Project Progress Report: Lumina Lanka

Smart Street Light Management System for Maharagama Urban Council

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Executive Summary

Lumina Lanka is a high-fidelity, cross-platform Smart Street Light Management System designed to streamline maintenance reporting and tracking using GPS technology. This solution delivers a seamless native experience across iOS, Android, Web, and Linux platforms. Phase 1 is now complete, establishing the core infrastructure for scalable deployment.

1 Technical Infrastructure

The technical architecture maximizes performance and scalability while minimizing maintenance overhead.

Cloud Infrastructure

The system operates on a serverless architecture powered by Google Firebase. This infrastructure manages data storage, authentication, and real-time synchronization through a fully managed cloud environment. This approach ensures high availability and automatic scaling by leveraging Google's global network resources.

Technology Stack

- **Geospatial Rendering:** The Google Maps Platform is utilized for accurate, high-performance geospatial data rendering, which is essential for locating and managing street light infrastructure.
- **Cross-Platform Framework:** The application is built with Flutter, enabling the compilation of native code for iOS, Android, Web, and Linux from a single codebase.

2 Completed Progress (Phase 1)

The following timeline outlines the key milestones achieved during the first month of development.

3 Upcoming Implementation Roadmap

The project will proceed through the following phases to achieve full deployment in the Maharagama region.

Week	Focus Area	Key Achievements
1	Environment Setup	Configured Arch Linux development environment, installed Flutter SDK, Android Studio, and verified Linux Toolchain.
2	Core UI Engineering	Implemented Glassmorphism UI concepts. Developed custom shaders and high-blur backdrops for the application interface.
3	Map Integration	Integrated Google Maps Web API with hardware acceleration. Implemented custom night mode mapping styles for improved visibility.
4	Backend Init	Initialized the Firebase Project. Configured the Firestore Database structure and established secure API connectivity.

Phase 2: Data Digitization

Objective: Populate the system with physical assets.

- **Precise Geotagging:** Implementation of high-accuracy GPS pinning logic.
- **Asset Classification:** Data entry forms for classifying pole and bulb types.
- **Volunteer Access:** Deployment of the mapping module for Ward-level data tagging.

Phase 3: Public Reporting and Administration

Objective: Enable citizen engagement and council oversight.

- **Public Interface:** Launching the reporting interface for users to flag faulty street lights.
- **Council Dashboard:** A web-based analytical view for identifying high-failure zones.
- **Ward Filtering:** Filtering logic to view issues by specific administrative boundaries.

Phase 4: Maintenance Operations

Objective: Closing the loop on repairs and warranty.

- **Job Cards:** Automated assignment of faulty lights to maintenance staff.
- **Warranty Tracking:** Data entry of serial numbers during repair to automate stock records.
- **Resolution:** System logic to update light status upon job completion.

Phase 5: Pilot Deployment

Objective: Live testing in the Maharagama Urban Council area.

- Field testing with public security committee volunteers.
- Stress testing the backend with real-time reporting data.
- Final calibration of GPS coordinates for Ward boundaries.

4 Current Status Summary

As of this report, the foundational infrastructure is operational. The application runs successfully on Localhost (Web) and Linux Desktop, featuring active real-time map rendering and a secured database connection.