INDIRECT LAND USE AND GROWTH IMPACTS OF HIGHWAY IMPROVEMENTS

Interim Report

SPR 310/327

by

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16. Abstract

The Oregon Department of Transportation undertook this study of the impacts of highway capacity improvements on land uses and growth, particularly at the urban fringe. This study was instituted to better understand the "cause and effect" relationships between highway capacity, travel demand and development patterns. The relationships of a variety of factors to resulting growth were evaluated for their ability to predict growth. Case studies of some communities were completed to provide an in-depth understanding of the pressures which drive development decisions and land use change.

This interim report provides initial findings of the study. It has found that most highway capacity increases do not cause development to be dramatically different from local land use plan guidance, or from what would have occurred in absence of the highway improvement. For Oregon, local governments hold the tools to determine development patterns, using zoning and public utilities such as water, sewer and roads.

The final phase of the study will complete additional case studies and develop guidance for transportation planners to evaluate indirect impacts of highway improvements.

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SI* (MODERN METRIC) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
in	inches	25.4	millimeters	mm
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yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
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		VOLUME		
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
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yd^3	cubic yards	0.765	meters cubed	m^3
NOTE: Volumes greater than 1000 L shall be shown in m^3.				
		MASS		
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams	Mg
		TEMPERATURE (exact)		
°F	Fahrenheit temperature	5(F-32)/9	Celsius temperature	°C

APPROXIMATE CONVERSIONS FROM SI UNITS

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m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
		AREA		
mm^2	millimeters squared	0.0016	square inches	in^2
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m^3	meters cubed	1.308	cubic yards	yd^3
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kg	kilograms	2.205	pounds	lb
Mg	megagrams	1.102	short tons (2000 lb)	T
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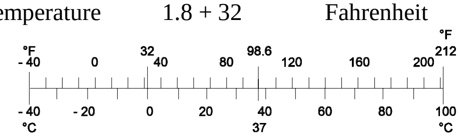

***** SI is the symbol for the International System of Measurement (4-7-94 jbp)

INDIRECT LAND USE AND GROWTH IMPACTS

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INTRODUCTION

The Oregon Department of Transportation (ODOT) has undertaken research to improve its ability to evaluate the indirect land use impacts of highway improvements. This research seeks to better understand the relationship between capacity-increasing highway improvements within urban fringe areas, associated rates of development, and land use changes in surrounding areas. This information will be used to improve the procedures ODOT uses to assess transportation project impacts and ensure compliance with Federal Highway Administration (FHWA), National Environmental Policy Act (NEPA) and other laws and regulations.

A 1994 report prepared for ODOT by ECONorthwest described the role of transportation improvements in the conversion of rural lands. The report articulated the difference between "direction" and "magnitude" of impacts. Based upon a review of the literature, a variety of factors related to rural land conversion were identified. The ECONorthwest report also outlined a framework by which the conversion process could be analyzed.

Building on this framework, the Oregon Department of Transportation (ODOT) contracted with Portland State University (PSU) to investigate the possible link between highway improvements and land development in more depth. Tom Sanchez of PSU and Terry Moore of ECONorthwest are the principal investigators, working under the guidance of a Technical Advisory Committee (TAC). The TAC was appointed, with representatives from ODOT, Department of Land Conservation and Development (DLCD), and FHWA, to review and approve the work plan and work products.

1.1 OBJECTIVE AND APPROACH

The objective of this research project is to develop guidance for ODOT on the assessment of indirect impacts of capacity increasing state highway improvements on land use. It is commonly accepted that the relationship between transportation improvements and land use change is complex and involves social, political, economic, and environmental factors. While each of these factors is typically addressed in environmental impact documentation, one of the ways the aggregate effect is manifest is in land use development impacts.

Two distinct research tasks were identified to provide the basis for an indirect land use impact framework. First, an urban growth trend analysis was performed for twenty selected Oregon cities (Phase I). The growth trend analysis used a geographic information system (GIS) to map the extent of urban development for each city over 20 years (aerial photographs were used to measure extent of development). The analysis focused on the relationship between the location of state highway improvements and the location of land use development. Several spatial variables were evaluated as factors associated with land use change. This phase of the research was intended to be descriptive and to provide historical evidence about the nature of land use changes.

