2017 Project Abstract

Project Title: Integrated Implementation of Innovative Designs (Project F)

Principal Investigator: Nagui Rouphail, Ph.D., North Carolina State University, Department of Civil, Construction & Environmental Engineering, Email: rouphail@ncsu.edu

Co-PI: Chris Cunningham, Ph.D., North Carolina State University/ITRE; Shannon Warchol, NCSU/ITRE; Steven Click, Ph.D., Tennessee Technological University; Jeff Davis, Ph.D., The Citadel

ABSTRACT: Alternative intersections and interchanges (AII) such as the Restricted Crossing U-Turn (RCUT), can increase safety and capacity, thereby reducing congestion for both vehicular and non-vehicular traffic. Often, RCUTs provide extended capacity for an existing intersection, typically for intersections which are under consideration for grade separation due to capacity constraints. Limited construction funding can often delay costly bridge projects for years. Consequently, AII designs can be useful in many cases because the intersection strategy provides the opportunity to extend the service life of intersections experiencing problems that will not likely be resolved otherwise in the foreseeable future. While many agencies recognize the operational and safety benefits of RCUT designs, the comparative evaluations undertaken during the selection process often have a very narrow scope. For example, in evaluating the effectiveness of RCUT intersections, studies typically model only vehicular operations. However, the implementation of RCUT intersections may significantly impact other users of other modes, such as pedestrians and bicyclists. In addition, RCUT designs may have broader level impacts on the corridor if operations are improved at one intersection and not at other upstream and downstream intersections. Accordingly, this proposed project will explore system level integration alternatives related to RCUT designs and will provide guidance for their use to optimize operations and to extend the useful life of facilities. In addition, the research team will explore the multimodal impacts of this intersection design to look at ways to improve operations for all users.