# School Building Repair App Proposal

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## Introduction

This proposal presents our plan to develop a comprehensive School Infrastructure Information Management App- first-of-its-kind solution in Sri Lanka. Although many services in the country have already embraced digital platforms, most school infrastructure records are still maintained in manual, physical files, making data management time-consuming and inefficient.

Our app is designed to centralize and digitize all school-related building and infrastructure details into a single, secure main hub. Authorized users—Provincial Engineers, District Engineers, Technical Officers, and Principals will be able to log in to the system. Among them, Principals will be responsible for feeding accurate, up-to-date data about their schools.

The platform will also help address resource distribution inequalities, ensuring that even under-resourced schools receive the necessary support and facilities. Furthermore, the app will provide decision-makers and clients with real-time insights during meetings, enabling data-driven planning and more effective allocation of funds and resources.

Initially, this project will focus on schools in Sri Lanka's Southern Province, serving as a pilot for wider national implementation in the future. Through this initiative, we aim to modernize school infrastructure management and pave the way for transparent, equitable, and efficient educational development.

## Objectives

- Compare Contractor Quality – Establish a structured framework to evaluate and compare the performance and quality of work delivered by different contractors involved in school infrastructure projects.

- Accurate Data Collection– Ensure that all school infrastructure details are gathered and stored with high accuracy and consistency, minimizing manual errors and missing information.

- Real-Time Monitoring– Provide stakeholders with the ability to track project progress, resource allocation, and infrastructure updates instantly through real-time dashboards.

- User-Friendly Interface – Design an intuitive and simple user interface so that government officers and other stakeholders (such as Provincial Engineers, District Engineers, Technical Officers, and Principals) can easily access and manage information without needing advanced technical skills.

- Use of Online Database – Replace traditional physical files with a secure online database, ensuring centralized, easily accessible, and up-to-date information for all authorized users.

## Project Scope

This project aims to develop a School Infrastructure Information Management App to centralize and digitize all school building and resource data in the Southern Province. The app will enable accurate data collection and real-time monitoring, supporting data-driven decisions for resource allocation and project planning.

## Features and Functionality

- Login / Register – Secure user authentication and registration system to provide role-based access for Provincial Engineers, District Engineers, Technical Officers, and Principals.

- Add Details– Functionality for Principals and authorized users to enter and upload comprehensive school infrastructure and resource information directly into the system.

- Manage Details – Tools for authorized users to edit, update, and maintain school infrastructure records, ensuring information remains accurate and up to date.

- User Management – Administrative controls to create, update, or deactivate user accounts and assign specific roles and permissions for effective system management.

## Stakeholders

**Primary Stakeholders**-Buildings Department, Provincial Director, Chief Engineer, District Engineer, Technical Officer, Principal

**External Partners**-App Development Team, Technical Consultant

## Methodology

### Project Development Approach:

Agile Methodology: The project will follow an Agile approach, allowing for iterative development and frequent feedback. This ensures flexibility and the ability to adapt to changing requirements. Regular sprints will enable continuous improvement and timely delivery of features.

### Timeline

**Phase 1: Preparation and Study (Weeks 1-3)**

- Week 1-3 (Study Time)

- Objective: Deepen understanding of Flutter, Spring Boot, and microservice architecture.
- Activities:
- Review Flutter documentation and tutorials.
- Study Spring Boot, focusing on building scalable microservices.
- Explore best practices for integrating Flutter with microservices.
- Conduct any necessary research or training.

**Phase 2: Requirements Gathering & Planning (Weeks 4-5)**

- Week 4-5 (Requirements Gathering & Design)

- Week 4:

- Objective: Gather and document project requirements.
- Activities:
- Conduct meetings with stakeholders (Irrigation Department, Technical Officers, etc.).
- Define detailed functional and non-functional requirements.
- Document user stories and use cases.

- Week 5:

- Objective: Design system architecture and plan.
- Activities:
- Design system architecture, focusing on microservices.
- Define data flow and interactions between services.
- Create wireframes and UI mockups for the Flutter app.
- Finalize the tech stack and tools.

