E-Challan System - Test Script & QA Plan

Date: 2025-12-22
Version: 1.0

1. Automated API Testing

We have developed an automated Python script to verify the health and functionality of the Backend API.

Command to Run:
```
python backend/test_api.py
```

Scope:
- Server Connectivity Check
- Camera List Retrieval (/api/cameras)
- Analytics Dashboard Data (/api/analytics/dashboard)
- AI Prediction Endpoint (/predict) with dummy image

2. Manual Testing - Web Interface

Test Case TC-001: Map Visualization

Steps:
1. Open 'frontend/demo.html' in a browser.
2. Wait for the map to load.

Expected Result: Map should display centered on Lahore with Green (Active) and Red (Inactive) camera markers.

Test Case TC-002: Camera Details

Steps:
1. Click on any Green camera marker.
2. Observe the popup.

Expected Result: A popup should appear showing Camera Location, Status, Traffic Light status, and a 'Get Directions' button.

Test Case TC-003: Real-time Notifications

Steps:
1. Wait for 15-30 seconds on the dashboard.
2. Observe the top-right corner.

Expected Result: Toast notifications (e.g., 'Over Speed Detected') should appear automatically, simulating real-time alerts.

Test Case TC-004: Dark Mode Toggle

Steps:
1. Click the 'Dark Mode' button in the top navigation bar.

Expected Result: The interface should switch to a dark theme, and the map tiles should invert colors to match the theme.

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3. Manual Testing - Backend API

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Test Case TC-005: API Documentation Access

Steps:

1. Ensure backend is running.
2. Navigate to 'http://localhost:8000/docs'.

Expected Result: Swagger UI should load, listing all available API endpoints (GET, POST, PUT, DELETE).

Test Case TC-006: Challan History API

Steps:

1. Send a GET request to '/api/challans'.

Expected Result: Server should return a JSON list of challan objects with status, amount, and vehicle details.
