

Abstract

Portland's strategic location as a transportation hub can be improved considerably by incorporating new technologies and priority managed commercial vehicles lanes within the existing Portland freeway network. **The basic premise of network analysis is the more connections you have on a network the slower the network moves.** When considering the I-5 Corridor between downtown Portland and Vancouver there are too many interchanges too close together that don't adhere to current design standards and are therefore unsafe. Some of these interchanges are mere blocks from existing MAX stations with associated vehicular conflict with pedestrians, cyclists and buses. There are also large numbers of private out of town commuters using I-5 during peak periods along, adding more connections to a congested network.

Doubling of Freight Movement by 2035

The [2010 Portland Regional Freight Strategy](#) projected an overall doubling of freight tonnage moved in the region by 2030. Much of the projected doubling of freight tonnage passing through the Portland metropolitan region doesn't terminate here but instead moves well beyond the region's boundary to the rest of the country. This places a heavier transportation cost on the entire region to service connections to the rest of the country.

Introduction to Managed Lanes

"Managed lanes" are defined as a limited number of lanes set aside within an expressway cross section or lanes comprising a separate expressway facility where multiple operational strategies are utilized and actively adjusted as needed for the purpose of achieving pre-defined performance objectives. The operation and utilization of managed lanes, typically situated within expressway rights-of-way, are controlled in order to optimize travel flow and reduce congestion. To move toward uncongested operations, managing a lane typically involves reducing excessive traffic volumes, reducing conflicts between vehicles, reducing the number of incidents, and better managing those incidents that occur.¹

I-5 Corridor Between Downtown Portland and Downtown Vancouver

The Columbia River Crossing 2013 project was hamstrung by the focus on expanding major interchanges with little support from Vancouver for an expensive Max line. The CRC Environmental Impact Statement did not include analysis of a commercial vehicle lane option that combined freight and bus priority lane². In 2006 the CRC sub group



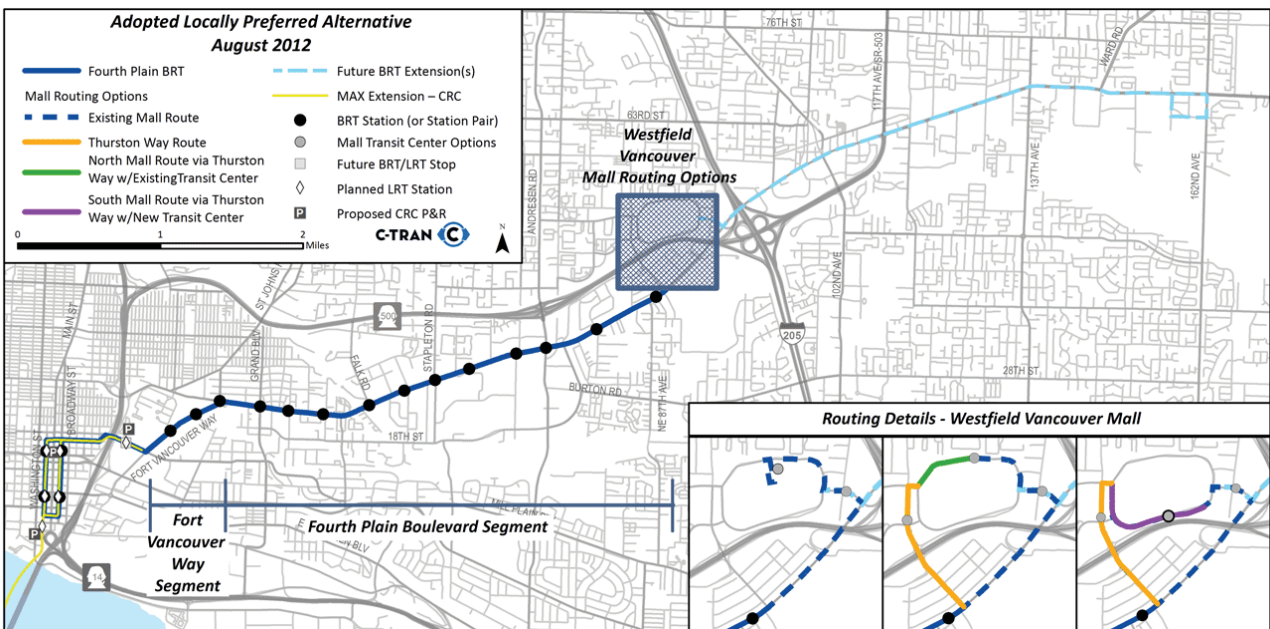
Chicago Metropolitan Agency for Planning
August 2008

