



Memorandum

To: Terri Slack

From: Ron Davis

Date: October 19, 2012

Subject: Current Status: CRC Origin-Destination Survey Data Collection

Overview

An Origin-Destination (O-D) Survey is being planned as part of the Columbia River Crossing (CRC) Traffic and Revenue (T&R) Analysis. This survey will be used to obtain actual data on trip movements across the I-5 bridge to assist in the project model development. To meet the project requirement of having the investment grade model developed by Spring 2013, timely implementation of the O-D Survey is critical. The O-D survey will be implemented by first capturing video of vehicle license plates on the I-5 bridge. The plate numbers will then be cross-referencing with the Departments of Motor Vehicles (DMV's) from Oregon and Washington to obtain the mailing addresses of the owners of the vehicles from these states. A postcard will be mailed to identified owners with an invitation to participate in an online O-D Survey. Some incentive will be provided for participating. A subset of the O-D Survey respondents will also be used by RSG for their Stated Preference Survey which estimates motorists' willingness-to-pay tolls for different traveler market segments.

This memo provides an overview of the license plate capture data collection as well as other data collection efforts that are currently planned. The other collection efforts include an estimate of the trips traveling through the Portland-Vancouver region, vehicle classification video capture, and a vehicle occupancy count on the I-5 bridge.

License Plate Capture for O-D Survey

The license plate capture data collection effort will be performed during daytime hours on Wednesday October 24 and Saturday October 27. Thursday October 25 and Sunday October 28 will be backup days in case of rainy conditions on the preferred days. Wet roadways have been found to significantly degrade the success of license plate reads as water spray obstructs the clear vision of the plates. The October time frame was chosen to be early enough to minimize the impact of wintry weather on the data collection as well as to avoid the survey response rate being impacted by the Thanksgiving, Christmas, and New Year's holidays. Halloween, Election Day, and Veterans Day weekend will be avoided during these dates. This time frame will also allow the model

development schedule to remain on track. The preferred Wednesday and Saturday were chosen as representative weekday and weekend days, respectively.

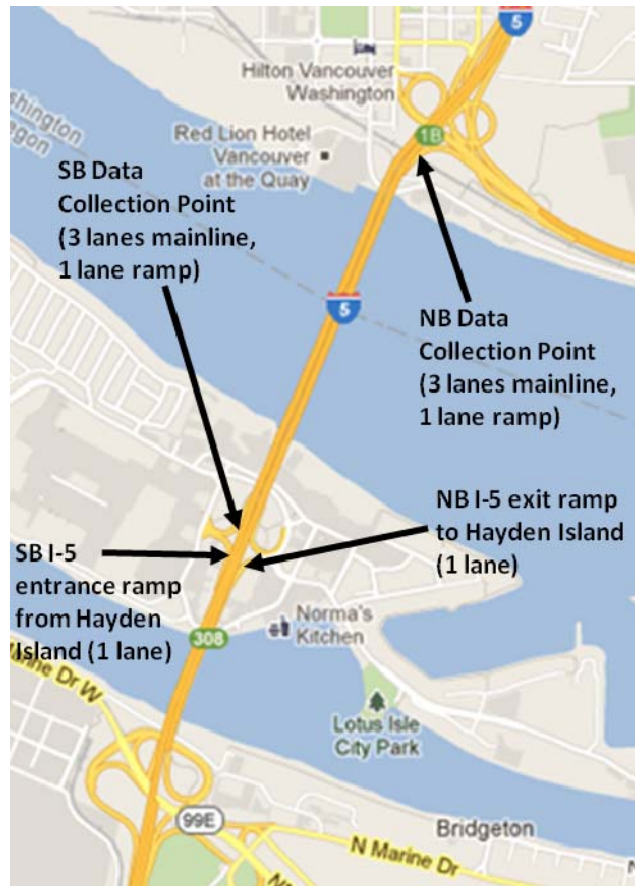
The license plates of traffic traveling both southbound and northbound on the I-5 bridge during daytime hours will to be captured for the purposes of the O-D survey. To the extent possible, the cameras will be placed to minimize recording in congested conditions which can reduce the license plate capture rate.

Manual review of the license plate videos will be used to identify the plate numbers that will be used in the DMV address lookup for both Oregon and Washington. In addition to plate numbers, it has been requested that the state and country of origin, specifically plates from Oregon, Washington, Canada, Mexico, and California, be tracked for all vehicles crossing the I-5 bridge. The state and country of the plates will therefore also be identified in the manual review process. Note that the numerous variations of specialized plates, small size of some states identification lettering, and plastic license plate frames often make the state and country identification challenging. However it is felt that this is the best way to obtain a sample of this important data.