**Phase 3: Backend Development (Weeks 6-10)**

- Week 6-10 (Backend Development)

- Week 6:

- Objective: Set up the project environment and initialize backend services.
- Activities:
- Set up project repositories (Git, version control).
- Configure Spring Boot and start developing microservices.
- Set up databases and cloud infrastructure.

- Week7-9:

- Objective: Develop core microservices.
- Activities:
- Develop authentication, user management, and data handling services.
- Implement APIs for data collection and synchronization.
- Ensure security protocols are in place (encryption, authentication).

- Week 10:

- Objective: Complete and test backend services.
- Activities:
- Conduct unit testing of microservices.
- Deploy services to a test environment.
- Perform integration testing with mock data.

**Phase 4: Frontend Development (Weeks 11-14)**

- Week 11-13 (Frontend Development)

- Week 11:

- Objective: Set up Flutter environment and start development.
- Activities:
- Initialize Flutter project and set up UI components.
- Implement user authentication screens and navigation.

- Week 12-13:

- Objective: Develop core app functionality.
- Activities:
- Develop data entry forms, GPS integration, and photo upload features.
- Integrate APIs with the backend for real-time data submission.
- Implement role-based access controls in the UI.

- Week 14:

- Objective: Complete and test the frontend.
- Activities:
- Conduct UI testing and debugging.
- Perform end-to-end testing with the backend services.
- Refine the UI/UX based on testing feedback.

**Phase 5: Testing, Deployment, and Rollout (Weeks 15-17)**

- Week 15 (Final Testing and Bug Fixes)

- Objective: Ensure the application is stable and bug-free.
- Activities:
- Perform comprehensive testing (unit, integration, system).
- Fix any identified bugs or issues.
- Optimize performance for both the frontend and backend.

- Week 16 (Deployment and Training Preparation)

  - Objective: Deploy the application and prepare for user training.
  - Activities:
  - Deploy the application to the production environment.
  - Prepare training materials and user manuals.
  - Set up support channels for users.

-Week 17 (Pilot Rollout and Feedback Collection)

  - Objective: Conduct a pilot rollout and gather feedback.
  - Activities:
  - Roll out the application to a small group of users.
  - Monitor performance and collect user feedback.
  - Make any final adjustments before full deployment.

| Weeks | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
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| Preparation and Study | | | | | | | | | | | | | | | | | |
| Requirements Gathering & Planning | | | | | | | | | | | | | | | | | |
| Backend Development | | | | | | | | | | | | | | | | | |
| Frontend Development | | | | | | | | | | | | | | | | | |
| Testing, Deployment, and Rollout | | | | | | | | | | | | | | | | | |

## Technologies and Tools

**Technologies:** The app will be developed Flutter for cross-platform compatibility.

Backend development will use spring boot.

**Tools:** Tools like Git for version control, and Firebase for real-time data handling will be utilized to streamline development. Figma for UI design.

### Data Collection Methods and Protocols

**Methods:** Data will be collected via mobile devices by technical officers using the app's data entry forms and they can feed data. Principals can report if they have issues.

**Protocols:** Data will be synced to a database with secure, role-based access.

## Business Analysis

### Market Analysis

There is a growing need in Sri Lanka's education sector to digitally manage school infrastructure data. At present, most schools rely on manual record-keeping, making it difficult to access accurate information for planning and resource allocation. Government initiatives toward digital transformation create an ideal environment for introducing a centralized School Infrastructure Information Management App, starting with the Southern Province and expanding nationwide.

### SWOT Analysis

#### Strengths

- First-of-its-kind centralized platform for school infrastructure data in Sri Lanka.
- Role-based access ensures secure and organized data management.
- Reduces time and cost by eliminating manual file handling.

#### Weaknesses

- Requires continuous internet connectivity for real-time operations.
- Initial training may be needed for some government officers unfamiliar with digital tools.
- Cannot physically identify real structural damage in buildings—relies on data entered by users, which may not always capture hidden issues.