¹ Quote from the Chicago Metropolitan Agency for Planning [Managed Lanes Strategy Study](#).

² Screening of Freight Components Memo, 2006 to the CRC Task Force from the CRC Freight Working Group.

on freight recommended some freight bypass lanes and freight direct access ramps as components of existing projects. Since this time driver technologies and ITS improvements has broadened the range of how freeway networks could be managed given the physical constraints alongside this congested corridor.

Managed commercial vehicle lanes consisting of combined freight and bus traffic is a viable option worthy of further consideration. Most importantly C-TRAN, is moving forward with opening their first bus rapid transit corridor via the Mill Plains Rd Bus Rapid Transit. Bus Rapid Transit (BRT) is the public transportation choice of our neighbors to the north. We need to encourage and support these initiatives.



The next big question for Vancouver's C-TRAN is how to connect Mill Plain BRT with downtown Portland, as these commuters represent a large portion of congestion causing traffic on the I-5 corridor during the peak periods. Removing outdated interchanges and replacing them with fewer and better designed interchanges for dedicated commercial (FREIGHT + BUS) vehicle on-ramps and thru lanes will provide a viable high speed bus and freight option that saves time, reduces I-5 congestion and requires no additional lanes.

This concept plan assumes the existing CRC bridge can be earthquake proofed or a low cost replacement bridge is needed.

FHWA

The Federal Highway Administration has defined commercial vehicle lanes widely, and is seen as giving wide latitude to local jurisdictions to design systems that support moving freight and people as opposed to single occupancy private vehicles. Federal funding policies favor projects that support last mile connections to ports, recognizing the detrimental effects that urban congestion has on national economic trade. Portland is currently finishing a bridge that

excludes private vehicles, the Tilikum Bridge, in favor of active modes and public transit. Similarly, we could build or retrofit the Columbia River bridge with lanes that prioritize freight and buses.

In the future these lanes could be converted into driverless vehicle lanes. According to the Center for Urban Transportation Research paper [Automated and Autonomous Vehicles in Managed Lanes](#) (2013), the technology and demand for managed lanes for autonomous vehicles is not likely to occur until 2040. In the meantime, managed lanes for priority vehicles remains a viable option for moving more freight and people, vs. number of vehicles as the measurement of effectiveness.

Furthermore “ vehicle platooning could yield more significant capacity gains than the elimination of points of traffic constraints”. This illustrates other examples of improved travel times that does not require the expansion of interchanges.



Interchange Area Management Plans

[ODOT has established guidelines](#) for planning the function of interchanges. However none of the interchanges along this corridor have Interchange Area Management Plans that are consistent with changes in the city’s Comprehensive Plan.

The CRC Crossing interchange expansions were too expensive and controversial given the extra land requirements. With the I-5 Commercial Vehicle Lane, some interchanges will have to be removed, Each remaining interchange would have to be carefully planned and manage to prioritize freight traffic and other interchanges would be designed to prioritize bus rapid transit. Here are 3 sample interchange concept plans:

1. Swan Island Industrial Area Connection - It’s been estimated that in the next 5-10 years the number of jobs will increase from another 1-2,000 in the next five years. There is limited connections into and out of the area by land. Improving freight truck connections via guaranteed green light connection onto the I5- Commercial Vehicle Lane north and

southbound would guaranteed time sensitive critical commercial vehicle travel times. This would eliminate unsafe merging activity with private vehicles. You would be merging with a high technology priority managed lane.

