible
10	GIS Portal	Publicly Accessible
11	Private Housing Societies	5000+
12	Development Authorities & Cooperative	891+
13	All internal & external Integrations	
14	Future Projects	

PULSE now intends to hire services for updating, maintenance and administration of above mentioned services.

a. Software Development, Maintenance, and Upgrade Services

The bidder shall provide complete lifecycle support for LAMP and other bi-products as mentioned above, including:

1. Application Development & Maintenance

- Corrective, adaptive, and perfective maintenance.
- Performance optimization of web, mobile, and GIS-enabled applications.
- Enhancement of parcel-based workflows (mutation, registration, subdivision, consolidation, rights management, etc.).
- Continuous incorporation of new requirements.
- Implementation of new modules, feature upgrades, and database amendments.

2. Architecture & DevOps

- Adoption of **Microservices Architecture** aligned with scalable private cloud infrastructure.
- Implementation of industry best design patterns and clean architecture principles.
- Source Code Management using Git-based/DevOps repositories.
- CI/CD pipelines using Azure DevOps (or equivalent platforms).
- Version control, branching strategies, automated builds, and deployment workflows.
- Containerization and orchestration support where applicable.

3. APIs & Integrations

- Secure API development and management for integration with:
 - NADRA
 - Board of Revenue systems
 - Commercial Banks
 - Government Agencies
 - E-Registration
 - Mobile Applications
 - Any other application / system
- Web services for inter-departmental and institutional data exchange.
- GIS integration for spatial parcel data synchronization.

4. Support Services

- Provision of **Level 1, Level 2, and Level 3 support.**
- Dedicated professional team under the contract.
- Incident resolution within defined SLAs.

5. Documentation & Knowledge Management

The bidder shall prepare, update, and maintain comprehensive documentation, including:

- System Requirement Specifications (SRS)
- User Stories, Change Requests, Bug Logs
- Figma
- System Design Documents (SDD)
- Technical Specification Documents
- Wiki-based Code Documentation
- Flowcharts and Process Diagrams
- ER Diagrams (ERD)
- System Architecture Diagrams
- Database Design and Metadata Documentation
- Test Cases, Test Plans, Unit Test Reports
- Deployment & Configuration Manuals
- User Manuals & CBTs (Computer-Based Trainings)

b. Software Quality Assurance (SQA)

The bidder shall ensure robust quality assurance practices including:

- Detailed Test Cases and Test Plans.
- Unit Testing coverage $\geq 95\%$.
- Functional Testing.
- Usability Testing.
- Compatibility Testing (Cross-browser, cross-platform).
- Database Integrity Testing.
- Security Testing.
- Performance & Load Testing.
- Regression Testing prior to each production release.
- Automated testing where feasible.

Comprehensive QA reports shall be submitted with each major release.

c. Database Administration (DBA) Services

The bidder shall provide end-to-end database management services for the parcel-based LAMP system, including:

- Routine database configuration and maintenance.
- Backup creation and recovery management.
- Performance tuning and query optimization.
- Disaster Recovery planning and execution.
- Data migration from legacy LRMIS to parcel-based system (as required).
- Data archiving strategies to keep environment lightweight.
- Maintenance of read-only replica databases for public portal.
- Data warehouse / data mart support for reporting and analytics.
- Development of bulk import/export utilities for mass data updates.
- Historical data reporting and analytics enablement.

d. System Administration & Infrastructure Support

The bidder shall assist in the administration of PULSE's private cloud and IT infrastructure supporting PULSE and LAMP.

Scope includes:

- Microsoft System Center support.
- Active Directory management.
- DNS & DHCP administration.

- Virtualization management.
- VLAN configuration and network segmentation.
- Storage and server monitoring.
- Security configuration hardening.
- Coordination with technology principals and third-party vendors.

Note:

Primary responsibility for infrastructure execution remains with the Procuring Agency. The bidder shall provide technical assistance and operational support as required.

The bidder shall also:

- Arrange redundant secure connectivity for accessing Central LRMIS/LAMP.
- Maintain separate testing/staging environments for development and upgrades.

e. Cybersecurity & Application Security

The bidder shall adopt a secure-by-design and secure-by-default approach across the Software Development Lifecycle (SDLC).

Security Requirements:

- Compliance with OWASP secure coding standards.
- Threat Modeling exercises for critical modules.
- Static Application Security Testing (SAST).
- Dynamic Application Security Testing (DAST).
- Regular Code Security Reviews.
- Misuse Case Testing.
- Secure Authentication & Authorization (RBAC, MFA where applicable).
- Secure Session Management.
- Use of strong cryptographic algorithms (avoid deprecated ciphers).
- Timely patching of APIs and third-party libraries.
- API security hardening.
- Security logging, monitoring, and audit trail mechanisms.
- Time to time VAPT scans.