Note that passenger cars will be the focus of the DMV address lookup and the mailed O-D survey. In past CDM Smith O-D surveys, commercial vehicles have not had enough response rates to be used in the analysis. Commercial vehicle O-D patterns will therefore plan to be assessed through in-person interviews and other data sources. Commercial vehicle information will still be compiled for the state and country of plate identification described above however.

The vendor National Data & Surveying Services will perform the data collection, plate number identification, and state and country of origin identification for \$52,000. Their turnaround time from the end of data collection to the delivery of the data collected will be two weeks. If inclement weather or other uncontrollable circumstances require additional collection days there will be a \$1,500 charge per additional set-up added to the base cost. **Figure 1** on the next page shows the location of the license plate capture cameras currently proposed. These locations may change after field visits which we be completed early next week.

Figure 1: Location of the License Plate Capture Cameras on the I-5 Bridge



Through Trip Estimate

“Through trips” in context of this study refer to vehicle trips that have both their origin and destination outside of the greater Portland/Vancouver study area. An estimate of through trips will be important to the overall T&R study in assessing the time and cost tradeoffs between the I-205 bridge and the future tolled I-5 bridge for long distance trips. A through trip estimate for commercial vehicles is especially important. This is due to the relatively high number of commercial vehicles currently traveling on the I-5 bridge, the fact that commercial vehicles tend to make longer trips than passenger cars on average, and the anticipated relatively high commercial vehicle toll rates for the new bridge.

Several sources of potential through trip data are currently being investigated. In the previous CRC Origin-Destination Survey Data Collection Overview Memo dated October 12 a full license plate matching based origin-destination survey was proposed. However, preliminary price quotes for

this effort were thought to be too expensive compared to other potential data sources described below.

One potential through trip data source is using cellular data through a vendor such as AirSage. Cellular data is a relatively new data source option in travel demand modeling. AirSage has relationships with two major cell phone carriers to obtain 15 billion cellular locations every day. They archive the data and can provide information on population movements. We can provide AirSage with a shapefile of zones and they can use their dataset to estimate an O-D matrix based on those zones. They can break the data into time period, trip purpose, and different levels of day of week aggregation. Their base collection period is one month and their base price is \$10,000. The price increases with more zones and more data categories. Passenger cars and commercial vehicles cannot be separated in the data however.

Another potential data source is INRIX. ODOT has a subscription to INRIX data. Evaluation of the potential use of the INRIX data through the ODOT subscription relating to through trips is ongoing.

A third potential data source is utilizing weigh in motion transponder reads for commercial vehicles from the Green Light program in Oregon and the CVISN program in Washington. Both Oregon and Washington have weigh in motion programs available to commercial vehicles that allow them to bypass weigh stations at certain locations if the commercial vehicles pre-register and acquire a transponder. Transponder readers are available on I-5 at the Woodburn weigh station in Oregon and the Ridgefield station in Washington. Both the Oregon and Washington programs use the same transponders. Transponder reads at specific times may be able to be obtained from the Woodburn and Ridgefield weigh in motion locations to assess the travel patterns of commercial vehicles in the programs. WSDOT has confirmed that this is possible from their end. Discussions with ODOT about the feasibility from their end are ongoing. One downside of this data source is that only commercial vehicles in the programs would be captured. However if it is possible to use this data it could provide a significant time period of data at low cost to the project and would benefit the modeling process.

A fourth potential data source is a license plate matching based origin-destination survey for commercial vehicles only. This could be done in combination with the potential weigh in motion data source to obtain a robust understanding of commercial vehicle through trip patterns. If combined with using AirSage cellular data to estimate total traffic movements, this would be a much lower cost compared to full license plate O-D survey as only the commercial vehicle license plates would need to be identified. License plate captures could be performed on I-5 south of the I-205 split (south of Portland), on I-5 north of the I-205 split (north of Vancouver), on the I-205 bridge, and on the I-5 bridge. A cost estimate on this potential data source is not yet available.

Vehicle Classification Video Capture

Cameras will be used to capture video of the entire traffic stream in both directions on the mainline I-5 bridge from a side angle view. The purpose of this video will be to identify vehicle classification by axles. This will be used to ground truth existing vehicle count and classification data. The counts will be completed by manual observation of the video. This type of video count was used by CDM Smith on the Seattle SR-520 Tolling Study and is also recommended for this project. The collection dates and costs of this effort are not yet known.

Vehicle Occupancy Count

Vehicle occupancy counts will be completed in both directions of the I-5 bridge mainline. The counts will be done by manual observation of the traffic stream during daylight hours. Unknown vehicle occupancy (such as from tinted windows) as well as vehicle occupancy of 1, 2, and 3+ will all be counted. Traffic counts will be used to factor the sampled occupancy counts up to totals for the traffic stream. The collection dates and costs of this effort are not yet known.