The second task (Phase II, Case Studies), also looked at the factors related to land use development patterns, but it focused on selected highway corridors at a greater level of detail than the growth trend analysis. It was felt that analyzing in detail what happened in selected areas could aid in understanding the indirect impacts of highway improvements as well as the other factors which influence growth. Four corridors were evaluated in terms of pre- and post-highway project land use conditions, particularly for projects that crossed the Urban Growth Boundary (UGB) for the area. Quantitative and qualitative data were collected and analyzed to provide insights about land use development activities.

Phase III of the project was added to allow for additional case studies to further investigate possible links between highway improvements and land use impacts. The combined results will be used to prepare a methodology that ODOT can apply in planning and project development to describe potential land use changes that may occur around highway projects. Reports from Phase I or II and a current status report on this project can be obtained from the ODOT Research Unit.

The following is a brief summary of the research findings for these first two phases of the research project. These summaries are followed by an outline of the final products planned for the project. The purpose of this discussion is to summarize the research findings to date and provide a description of how these findings will be useful to ODOT as it establishes improved methods for indirect land use impact assessment.

2.0 PHASE I SUMMARY

Phase I of the research included a literature review on issues related to transportation and land use. The literature review illustrated the current thinking in the field and provided background for the technical analysis. The second part of this phase was a GIS-based spatial analysis of trends in land use change.

2.1 LITERATURE REVIEW

The literature on the effect of transportation infrastructure on urban development is large but reaches few definitive conclusions and provides little empirical guidance. There is widespread acknowledgment that the provision of roads opens land up to development and that land close to road access points is more valuable than land further from access points. There is relatively little analysis, however, of the degree to which transportation projects cause development to occur in places and at a scale that it would not otherwise have occurred, or whether they simply allow it to occur where many other forces lead it. The academic literature has analyzed the effect of road improvements on state and regional economic development, and the results have helped to provide context for analyzing the effect of specific road improvements. The Phase I report for this project includes the references reviewed and summarizes the literature relevant to indirect land use impacts of transportation improvements.

2.2 SPATIAL ANALYSIS

The spatial analysis focused on the spatial trends in land use change that have occurred in selected Oregon cities over a twenty-year time period. Spatial indicators were used to describe the patterns of urban development. The spatial indicators that were significant predictors of urban development will be used to develop an impact assessment framework. This framework will be the subject of the final phase of this project.

The growth trend analysis was based on aerial photographs of 20 cities from 1970 to 1990 (see Table 2.1 for cities). To determine the location of urban development, a GIS was used to overlay the extent of urban development (derived from aerial photography) for cities over time. Historical highway improvement information was overlaid on urban land use patterns to examine the coincidence of changes in land use and changes to the highway system. Logit regression analysis was applied to test for the significance of spatial characteristics that influence urban development patterns.

Of most significance to this research, the results of the spatial analysis indicated that, controlling for other location factors, urban development had not clustered along state highway project corridors. It can be assumed that these highway facilities provided the requisite accessibility for urban development to occur elsewhere in the area. With a few exceptions, (such as Troutdale and Hillsboro), city size and growth rates from 1970 to 1990 explained only a small amount of the variation in development occurring adjacent to specific highway improvements. It was anticipated that city sizes and growth rates would be significant indicators of demand for new development, especailly near locations with increased transportation accessibility. In the case of the cities analyzed in this study, it appears that capacity-increasing highway projects, which are typically a response to current or anticipated increase in travel demand, have not led to direct and immediate land development activities that are inconsistent with local comprehensive plans and zoning. At the same time, indirect land use impacts from transportation network improvements may be reflected in development that occurs elsewhere in the city.

Table 2.1: Cities Selected For Growth Trend Spatial Analysis

City	County	Population 1970	Population 1990	% Change 1970-1990
Albany	Linn	18,181	29,540	62.5%
Aumsville	Marion	590	1,650	179.7%
Bend	Deschutes	13,710	20,447	49.1%
Canby	Clackamas	3,813	8,990	135.8%
Central Point	Jackson	4,004	7,512	87.6%
Columbia City	Columbia	537	1,003	86.8%
Corvallis	Benton	35,056	44,757	27.7%
Dallas	Polk	6,361	9,422	48.1%
Florence	Lane	2,246	5,171	130.2%
Grants Pass	Josephine	12,455	17,503	40.5%
Hillsboro	Washington	14,675	37,598	156.2%
Klamath Falls	Klamath	15,775	17,737	12.4%
Lincoln City	Lincoln	4,196	5,908	40.8%
Madras	Jefferson	1,689	3,443	103.8%
McMinnville	Yamhill	10,125	17,894	76.7%
North Plains	Washington	690	997	44.5%
Redmond	Deschutes	3,721	7,165	92.6%
Sherwood	Washington	1,396	3,093	121.6%
Troutdale	Multnomah	1,661	7,852	372.7%
Woodburn	Marion	7,495	13,404	78.8%

Source: Center for Population Research and Census, Portland State University

The following are some of the key findings of the Phase I research:

- Capacity increasing highway projects have not resulted in low density, sprawling development; rather, density increases have been realized. The selected cities experienced considerable urban development from 1970 to 1990. The average increase in urbanized acreage was approximately 72.2 percent. While these cities grew in population and area, most increased both in population density and housing density within their 1990 city limits.