Security assessment reports and remediation documentation shall be mandatory deliverables.

f. End User Support & Capacity Building

The bidder shall provide:

- Application usage guidance.
- Process flow assistance for parcel-based land administration.

- Helpdesk support via phone, email, and messaging platforms.
- Escalation mechanism to Level 2 and Level 3 support teams.
- Development and dissemination of:
 - FAQs
 - Online Help Material
 - User Manuals
 - CBT Modules
 - Video Tutorials

g. Service Levels & Operational Requirements

- Minimum response time for show-stopper issues: **15 minutes**.
- Service availability: **6 days per week, 12 hours per day**.
- Exceptional support: Up to 24 off-hour support hours per quarter.
- Scheduled maintenance requiring downtime shall be conducted on off-days.
- Any upgrade or modification materially affecting processes, data, or functions shall require formal approval from PULSE.

h. General Provisions

The scope of engagement is comprehensive and includes provision of managed services for LAMP. Bidders are encouraged to plan contingencies for additional services not explicitly listed but required for smooth operation of the parcel-based ecosystem.

The bidder’s responsibility shall not include hardware repairs; however, assistance in providing logs, diagnostics, and system data to hardware vendors may be required.

Bidders are encouraged to visit production and service delivery sites to understand the operational model and the central role of IT systems within the parcel-based land administration framework.

3. Required Human Resource

Sr	Resource Type	Prospective Number of Resources Needed (count)	Experience (Years)	Estimated Hours (spanning over 1 year)
1.	Solution Architect	2	8	2000
2.	Business Analyst	3	6	5000
3.	Project Manager	2	8	4000
4.	Development Lead	3	8	5000
5.	Full Stack Developers	8	5	14000

6.	GIS Developer	3	5	5000
7.	DB Architect / DB Lead	1	8	2000
8.	DBA	2	5	3000
9.	L1/L2 Help Desk Manager	2	5	2500
10.	L1 Help Desk Team	3	5	5000
11.	L2 Help Desk Team	4	5	7000
12.	QA Lead	1	8	2000
13.	Quality Assurance	2	5	3000
14.	UI/UX Designer	2	5	2500
15.	DevOps Engineer	2	5	2000
16.	Mobile Apps Developer	2	5	2500
17.	Application Security	2	5	2500
18.	Data Scientist	1	5	1500
19.	Security Specialist	1	5	1000
20.	Penetration Tester	1	5	1000
21.	System Auditor	1	5	1000
	Total	48		73500

PULSE may increase/decrease the number of resources/hours. The above-mentioned tentative input hours may be adjusted on need basis across resources within the ceiling of the total hours.

- Based on the assumption that year comprises of 52 weeks and there are 40 working hours per week per person.

4. Resource Engagement, Intellectual Property & Coordination Framework

Resource Engagement & Intimation

The Procuring Agency shall officially communicate to the Supplier/Contractor at least thirty (30) days prior notice regarding:

- The number of human resources required;

- The required skill sets and roles;
- The number of engagement hours;
- The expected date of engagement or disengagement.

The Contractor shall ensure timely mobilization or demobilization of resources in accordance with such written communication, without disruption to ongoing operations of the PULSE and LAMP systems.

5. Qualification Criteria for the required Human Resource

Sr.#	Position	Count	Key post/Non Key Post	Qualification	Experience	Description
1	Solution / System Architect	2	Key Post	16 years of education in Computer Science / Software Engineering/ Information Technology or equivalent from HEC recognized University / Institution.	8 Years	Minimum of 8 years' experience as a Solution/System Architect, a person will be responsible for designing, developing, and implementing end-to-end solutions that align with the organization's objectives. Collaborate with various stakeholders, including business leaders, developers, project managers, and infrastructure teams, to create robust architectures and guide the implementation of solutions.
2	Business Analyst	3	Non-Key Post	16 years of education in Computer Science / Software Engineering/ Information Technology or equivalent from HEC recognized University / Institution.	6 Years	Minimum of 6 years' experience as a Business Analyst. Understanding Business Needs, Requirements Gathering, Analyzing Processes, and facilitating solutions that align with organizational objectives. Assist in Project Planning, Tracking, and Management. Work closely with Project Managers and cross-functional teams to ensure project goals align with business objectives.
3	Project Manager	2	Non-Key Post	16 years of education in Computer Science / Software Engineering/ Information Technology or equivalent from HEC	8 Years	Minimum of 8 years' experience as a Project Manager involves overseeing and managing the Planning, Execution, and delivery of Technical Projects within an organization. Their primary responsibilities typically

