Identification of Traffic Hotspots in CMC Area and Study of Flow Dynamics around them Using GIS & RS Techniques

L.H.M.K. Kumarasinghe[1], T.D.C. Pushpakumara[2]

Urban environment is an important part of any country that largely sustains its economy. It evolves day by day undergoing rapid changes. In such an environment, transportation is an essential activity that links the important urban centers and masses. Transportation in an urban environment is a complex activity associated with many challenges. Nowadays urban environment facing complex and multidimensional challenges such as Traffic congestion, Efficiency of public transportation, Safety management, Limited Transport infrastructure capacity (parking issues), Environmental concerns (Air, Nosie and heat island effects), Accessibility and equity of transportation systems.

Traffic analysis relies on limited, localized, and outdated data from ground sensors and surveys. This approach struggles to effectively manage congestion in dynamic urban environments. Lack of comprehensive understanding of spatiotemporal factors, congestion dynamics across the city becomes reactive and ineffective. Advance technologies such as GIS and

Remote Sensing help to understand the dynamic urban environment more effectively. Therefore, it is imperative to formulate more effective traffic planning through studies of dynamics of traffic flow using modern technologies.

This research aims to illustrate the possibility of successfully using GIS and RS for Urban Transport Planning. Moreover, with the objectives of use of GIS and RS to illustrate the dynamics of traffic flow andpropose the effective transportation plan by incorporating GIS and RS.

A mixed method combining qualitative and quantitative approaches used in the study. Primary data will be gathered through questionnaires and interviews to identify congestion hotspots. Advanced drone-basedRS systems will be deployed to capture high-resolution traffic flow data within 1km radius of identified hotspots during peak and off-peak hours. The drone data collection will utilize RTK/PPK GPS systems and strategic ground control points for precise spatial accuracy. This data will be integrated into a GIS environment, enabling sophisticated spatial analysis and traffic pattern visualization.

The significance of the research lies in its potential to transform urban transportation planning practices through the integration of advanced technologies. By providing a comprehensive framework for data collection, analysis, and visualization, this study will enable urban planners to

develop more effective, evidence-based transportation solutions. The outcomes will contribute to reducing traffic congestion, improving environmental conditions, and enhancing the overall quality of urban life through better-informed transportation planning decisions. The findings will serve as a valuable reference for urban planners, transportation authorities, and policymakers in developing sustainable, efficient urban transportation systems.

Keywords: *Traffic flow dynamics, Remote Sensing, Geographic Information Systems, hotspots area*

1. Department of Civil Engineering, University of Moratuwa. mkkumarasinghe@gmail.com

2. Department of Civil Engineering, University of Moratuwa.