

THE EFFECT OF TRAFFIC STRATEGIES ON EMISSIONS

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ABSTRACT

Air pollution and its relationship to the ecosystem and human life has always been the subject of a significant amount of study. The effect of highway air emissions on urban air quality has been studied for many years. This report contains a simulation of a single intersection in an urban area, using Arena®, a general purpose simulation program, and taking into account dynamic and stochastic considerations. The United States Environmental Protection Agency (USEPA) emission factors for idling situations were used to measure the emission of carbon monoxide (CO), volatile organic compounds (VOC) and nitrogen oxide (NO_x) for the delay time. The simulation result predicts emission levels to be higher in a two-phase plan (unprotected left lane) with three different cycle times studied in this case (90, 120, and 140 seconds) compared to a three-phase plan (a protected left lane). However, the degree to which a two-phase plan is positively correlated with intersection cycle time suggests that a multi-faceted approach needs be taken in implementing modifications to reduce overall emissions.