				recognized University / Institution.		include: Planning, Communication & Execution, Resource Management, Risk Management, and Change Management. Note: Must have PMP Certified or Agile Practitioner, or SCRUM Master with a minimum of 5 years of software development experience in his/her career.
4	Development Lead	3	Key Post	16 years of education in Computer Science / Software Engineering/ Information Technology or equivalent from HEC recognized University / Institution.	8 Years	Minimum 08 years experience as a Development Lead responsible for creating the overall structure and framework of applications, ensuring they align with Business Objectives and Technological Standards. Design the Architecture and Framework for Software Applications, considering Scalability, Performance, Security, and Maintainability. Create Technical Specifications and Guidelines for implementation.
5	Full Stack Developers	8	Key Post	16 years of education in Computer Science / Software Engineering/ Information Technology or equivalent from HEC recognized University / Institution.	5 Years	Minimum of 05 years of experience as a Full Stack, in developing, deploying, and maintaining robust web applications. With a deep understanding of both front-end and back-end technologies. Proficient in building scalable, secure, and user-friendly software solutions using the Microsoft technology stack.
6	GIS Developer	3	Key Post	Minimum 16 years of education in IT/ Computer Science/ GIS /Remote Sensing / Geomatics / Space Sciences / Computer Science or equivalent from a HEC recognized University / Institute.	5 Years	At least 5 years post qualification experience in the relevant field..

7	DB Architect / DB Lead	1	Non-Key Post	16 years of education in Computer Science / Software Engineering/ Information Technology or equivalent from HEC recognized University / Institution.	8 Years	Minimum of 8 years' experience as a DB Architect / DB Lead. Responsible for overseeing the design, implementation, maintenance, and security of an organization's databases Database Management, ETL Routines, Performance Optimization, Security and Compliance, Backup and Recovery, migration, Troubleshooting and Issue Resolution, Documentation and Reporting. Note: Must have relevant DBA (Microsoft SQL Server) Certification from Microsoft.
8	DBA	2	Non-Key Post	16 years of education in Computer Science / Software Engineering/ Information Technology or equivalent from HEC recognized University / Institution.	5 Years	Minimum of 05 years of experience as a DBA, in managing, securing, and optimizing databases. Possess in-depth expertise in database design, administration, and troubleshooting. Maintain high availability, data integrity, and performance across a variety of database platforms.
9	L1/L2 Help Desk Manager	2	Non-Key Post	16 years of education in Computer Science / Software Engineering/ Information Technology or equivalent from HEC recognized University / Institution.	5 Years	Minimum of 05 years' experience as an L1/L2 Help Desk Manager. Responsible for leading a technical support team, ensuring timely and accurate customer service, recruiting and training representatives, and establishing customer service standards. Develop daily, weekly, and monthly reports on the help desk team's productivity. Provide customer feedback to the appropriate internal teams e.g. SD/QA
10	L1 Help Desk Team	3	Non-Key Post	16 Years of education from HEC recognized University/Institution.	5 Years	Minimum of 05 years of experience as L1 Help Desk, in providing first-line IT support. Adept at troubleshooting technical issues, resolving user queries, and ensuring seamless IT operations. Act as the initial point of contact for end-users, efficiently managing incidents,

						and service requests, and escalating complex problems to higher-level support teams.
11	L2 Help Desk Team	4	Non-Key Post	16 Years of education from HEC recognized University/Institution.	5 Years	Minimum of 05 years of experience as L2 Help Desk, advanced technical support, and incident management. Handle escalated technical issues and work closely with L1 teams and other IT departments to ensure seamless IT operations. Specialize in root cause analysis, troubleshooting complex issues, and implementing solutions while maintaining system stability.
12	QA Lead	1	Non-Key Post	16 years of education in Computer Science / Software Engineering/ Information Technology or equivalent from HEC recognized University / Institution.	8 Years	Minimum 8 years' experience as a Software QA Lead. Prepare and implement quality assurance policies and procedures, and carry out routine inspections and quality tests. Document quality assurance activities make recommendations and share findings. Support creating training materials and operating manuals. Overall responsibility for quality assurance of all related project activities and team management. Certification of Certified Software Quality Manager (CSQM) would be a plus.
13	Quality Assurance	2	Non-Key Post	16 years of education in Computer Science / Software Engineering/ Information Technology or equivalent from HEC recognized University / Institution.	5 Years	Minimum of 05 years of experience as a Quality Assurance Engineer, to develop, document, and test software to ensure that the software meets the needs of end-users and achieves business goals. And provide technical guidance to development teams and oversee the technical aspects of all projects. Recommend adjustments to resolve software issues, improve the functionality of existing software, and ensure

