Before and After Evaluation of Transportation Improvements Using High-Resolution Transit Data

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Introduction

High-resolution archived transit data may be used to study the effect of roadway changes using collected before and after the completion of a project affecting transit. Methodologies are presented to compare percentile and time-of-day performance measures before and after the project. Additionally, differences in travel time and travel

time variability are examined over the altered route. One case study examines a heavily used route in Portland that was recently diverted onto a newly built transitonly bridge, to examine the claims that travel times would decrease and reliability would increase. The results of this study indicate that travel times increased for the majority of trips but travel time variability during the peak period were sharply reduced.

Two more case studies highlight the broad applicability for this approach to before-and-after studies.



FIGURE 1 — Route 9 diversion over the newly-completed **Tilikum Crossing Bridge.**

Data Sources

TriMet, Portland's public transportation provider, has been collecting and archiving stop-level, disturbance, and high-resolution data for all buses since 2013. This analysis uses several months of data from 2014 for the before cases and several months from 2016 for the after cases. Outliers were carefully removed according to the 99th percentile of each data field, which removed situations of abnormal operation, such as breakdowns or cases of malfunctioning equipment.



FIGURE 2 — 4500 ft. segment east of where Route 9 diverged (FIGURE 1) from previous route. This segment of Powell Blvd. experiences the highest levels of congestion experience by Route 9.

Bus Travel Speeds

Bus speeds are calculated using a combined data set of stop level, disturbance, and high resolution data. Travel speeds are calculated independently for a before and after case. These speeds are compiled by percentile and time-ofday. Lower percentile indicate faster speeds. Travel speed differences are calculate by subtracting the after case from the before case.

For westbound travel (FIGURE 4), travel speeds increased significantly for the 10th through 25th percentiles. This decreased travel time is concentrated during the evening commute. Traffic patterns suggest that, typically, vehicles are attempting to leave the city center. For eastbound travel, travel times remained largely unaffected (within five miles per hour) of their original speed over this study area.





- Provide insights into transit following change

- Reduced range of travel times in peak period

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