



Research Notes

Oregon Department of Transportation

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Linking Land Use to Traffic Impacts at Interchanges

The Problem

Land development near highway interchanges can increase the traffic loads on these facilities. When the potential for such land development is known ahead of time, an interchange can be designed to accommodate the development when it eventually occurs. But plans are subject to change. When a comprehensive plan is amended to designate a more intensive land use near an interchange, earlier traffic projections can be undermined, and the design life of the interchange can be affected.

How much do land use changes occur at interchanges? How much effect do they have on the interchange traffic counts? Do we have the necessary tools to address the need to manage existing interchange capacity? ODOT Research worked with transportation planning staff and the Center for Urban Studies at Portland State University to address these questions.

The objective of the research was to examine the effects of comprehensive plan amendments on interchange performance on the Oregon highway system. The focus of the study was on comprehensive plan amendments for new commercial and industrial land uses near interchanges. The research questions addressed in this study were as follows:

- What is the historical incidence of all comprehensive plan amendments for commercial and industrial uses? Are they any more likely to occur near interchanges than elsewhere?
- What are the interchange traffic impacts of nearby plan amendments?
- What do amendment adoption records indicate regarding ODOT involvement and consideration of interchange traffic impacts?
- What has been done to better coordinate management of development near interchanges?

Data Collection

The study identified 273 interchanges on 10 state system highways to include in the analysis. A one-mile radius was drawn around each interchange to define an area for examining the effects of comprehensive plan amendments. These interchange areas were grouped as follows:

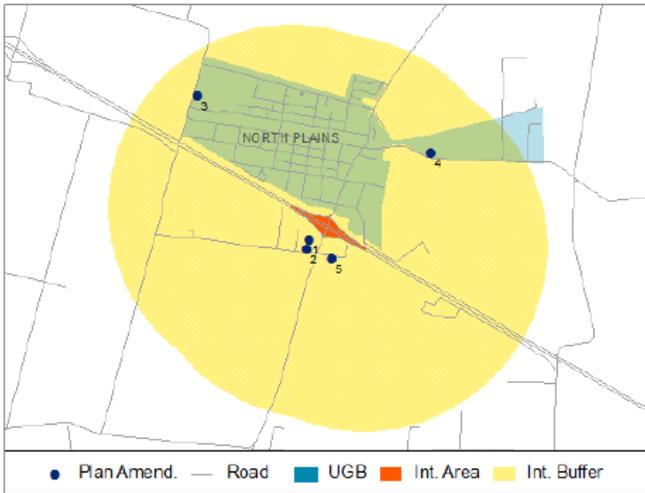
- “Rural” — 1-mile radius entirely outside of any urban growth boundary (UGB) (103 interchanges);
- “Urban Core” — 1-mile radius entirely inside a UGB (63 interchanges); and
- “Urban Fringe” — 1-mile radius crosses a UGB (107 interchanges).

The study compiled data on all comprehensive plan amendments in Oregon resulting in changes to industrial or commercial land uses, over a 15-year period (1987-2002). These totaled 1,565 statewide. Of these, 448 (29%) were found to occur within the one-mile radius of an interchange.

Findings

The incidence of comprehensive plan amendments to commercial or industrial uses near Rural interchanges was very low. In only 10% of those interchange areas were there any such amendments over the 15-year period. Among Urban Fringe interchanges, 62% had experienced amendments to commercial or industrial uses during that period. Among Urban Core interchanges, 77% had experienced such amendments during that period.

Using this data the study calculated the likelihood of comprehensive plan amendments to commercial or industrial uses occurring within an Urban Core or Urban Fringe interchange compared to the likelihood of such amendments occurring outside those areas. It found that comprehensive plan amendments were 25% more likely to occur near interchanges than elsewhere.



Case study map showing the locations of comprehensive plan amendments within the one-mile radius of the North Plains interchange on U.S. 26.

Regression analysis was performed to estimate the impact of nearby comprehensive plan amendments (to commercial or industrial uses) on subsequent interchange Average Daily Traffic (ADT) in interchange areas. The analysis controlled for other factors affecting interchange ADT.

Plan amendments were found to have a substantial ADT effect on Rural interchanges, accounting for about 13% of the subsequent ADT, taking into account the low incidence of amendments at these interchanges during the 15-year period. In Urban Fringe areas, plan amendments were estimated to account for about 5% of the subsequent interchange ADT, equivalent to about two years of the design life of these facilities. In Urban

Core areas, the estimated effect of plan amendments on ADT was small (0.13%).

The case studies revealed that in the past, ODOT's role in many comprehensive plan amendment cases near interchanges was minimal, probably because many did not involve large acreage.

Conclusions and Implications

The study confirms what planners previously suspected but could not quantify – that interchanges are significant development attractors, with a high degree of potential for land use change and intensification.

While any one comprehensive plan amendment may not have a large effect on interchange traffic, the cumulative effects of a succession of plan amendments does shorten the useful life of the interchange.

With the evidence that even small changes can add up to significant impacts, ODOT has been working with local governments to clarify their respective and collective roles in the preservation of interchange capacity.

The study also helps to set priorities for the types of interchange conditions that need heightened attention. Interchange area management plans (IAMPs) provide a process to achieve the desired long-term stability for interchange areas. They are now required in cases of interchange construction or improvement. Changes in Oregon's Transportation Planning Rule also provide for direct involvement of ODOT in the review of plan amendments in interchange areas.

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To obtain a copy of the study, "Comprehensive Plan Amendment Impacts on Interchanges in Oregon," you may download a PDF version at http://www.oregon.gov/ODOT/TD/TP_RES/ResearchReports.shtml; or you may request a printed copy from the ODOT Research Unit at 503-986-2700.



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