High speed employee transit connections to either the existing max line and or the BRT stop to the east would lead to overall improvements in moving people on and off the island and reducing conflict with small private vehicles. The Swan Island TMA would be critical in developing an employee transit system connection.

2. NW Industrial Area Connection - Similar to the Swan Island connection NW freight related commercial vehicles would have Fremont bridge priority access to both NB and SB I-5 traffic. Since there is no merging with private vehicles and instead prioritize commercial vehicles freight connections to the following connection highways including 1-405 and 26.
3. The Killingsworth I-5, BRT, Growth Center, Portland Community College represents a unique opportunity to achieving tremendous growth in an urban center identified for high growth. Reconsider this entire interchange given the expected growth in urban density. It will be easier to achieve urban density goals with improved active transport connections with service to BRT and Max stations. Moving freight through this interchange would be improved if commuters have better transit options. A completely new urban center will not be easy to achieve if there are excessive number of private vehicles accessing the freeway network.
4. Further research is needed to identify priority freight connections to both Portland and Vancouver Ports, and the Portland International Airport. **It is likely that this type of improvement to ports would be a strong contender for a federal [Tiger Grant](#).**

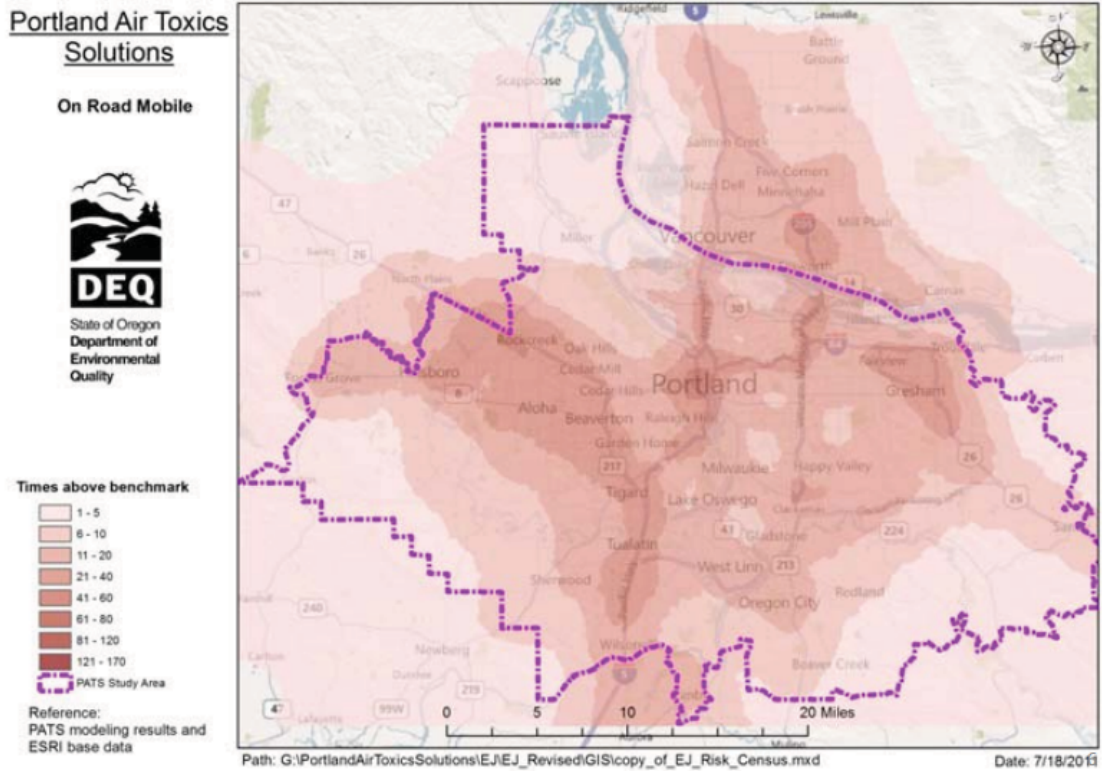
Clearly more work needs to be done to outline the objective for each interchange and how to achieve regional goals. ODOT should give further consideration to how interchanges are integrated into the local neighborhoods in a manner that supports regional growth objectives, not just vehicle throughput. Fewer interchanges are easier to manage and maintain.

