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Automatic GIS-based Geospatial Analysis for Urban Planning “Series/Jenin” Case Study

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Abstract

This study employs geospatial analysis to evaluate urban planning efficacy in Series village, Jenin Governorate, Palestine. Using high-resolution aerial orthophotography (2021), GNSS-surveyed control points, and GIS techniques, we assessed conflicts between existing infrastructure and a historical master plan. Key workflows implemented in ArcGIS ModelBuilder included: (1) Intersection analysis between buildings and planned roads, revealing 216 conflict zones (total area: 3,988 m², max: 165 m²); (2) Buffered road analysis (AASHTO standards) showing 305 encroachments (total: 7,240 m²); (3) Slope analysis of planned roads, identifying hazardous gradients >45% in southwestern sectors; and (4) Parcel deduction calculations, indicating 643 land-use conflicts (total: 219,000 m²).

Orthophoto re-georeferencing reduced spatial displacement by >5 meters, enhancing dataset reliability. Results demonstrate significant misalignment between planned frameworks and on-ground development, attributed to non-compliance with zoning regulations. Critical findings indicate the existing master plan inadequately addresses terrain constraints (e.g., steep slopes) and current urbanization patterns. Recommendations include revising road alignments using local municipal standards (not AASHTO), enforcing slope-compliant designs (<25%), and implementing stricter regulatory oversight. This methodology provides a replicable framework for evaluating master plans in rapidly developing regions, emphasizing the integration of high-accuracy geospatial data to bridge planning proposals and actionable implementation.