Project Progress Report: Lumina Lanka

Smart Street Light Management System for Maharagama Urban Council

Prepared for: [Supervisor Name]
From: Lead Developer

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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, eliminating the need for complex server hardware. Phase 1 (Infrastructure & UI) is now complete, establishing a robust foundation for scalable deployment.

1 Technical Infrastructure

The technical architecture of Lumina Lanka has been strategically chosen to minimize overhead while maximizing performance and scalability.

Serverless Architecture

We have adopted a **Serverless Architecture** utilizing **Google Firebase** as the backend infrastructure. This decision ensures high availability and eliminates the need for maintaining traditional server infrastructure.

No physical server hardware is required.

Technology Stack

- **Geospatial Rendering:** The system leverages the **Google Maps Platform** to provide accurate, high-performance geospatial data rendering, essential for locating and managing street light infrastructure.
- **Cross-Platform Framework:** The application is built with **Flutter**, enabling us to compile native code for iOS, Android, Web, and Linux from a single codebase. This ensures consistent high performance and a unified user experience across all devices.

2 Development Timeline: Phase 1

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

Week	Focus Area	Key Achievements
1	Environment Setup	Configured Arch Linux development environment. Installed Flutter SDK, Android Studio, and the Linux Build Toolchain to ensure a robust development workflow.
2	Core UI Engineering	Implemented "Next-Gen" Glassmorphism UI (inspired by iOS 26 concepts). Developed custom shaders and high-blur backdrops to achieve a premium, modern aesthetic.
3	Map Integration	Integrated Google Maps Web API with hardware acceleration enabled. Implemented custom "Night Mode" mapping styles to enhance visibility and reduce eye strain during night operations.
4	Backend Init	Initialized Firebase Project (`lumina-lanka`). Configured Firestore Database structure and linked API keys to secure connectivity between client and backend.

3 Current Status

As of this report, Phase 1 is complete. The system's status is as follows:

- **Platform Availability:** The application is successfully building and running on **Localhost (Web)** and **Linux Desktop**.
- **Map System:** Real-time map rendering is active and responsive.
- **Connectivity:** Secure connection to the Google Firestore database has been established and verified.