Equity Issues

The I-5 corridor between downtown Portland and Vancouver is the most heavily polluted corridor in the entire State of Oregon. Specific consideration needs to be made to ensure that the corridor does not further concentrate environmental pollutants.

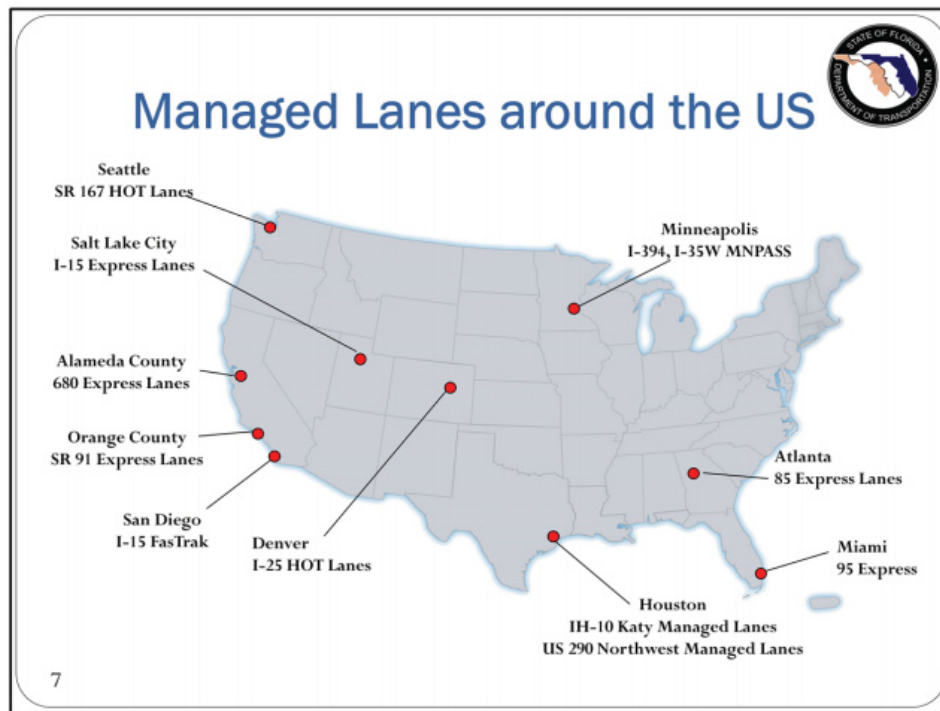
This corridor is also the home to the most diverse neighborhoods in Oregon. These citizens suffer higher rates of asthma and other airborne diseases. The Oregon Department of Environmental Quality has performed meaningful environmental justice analysis. According to [Environmental Justice Consideration](#) (2011), there is no question that these neighborhoods and citizens have been shouldering higher health costs for their proximity to the I-5 corridor. Clearly

there is a need for innovative solutions that prioritizes innovation, efficiency and cleaner technologies that will benefit everybody.
(http://www.deq.state.or.us/aq/toxics/docs/pats/7_25_11presentation.pdf)