#### Opportunities

- Potential to expand beyond the Southern Province to national-level implementation.
- Possibility of integrating with other education or government databases in the future.
- Can support better budgeting and resource distribution at provincial and national levels.

**Threats**

- Risk of cybersecurity breaches if data protection is not strong.
- Resistance to change from users accustomed to physical record-keeping.
- Technical Challenges: Potential issues such as device malfunctions, software bugs, or challenges in integrating the app with existing systems could delay implementation or affect performance.

**Risk Assessment**

**Data Security Risks:** Unauthorized access or cyberattacks could compromise sensitive school data.

**Technical Risks:** System downtime or server failures may interrupt real-time access.

**Adoption Risks:** Some stakeholders may be reluctant to shift from manual processes to a digital platform.

**Mitigation Strategies**

**Technical Risks:** Conduct thorough testing, implement regular updates, and maintain robust server infrastructure.

**Adoption Risks:** Provide comprehensive training and support, and gather feedback for continuous improvement.

**Security Risks:** Use strong encryption, implement multi-factor authentication, and regularly audit security protocols.

## Cost-Benefit Analysis:

### Justification for Investment:

**Costs:** Initial development and implementation costs, including technology, training, and ongoing maintenance.

**Benefits:** Long-term savings from efficient resource management, reduced manual data entry errors, and timely decision-making based on real-time data.

It will help manage and reduce the inequality in resource distribution between rural schools and urban schools.

## Budget

**Development Costs:**

- **Software Development:** This includes purchasing necessary software services and development tools.
- **Hardware:** Budget for acquiring any required hardware, servers for hosting the application, or other specialized equipment.

**Operational Costs:**

- **Maintenance:** Ongoing costs for maintaining and updating the app, fixing bugs, and adding new features.
- **Server Hosting:** Expenses related to hosting the app's database and backend services, including cloud storage, bandwidth, and server management.

## Implementation Plan

### 1. Phased Rollout Plan

The project will begin with a pilot rollout in selected schools within the Southern Province. During this phase, the system's core features—data entry, contractor quality comparison, and real-time monitoring—will be tested in a controlled environment. Feedback will be collected from Provincial Engineers, District Engineers, Technical Officers, and Principals to identify any issues and improve usability before wider deployment.

### 2. Gradual Expansion

After the pilot phase, the platform will be expanded gradually to all schools in the Southern Province. This stage will focus on scaling the system's infrastructure, ensuring stable performance under increased user load, and incorporating enhancements based on pilot feedback.

### 3. Full Implementation

Once the Southern Province rollout is successfully completed and the system has been optimized, a nationwide implementation will follow. This will include integration with existing government education databases if required, ensuring that all provinces benefit from centralized school infrastructure management.

### 4. Training and Support Strategy

**User Training:** Conduct structured training sessions and provide user guides for government officers, engineers, technical officers, and principals to ensure smooth adoption.

**Continuous Learning:** Offer refresher workshops and periodic updates to introduce new features and maintain user proficiency.

This phased approach ensures a smooth transition from manual to digital infrastructure management, minimizes risks, and encourages stakeholder confidence throughout the rollout process.

## Conclusion

This project aims to modernize school infrastructure management by introducing a centralized online platform for collecting, storing, and monitoring school building and resource data in the Southern Province.

### Summary of Key Points

- Digitizes existing physical records into a secure online database.
- Enables accurate data collection, real-time monitoring, and contractor quality comparison.
- Provides a user-friendly interface for government officers, engineers, technical staff, and principals.
- Addresses resource distribution inequalities between rural and urban schools.

### Expected Outcomes and Benefits

- Improved efficiency and transparency in school infrastructure management.
- Faster and data-driven decision-making for planning and resource allocation.
- Equitable distribution of resources across schools, minimizing disparities.
- Scalable system that can expand to other provinces nationwide.

### Call to Action

We recommend approval and support for the development and implementation of this app. By investing in this initiative, stakeholders will enable a more organized, efficient, and fair education infrastructure system, benefiting students, staff, and the broader community alike.