- Location impacts of capacity-increasing highway improvements were more substantial than general highway location impacts, however, the magnitude and nature of the impacts were not consistent across the selected cities.

- Land use change factors and highway project locations were positively correlated with city size but not with city population growth trends. Overall, the data and anlysis supported hypothesized relationships in some cities but not others; thus, the relationship between land use change and highway improvement projects in the 20 cities is not clear.

The Phase I analysis is limited by the availability and quality of the aerial photography, the precision of the urban area estimation techniques, the availability and reliability of the highway project data, and the resolution and extent of city data. Additional potentially useful information would include the historic land use regulations and parcel information for each of the cities. Another important variable is highway traffic volume. Additional vehicle traffic in the vicinity of highway capacity improvements may be correlated with urban development demand. The location of other capital investments besides transportation facilities also influence development patterns. Many of these issues were addressed in Phase II of this project where selected highway corridors were analyzed at a more detailed level.

3.0 PHASE II SUMMARY

Phase II of the project included four case studies that provided an in-depth evaluation of the impacts of highway improvements on adjacent land uses. Each case study community had major improvements to state highways (lanes or interchange) at the urban fringe (primarily inside, secondarily outside, Urban Growth Boundaries). The case studies completed for this phase of the project included three highway widenings (Albany, Bend, and McMinnville) and one widening with some new alignment (Grants Pass).

The case study analyses were both quantitative and qualitative. To conduct the baseline analysis, the research team reviewed environmental documents, land use plans, and capital improvement programs. Those sources were the basis for describing existing conditions before the case study highway improvements were made. The intent of the case studies was to isolate the impacts (the effects) uniquely attributable to a change in highway capacity.

Sections 3.1 – 3.4 summarize each case study, describing the project and the principal findings. Those sections are followed by general conclusions based on common features of all four case studies.

3.1 ALBANY CASE STUDY

3.1.1 Description

The Albany case study evaluated the land use impacts of improvements to a section of Oregon Highway 99E (the Albany–Junction City Highway) from Queen Avenue on the north to Oregon Highway 34 (at Tangent) to the south. The project widened a 5.5 mile section from two to four lanes, with a continuous left-turn median.

The draft environmental impact statement (DEIS) was completed in 1983, and the final environmental impact statement (EIS) in 1985. The project was built in two phases. Phase I, completed in 1988, included improvements from Queen Avenue to Linn-Benton Community College (LBCC). Phase II was completed in 1994 and included improvements south of LBCC to the 99E/34 intersection. According to the DEIS, the purpose of the project was to accommodate increases in traffic and provide greater highway safety. The DEIS explains that the need for the project resulted from anticipated commercial and residential development, as well as rapid growth of LBCC.

3.1.2 Findings

The analysis showed that ODOT's improvement of Highway 99E did not cause substantial land use changes in Albany, because little land use change is evident since project completion. Since completion of the first phase in 1988, growth in Albany has been distributed throughout the city; it has not concentrated along Highway 99.

The research found several reasons for the development patterns observed:

- Planning and public policy encouraged growth not only in the study area, but in other parts of Albany as well.

- The improvement to Highway 99 did not create new access: it improved safety, convenience, and travel by alternative modes, and kept congestion from increasing as quickly as it would have otherwise. Because the project was only five miles in length, its impacts on existing travel times were small.

- Little development occurred on vacant commercial and industrial property along OR 99E and elsewhere in Albany during the recession of the early 1980s.

- Land must be available at market prices for development to occur. Focus group participants pointed out several key sites they felt would have developed had the owners made them available.

- The availability and cost of infrastructure (water, sewer, etc.) was a limiting factor for sites south of Oak Creek, which runs midway through the project area. Albany policies would require looping of the water system for any major development south of Oak Creek. It is difficult for any one development to absorb the costs of extending services across the Oak Creek flood plain.

