



Supplemental Traffic Count Pilot Project for Establishing a Statewide Count Program in Colorado

CTIPS-048 – UTC Project Information

Recipient/Grant Number:	North Dakota State University, University of Colorado Denver Grant No. 69A3552348308
Center Name:	Center for Transformative Infrastructure Preservation and Sustainability
Research Priority:	Preserving the Existing Transportation System
Principal Investigator(s):	Aditi Misra, Ph.D. Wesley Marshall, Ph.D.
Project Partners:	USDOT, Office of the Assistant Secretary for Research and Technology – \$169,900 Colorado Department of Transportation – \$169,900
Total Project Cost:	\$339,800
Project Start and End Date:	5/21/2025 to 5/20/2027

Project Description

To design roadway infrastructure for comprehensive safety of all users, understanding exposure is essential. Current count and volume estimation methods primarily focus on vehicular traffic, leaving a gap in exposure data for other supplemental traffic modes. There is also a lack of guidance on supplemental traffic count programs for optimum coverage across regions. Partial guidance on counting programs is available from sources such as the Federal Highway Administration's Traffic Monitoring Guide. However, all these documents describe the design of a full-scale supplemental traffic counting program as being dependent on and informed by small scale pilot programs. The proposed project will develop guidance for Colorado Department of Transportation (CDOT) to develop a statewide full scale supplemental traffic count program.

The objective of this study is to conduct a small-scale pilot supplemental counting program to test approaches identifying count location/distribution, technology use, and calculation of key statistics that would be available from a well-designed count program (such as crash/fatality rates). The outputs of this research effort would inform CDOT senior management and other practitioners when creating a detailed design and schedule for a full-scale supplemental traffic counting program. For researchers, this will provide a robust data driven framework for identifying supplemental traffic count locations. Furthermore, machine learning and statistical models for estimating and predicting supplemental traffic volumes using open source, readily available data will also be produced as part of this project.

In addition to the aforementioned goals of the project, during multiple preliminary meetings with the CDOT team, the research team identified an additional need—creating a training program for the contractors who will collect the supplemental traffic data in the field. It is understood that, like the established vehicular traffic count program, a mature supplemental count program will rely on contractors for the data. The project team deemed it necessary that any contractor selected to collect supplemental traffic data via bidding would have to take a mandatory standardized training program. The project thus now focuses on contractor training and sample data collection during the training, field data collection post-training for a set of sites with different location characteristics (rural/urban/arterial, etc.), and identifying permanent counter locations based on the data collected, factors identified in the literature, and other available data.

USDOT Priorities

The proposed project primarily aligns with the USDOT strategic goals of Safety by enhancing the ability to collect accurate and representative supplemental traffic data. By developing a small-scale pilot supplemental counting program, the study aims to test methodologies for identifying count locations, utilizing appropriate technology, and calculating key statistics such as crash and fatality rates. The insights gained from this research will be instrumental in improving road user safety by informing decision-making at the CDOT.

Outputs

The overarching goal of this project is to provide actionable insights that enhance safety across different roadway environments in Colorado. Beyond publishing findings in peer-reviewed journals and presenting at major transportation and urban planning conferences, we will ensure that our methods and results are accessible to a broader audience. This includes disseminating key takeaways through policy briefs, interactive online tools, and workshops with transportation agencies and community stakeholders. We will participate in CTIPS technology transfer (T2) programs in any and either of the three forms of engaging clients and disseminating research results: (1) virtual delivery via live webinars, recorded online modules, videoconferences; (2) in-person seminars or presentations; (3) conferences or workshops that organize related T2 topics into day-long or multi-day events. Additionally, we will structure our data and analysis in an open, non-proprietary format to facilitate collaboration and further research by practitioners, policymakers, and academics.

Outcomes/Impacts

The expected outcomes and impacts of this research include:

1. A final report outlining the findings and guidance for selecting count locations through generalizable models which will be available in the public domain after approval by CDOT and can be used by other DOTs and agencies to plan for acquiring and implementing supplemental traffic count technologies and programs.
2. At least one journal paper and one conference paper to disseminate the research findings and advancements made to the state of the methods used.
3. Training materials for any contractor undertaking the task of supplemental traffic count such that errors in implementing count technologies are minimized and the actual counts are less affected by measurement errors. The training could be made mandatory for any contractor bidding/undertaking the task and the evaluation of the training score can be used for deciding contracts as well.

Final Report

Upon completion, the final report link will be added to the [project page on the CTIPS website](#).