SPR RESEARCH PROGRAM
SECOND-STAGE PROBLEM STATEMENT
FY 2017

ODOT Research Unit
555 13th St NE
Salem, Or 97301-6867

Phone (503) 986-2700
Fax (503) 986-2844

I. PROBLEM NUMBER AND TITLE

17-031_PEA A Method to Estimate Average Annual Daily Traffic for Minor Facilities for MAP-21 Reporting and Statewide Safety Analysis

II. RESEARCH PROBLEM STATEMENT

The Moving Ahead for Progress in the 21st Century Act (MAP-21) identifies Average Annual Daily Traffic (AADT) as a fundamental data element (FDE) required for a state's safety data system for all public roads. The Oregon Department of Transportation (ODOT) will have to report AADT for every highway facility across the state, *whether it is owned by the state, county or city*. The new Fixing America's Surface Transportation (FAST) act emphasizes data collection and application for prioritizing transportation investments and safety studies and is expected to have similar reporting requirements. ODOT generates AADT estimates for major state facilities but not minor state facilities. Also, counties and cities typically have very little traffic count data and few estimates for their local highway AADTs. There is a clear need to develop methods to estimate traffic volumes on highway facilities that are not available through Highway Performance Monitoring Systems (HPMS) or other state data collection programs. AADT for minor roads is also needed to measure crash rates, for predictive-level safety analysis.

Common ways to estimate AADT include using long term traffic counts obtained from Automated Traffic Recorders (ATR) which count traffic volumes throughout the year, using short term counts with appropriate adjustment factors, or by applying growth factors to historical AADT information. Historical AADT information is not always available. Traffic counts are expensive and extending short-term counts to cover all highway links will not be economical or practical. Traffic engineers have developed different approaches to estimate traffic counts; existing approaches can be categorized as regression models, travel demand models, and heuristics such as neural networks. These approaches have not been yet tested, adapted or applied to meet the new MAP-21's requirements. ODOT must devise a least-cost methodology to meet the MAP-21 and FAST reporting requirement for AADT for every highway facility, regardless of jurisdiction.

III. RESEARCH OBJECTIVES

This research will develop and recommend practical methods to estimate AADT for minor roads to meet MAP-21 and FAST reporting requirements and a statewide evaluation for safety. It is expected this research will build off of previous research conducted under SPR 756 "Improved Safety Performance Functions for Signalized Intersections," August 2015. SPR 756 devised methods to estimate minor road traffic volumes used for intersection-related crash analysis.

The objectives of this project are to: (i) identify data needs for estimating missing AADT information, (ii) develop a cost-effective method to estimate AADT for all minor facilities across the state of Oregon, regardless of jurisdictional ownership, (iii) conduct a pilot demonstration of the method to estimate missing AADT information in ODOT Region 2, and (iv) analyze the performance of the method and provide recommendations on future research directions and potential data to be collected to improve the accuracy of the AADT estimation.

IV. WORK TASKS, COST ESTIMATE AND DURATION

The specific tasks for the research project is outline below.

Task 1: Literature review (2 months)

The goal of this task is to understand how other states determine missing AADT data and synthesize the latest techniques available in the literature to predict AADT data. The review will summarize and

categorize the various methodological approaches (for example regression based, travel demand model approaches) and identify the data needs for each approach.

Task 2: Determine existing data sources in Oregon (3 months)

This task will identify the various potential data sources available in Oregon and analyze them in terms of coverage and quality. The potential data sources could include traffic counts by county, existing AADT data, land use, demographic, and economic activity information, network data, population forecasts, statewide planning model outputs, traffic signal data, and private sector traffic data. The research team will map the existing data sources and data gaps.

Task 3: Develop a method to predict missing AADT information in Oregon (4 months)

The research team will develop a method to estimate missing AADT information based on existing data sources available in Oregon. The research team envisions the method to be either a regression based approach with existing traffic counts, land use, demographic, or a travel demand based network modeling approach or a combination.

Task 4: Conduct a pilot demonstration and implement the methodology in ODOT Region 2 (5 months)

Based on the outputs of Tasks 1, 2, and 3, the research team and the TAC will select a study area or a subset of highways in Region 2. The research team will implement the proposed model(s) and compare the predictions accuracy utilizing roadways in which AADT information is available. The prediction accuracy will be analyzed by type of highway.

Task 5: Provide recommendations on future data needs to improve AADT estimation accuracy (2 months)

The research team will identify existing data gaps and needs and provide recommendations on potential data to be collected to improve the accuracy of the AADT estimation models.

Task 6: Final Report (2 months)

Prepare and submit a final report documenting the research study, conclusions, and recommendations for future data collection. The report will also describe the methods developed along with implementation instructions.

The project is estimated to cost $160,000 with 18 month schedule. Some of the task durations will overlap.

V. IMPLEMENTATION

The methodology will be implemented by ODOT Traffic Services, who conduct traffic safety analysis. Technical specifications of how to apply the methodology using ODOT data will be implemented by Traffic Services to conduct safety analysis involving minor roads. The technical methodology will also be implemented by the ODOT Transportation Data for reporting AADT across the state of Oregon.

VI. POTENTIAL BENEFITS

Potential benefits include reduction in costs associated with traffic count data collection in support of implementing the Highway Safety Manual methods for Oregon's statewide evaluation for safety, Transportation System Plan analyses, and meeting MAP-21 and FAST reporting requirements. ODOT currently has no methods for developing AADT data for minor roads without the need to collect expensive traffic counts, which must be updated about every three years. This approach is not sustainable.

VII. SUBMITTED BY

Stage 1 Submitter	***Stage 2 Submitter***	***ODOT champions***
Becky Knudson, ODOT Planning Section 503 986 4133 Rebecca.a.knudson@odot.state.or.us	Avinash Unnikrishnan, PSU, 5037252872 uavinash@pdx.edu Miguel Figliozzi, PSU, 5037252836 figliozzi@pdx.edu	Doug Bish, ODOT, 503 9863594 douglas.w.bish@odot.state.or.us Dave Ringeisen, ODOT, 503.986.4171 david.w.ringeisen@odot.state.or.us