						that the design, application, and maintenance of software meets the quality standards.
14	UI/UX Designer	2	Non-Key Post	Minimum 16 years of education in IT/ Computer Science.	5 Years	At least 5 years post qualification experience in the relevant field.
15	DevOps Engineer	2	Non-Key Post	16 years of education in Computer Science / Software Engineering/ Information Technology or equivalent from HEC recognized University / Institution.	4 Years	Minimum 4 years of experience as DevOps Engineer, in bridging the gap between software development and operations by establishing and maintaining automated processes for building, deploying, and managing source code and software systems. And streamline the software development lifecycle and improve operational efficiency.
16	Mobile Apps Developer	2	Key Post	16 years of education in Computer Science / Software Engineering/ Information Technology or equivalent from HEC recognized University / Institution.	5 Years	Minimum 5 years of experience as Mobile Applications Developer (Native and Hybrid), to review, design, develop, and maintain mobile applications for various platforms, including native (iOS and Android) and hybrid (using frameworks like React Native, Google Flutter, or Xamarin).
17	Application Security	2	Non-Key Post	Minimum 16 years of education in IT/ Computer Science.	5 Years	At least 5 years post qualification experience in the relevant field..
18	Data Scientist	1	Key Post	Minimum 16 years of education in IT/ Computer Science.	5 Years	At least 5 years post qualification experience in the relevant field.

19	Security Specialist	1	Key Post	16 years in IT, Cybersecurity, or related field.	5 Years	At least 5 years post qualification experience in the relevant field.
20	Penetration Tester	1	Non-Key Post	Minimum 16 years of education in IT/ Computer Science.	5 Years	At least 5 years post qualification experience in the relevant field.
21	System Auditor	1	Non-Key Post	Minimum 16 years of education in IT/ Computer Science.	5 Years	At least 5 years post qualification experience in the relevant field.

6. Professional Standards

The selected Consultant must operate in alignment with the following professional standards:

- **Integrity:** Maintain objectivity and transparency in all project activities, delivering unbiased, accurate, and consistent services.
- **Confidentiality:** Uphold strict confidentiality for all PULSE data and information, ensuring that proprietary information remains secure. The Software Code is property of PULSE and cannot be re-used or shared in any form to any other public/private client.
- **Compliance with Best Practices:** Implement the latest industry standards in development, project management, data security, and tool usage, ensuring project deliverables are robust, scalable, and efficient. The Knowledge transfer of developed modules will be a mandatory item post deliverables / project.

7. Reporting Arrangements

The Consultant will be required to report to the **Project Coordinator, PULSE** for all administrative and contractual matters. The reporting arrangements include:

1. **Resource Deployment Reports:** Provide updates on resource availability, skills deployed, and task assignments.
2. **Tool Usage and Maintenance Reports:** Report on tool utilization, issues encountered, and maintenance activities conducted to ensure tool availability.
3. **Progress and Issue Resolution Reports:** Submit regular reports summarizing project milestones, challenges, and action plans to overcome any obstacles in resource or tool management.

8. Contract Duration and Timeline

- **Assignment Type:** Long-term consultancy agreement
- **Contract Duration:** Till 30th June 2027 (Gestation period of the project)
- **Commencement Date:** Expected start date is July 2026

8. Qualification and Firm Requirements

The Software Development Company should meet the following qualifications:

- **Registration:** The national firm must be registered with PASHA, SECP, and PSEB, ensuring compliance with local industry regulations and international firm must be registered with relevant forum in the country of origin.
- **Experience:** Demonstrated experience of at least Seven (07) years in providing software development services, with a proven track record of working on large-scale public/private or donor-funded projects. The firm having land related projects will be preferred.
- **Technical Capacity:** Adequate infrastructure and a team of professionals with the expertise to provide high-quality, on-demand resources across multiple development disciplines.
- **Financial Stability:** Evidence of financial stability and capacity to undertake a project of this scale and duration, ensuring continuous and reliable service delivery.
- **Certification Standards:** The firm shall possess a valid and internationally recognized certification in information security management, such as ISO 27001, or an equivalent standard.

9. Selection Method

The selection of the **Consultant** will be based on the **Quality and Cost Based Selection (QCBS)** method, adhering to the procurement regulations specified by the World Bank in the **Procurement Regulations for IPF Borrowers** (November 2020 edition).