3.2 BEND CASE STUDY

3.2.1 Description

The Bend case study evaluated the land use impacts of improvements to a section of US Highway 97 (The Dalles-California Highway) from milepost 132.6 on the North (about 0.5 miles north of the Smalley Road/US 97 intersection) to the Highway 97/Highway 20 Interchange at milepost 134.8. Parts of the improvement were inside, and parts outside, the Bend urban growth boundary (UGB) at the time of construction. The project was called the Bend-Redmond South Unit. The project improved a 2.2-mile section from two to four lanes.

A full EIS was not completed for the Bend-Redmond South Project. ODOT completed an Environmental Assessment (EA) for the project in 1987. Construction was completed in 1991. According to the EA, the purpose of the project was to increase the capacity and level of service of the facility and to improve safety along this stretch of Highway 97. The EA explained that the need for the project resulted from operational problems due to heavy traffic volumes.

3.2.2 Findings

The evidence is mixed that ODOT's improvement of Highway 97 influenced land use changes in Bend, and more specifically, in the Highway 97 corridor. Development has certainly occurred in the corridor but (1) it has not accounted for a large amount of growth relative to the rest of Bend, and (2) it has been generally consistent with the types of development called for in local plans and policies.

While a commercial development pattern had begun to emerge on the east side of Highway 97 prior to completion of the EA, the redesignation of lands slated for light industrial use to highway commercial use might be construed as an unanticipated indirect land use impact. City planning staff suggested that the plan designation change was a “housekeeping” matter to get the plan designation consistent with existing uses. Focus group participants suggested that commercial use was the “highest and best” use of the land, and that the initial plan designation should have been commercial. Moreover, a considerable amount of vacant land exists east of the highway.

Many factors affect the functionality of land in the corridor, including highway capacity, access, and visibility. Commercial property in the project area may have developed sooner with the highway improvement than it otherwise would have.

The research found several reasons for the development patterns observed:

- Planning and public policy allowed for growth not only in the study area, but in other parts of Bend as well.

- The modifications to Highway 97 improved safety, convenience, and travel by alternative modes, and kept congestion from increasing as quickly as it would have otherwise. Because the project was only 2.2 miles in length, reductions in travel times have been small.

- Rapid population growth, coupled with a strong economy made Bend attractive to large discount retailers. Some of those retailers chose to locate in areas designated for commercial use in the highway corridor.

- According to focus group participants, there were few large sites designated for commercial use that would be suitable for large retail operations in Bend. The only other suitable sites were in the southern portions of Bend along the Highway 97 corridor. A lack of services to those sites provided a comparative advantage to vacant commercially-zoned areas in the study area.

- Field observation and conversations with Deschutes County Planning staff indicate that little development has occurred in the highway corridor outside the Bend UGB since 1987. This is consistent with the agricultural zoning that existed in the area in 1987 and still exists.

3.3 GRANTS PASS STUDY

3.3.1 Description

The Grants Pass case study evaluated the land use impacts of the construction of a third Rogue River crossing in the Grants Pass area. The project is a 2.1 mile section of highway known as the Grants Pass Parkway. The Parkway provides a southeast bypass of downtown Grants Pass for traffic travelling between Interstate 5 and Highways 199 (Redwood Highway), 99 (Rogue River Highway), and 238 (Jacksonville/Williams Highway).

The Draft Environmental Impact Statement (DEIS) was completed in 1978, and the Final Environmental Impact Statement (FEIS) in 1979. The project construction began in 1989 and was completed in 1991.

3.3.2 Findings

ODOT's construction of the Grants Pass Parkway does not appear to have encouraged substantial land use changes in Grants Pass. The City had planned for the development patterns that exist in the study area since the possibility of a third bridge was initially identified in 1961. On the other hand, some of the development envisioned by the City's plan may not have occurred at the same rate, and may have been a different mix, if the highway improvement had not been made.

Commercial development along the Redwood Spur in the study area has been strong, a land use trend that had begun before the FEIS was issued. Industrial development in the study area has not occurred to the level anticipated

The research found several reasons for the development patterns observed:

- Planning and public policy have consistently supported the development patterns and type of development that occurred in the study area. Moreover, the city provided restrictions and incentives for development to follow patterns established prior to issuance of the FEIS in 1979.

- Economic conditions (such as overall decline of timber products manufacturing) and the price of industrially-zoned land in the study area compared to that in nearby communities (such as Merlin) have contributed to less-than-expected industrial development in the Riverside Industrial Area.

