TECHSUMMARY *December 2020*

State Project No. DOTLT1000289 | LTRC Project No. 19-3SS

Exploring Non-Traditional Methods of Obtaining Vehicle Volumes

INTRODUCTION

Annual average daily traffic (AADT) is a fundamental traffic element that represents the average traffic volume each day at a particular roadway segment over an entire year. Agencies and institutions rely on AADT especially for roadway planning, pavement maintenance, roadway design, traffic operations, air quality assessments, revenue planning from roadway user fees, and roadway safety assessments. AADT is also required to calibrate and validate travel demand models as well as estimate statewide vehicle miles traveled.

Louisiana's Department of Transportation and Development (DOTD) presently collects traffic counts on approximately 16,600 miles of state roadways at 4,200 locations (on a 3-yr. cycle) and 44,000 miles of non-state roadways but at very limited locations (on a 10-yr. cycle). Traffic counting on non-state roadways are normally the responsibility of local governments/MPOs. Non-state roadways do not often have systemic traffic counts or estimation programs.

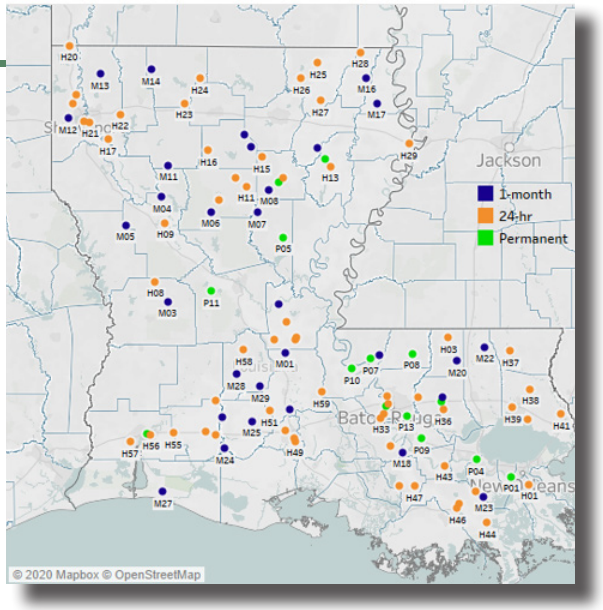

Figure 1
Selected locations for evaluation

StreetLight and Streetlytics are proprietary tools that have been designed to provide systemic AADTs and other data types on all roadways. This study therefore seeks to validate the accuracy of StreetLight and Streetlytics tools by comparing AADTs and monthly and daily traffic volumes across Louisiana, generated by these two tools against traditional counts collected for the validation effort.

OBJECTIVE

The primary objective of this project was to evaluate the accuracy of StreetLight and Streetlytics traffic volumes for rural roads with counts under 500 vpd and to make a recommendation as to whether the state of Louisiana can adopt any of these tools to provide accurate AADT for these areas. Specifically, the main tasks to fulfil the objectives were to:

1. Conduct a review of all available big data AADT estimation tools, documenting their pros and cons as well as their differences and how each can serve Louisiana's needs better.
2. Develop a list of rural roads with counts under 500 vpd to be used for the comparative study. This only applies to the monthly traffic counts analysis.
3. Obtain Streetlytics and StreetLight traffic volumes for the selected sample. Also, obtain corresponding traditional volume counts for the selected sample.
4. Undertake comparative analysis to evaluate accuracy of Streetlytics and StreetLight traffic volumes, using the traditional counts as ground truth.
5. Make a recommendation on whether each tool can provide acceptable volume counts for the state of Louisiana based on the results obtained.

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SCOPE

The literature review on the two products, StreetLight and Streetlytics, was conducted based on information obtained from the respective vendors. The study area was a sample list of roadways throughout Louisiana, and locations with anticipated traffic volumes of less than 500 vpd were purposely selected for the monthly assessments. For the AADT assessments, locations were limited to sites of permanent (continuous) traffic counters. There are variety of features that both StreetLight and Streetlytics provide, but the study focused only on their traffic volume estimation feature. The research team partly relied on DOTD's MS2 platform, and partly collected on-site data collection to provide the traditional count data for all roadways included in the sample.

METHODOLOGY

Five measures of effectiveness were used to assess the quality of data: accuracy, completeness, timeliness, validity, and accessibility. The three data types considered for the analysis were traditional count data, StreetLight volume data and Streetlytics volume data. Traditional count data were collected through a combination of DOTD's MS2's Traffic Count Database System (TCDS) and field data collections. The remaining two data types were requested from the vendors. Each data type was further grouped under three selection criteria that is permanent data, full-month data, and 24-hour data (specific day and typical day).

Mean absolute percentage error (MAPE) was primarily used as the performance metric to measure accuracy of the data. Percent root mean square error (%RMSE) was used as a secondary metric. Completeness of data measures how much data is available compared to how much data should be available for the analysis. Timeliness of data was estimated based on the date ranges for which each data type was available from the vendors. Validity of data was based on a certain threshold of MAPE defined from published literature. Accessibility, which is not a mathematical measure, shows the degree of accessibility of data.

CONCLUSION

- For the permanent stations, MAPE results showed StreetLight outperforming Streetlytics. StreetLight showed MAPE of 18.93% compared to Streetlytics of 25.55%.
- For the full-month counts, MAPE results showed Streetlytics outperforming StreetLight (MAPE of 57.17% for Streetlytics compared to StreetLight of 93.82%).
- For 24-hour specific and typical day counts, Streetlytics performed better with MAPEs of 64.33% and 59.03% compared to StreetLight of 70.43% and 70.54%, respectively.
- Considering only low-volume roadways for both full-month and 24-hour counts, Streetlytics outperformed StreetLight for locations with volumes under 300 vpd, while StreetLight generally outperformed Streetlytics for locations with volumes over 300 vpd.
- Based on the accuracy, data from both tools were determined to be valid for use for traffic assessments.
- Both scored very high completeness scores: 98.7% for Streetlytics and 95.70% for StreetLight.
- The timeliness of the data types reported cannot be verified and was not used for comparative assessments.
- Information on accessibility of data from both the vendors shows how user friendly their interfaces are to provide solutions to transportation agencies. The information provided cannot be used for comparative assessments.

RECOMMENDATIONS

- Only 14 counters out of the 65 permanent counters had been able to collect continuous volumes for more than six months out of the year. A recommendation emerging from this study is for these counters to be maintained to be able to properly collect volumes all year round.
- Since both tools performed similarly and output acceptable volume estimates, the study suggests a hands-on demonstration by selected DOTD personnel from various departments to report on the user-friendliness of the individual interfaces as well as the ease of use of the various tools on each platform to perform the functions they have been designed for.