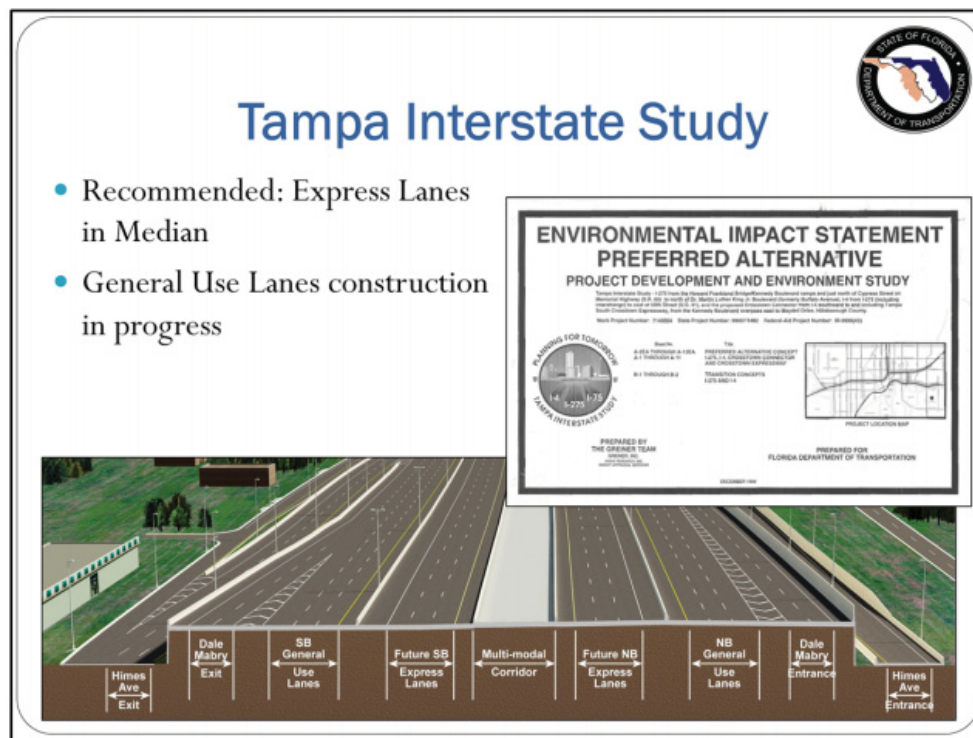


Successful Managed Lanes

There are many examples of managed lanes across the USA and Internationally.



From a presentation on [Florida Managed Lanes presentation](#) the Statewide Managed Lanes Action Plan outlines the roll out and connection of High Occupancy Toll Lanes most of which are planned for inclusion within the existing right of way.



In Australia and New Zealand, where the author has experience, the Auckland Northern Busway is an example of a completely separate bus facility next to a freeway that connects the North Shore suburbs across the harbour to the downtown core. This is a similar geographic water constraint as the Columbia River with similar population transport patterns. In New Zealand the Northern Busway was functioning at full capacity shortly after opening. Double decker busses are now being deployed to increase people capacity. Given the understanding that kiwis would never give up their cars, it was surprising to find they were willing to give up their cars if they were given the option to take up to an hour off their daily commute times on a decent bus..



Conclusion

The I-5 corridor between downtown Portland and Vancouver is congested with unsafe interchanges too close together. Removing some of the bottlenecks in support of a Commercial Vehicle Lane to prioritize the movement of freight and buses is a more efficient and reliable use of the existing road space. A high speed bus corridor would also support and connect to the Mill Plains BRT, and minimize commuter times across the Columbia river.

Recommendation

- The City of Portland add the I-5 Commercial Vehicle Lane Concept Plan to the Transportation System Plan updates.
- The I-5 Commercial Vehicle Lane be consider as a part of the Comprehensive Plan update with specific consideration given to Max Stations in close proximity to I-5 interchanges.
- ODOT consolidate and removing outdated or inefficient interchanges. Priority given to moving freight and buses. Separate and minimizing motor vehicle conflict with active modes.
- Work with C-Tran and Vancouver agencies regarding Vancouver BRT connections to downtown Portland.

Outcomes:

1. Improved Regional Travel Times to key Industrial Areas
2. Improved Transit Facilities Options
3. Reduced Congestion
4. Reduced Environmental Impacts
5. Improved Air Quality
6. Increase Economic Development
7. Neighborhood Traffic Calming

Roberta Robles Biography

Roberta Robles has experience in freight movement analysis, Intelligent Transportation Systems (ITS), ramp signaling and freeway networks. In New Zealand, Roberta worked as a transport planner at Transit New Zealand (similar to ODOT) and Auckland Regional Council (similar to Portland Metro). Prior to that she worked on the ODOT Bridge Replacement Program. Roberta is currently a stay at home mom living in NE Portland.