- Increased traffic volumes along the Redwood Spur portion of the Parkway may have enhanced its attractiveness to commercial development. Commercial development, however, is partially responsible for the increased traffic volumes. If the project had not been built, persons living south of the Rogue River may have been less willing to cross the river to shop along the Redwood Spur. Moreover, according to focus group participants, the types of commercial development found along the Redwood Spur may have located south of the Rogue River without the Parkway.

This last point raises another area of impacts of transportation improvements on land use: changes in land use near highway improvements may influence changes in and use in areas that are competing locations for development.

3.4 MCMINNVILLE CASE STUDY

3.4.1 Description

The McMinnville case study evaluated the land use impacts of improvements to a section of Oregon Highway 18 (the Salmon River Highway) from the East McMinnville Interchange on the west to Airport Road on the east (this stretch is also known as Three Mile Lane). The project improved a 2.2 mile section from two to four lanes, with a continuous left-turn median.

The EIS for the project was completed in 1985. Construction was initiated in 1991 and completed in 1993. According to the Draft Environmental Impact Statement, the purpose of the project was to accommodate increases in traffic and provide greater highway safety.

3.4.2 Findings

The analysis shows that ODOT's expansion of Three-Mile Lane has not caused substantial land use changes in the study area or in McMinnville because little land use change has occurred since project completion. Prior to the highway widening, the study area was located within the City's UGB and contained a mix of residential, commercial, industrial, institutional and agricultural activities and designations.

Non-residential development in the study area began to pick up in 1994 with the construction of the Tanger Outlet Center. Several retail and service establishments settled in the study area within several years of Tanger: McDonalds, the Willamette Valley Medical Center, Sun Retirement Assisted Living Home and Vineyard Inn Suites. Although a Planned Unit Development (PUD) overlay was designed to deter "strip" development, the businesses along OR 18 may be considered to be this style. I’m not sure factory outlet stores are considered to be “strip” development. I suggest referring to OR 18 businesses in general and deleting reference to specific names (i.e., why pick on McDonalds?). Meanwhile, the anticipated industrial development in the study area has not occurred.

The research found several reasons for the development patterns observed:

- Since 1981, planning and public policy have consistently supported the development patterns and type of development that occurred in the study area. The City designated a Planned Unit Development overlay affecting much of the study area. This PUD created conditions that were attractive to a number of businesses that have located along Three Mile Lane since 1994, primarily large lot sizes and zoning allowing a variety of uses on a state highway. In the case of the Willamette Valley Medical Center, the City modified its zoning laws to allow the hospital in a limited light industrial zone.

- The City of McMinnville developed land use and infrastructure policies for the area decades ago and lets the developers or businesses choose their locations based on these established conditions (rather than offer additional incentives, etc.).

- McMinnville residents and developers are not particularly attracted to Three Mile Lane for residential use. City staff felt that residents continue to see Three Mile Lane as geographically and culturally separate from the City. The Three Mile Lane area juts out from the southeastern edge of the City and lies on the eastern side of the South Yamhill River, a river with high banks north of Three Mile Lane. The land is flat and still has an agricultural character with the exception of the airport to the east and commercial/institutional development near the western end of Three Mile Lane.

3.5 GENERAL PATTERNS AND TRENDS FROM THE CASE STUDIES

As there were only four case studies, any generalizations must be made cautiously. But a few key points emerged from the analyses of conditions in the four studies:

- All the case studies illustrate that the development that occurred after the highway improvement was consistent with the development envisioned in local plans before the improvement. The highway improvements may have, facilitated making the existing expectations or hopes about future development a reality.

- All the case studies illustrate the interactive, iterative, and incremental nature of most urban development. City and county comprehensive land use plans say what kind of development is wanted or acceptable; the highway improvement may facilitate that development. Future land use plans may change in response to the way that growth occurs. The case studies all paint a picture of incremental decisions: small changes in land use plans and highway improvements, each responding to previous changes in land use and transportation.

- The case studies support the hypothesis that the scale of land use change will correlate with the scale of the access improvement. Where access already existed (as in the case studies), increasing highway capacity did not cause a change in the type or rate of development. Where access was increased, the highway capacity improvement did appear to affect the rate of the development.

- Good access is a necessary but not sufficient condition for local development. The amount of development is also dependent on the availability of other key public facilities (especially water and sewer).

- As implemented by counties, state policies that restrict development of resource lands have been effective in limiting development associated with highway improvements outside Urban Growth Boundaries. The case studies did not identify any major new developments outside UGBs.

Other conclusions relate to the specific objective of this study: to provide information of use to ODOT in assessing the potential indirect impacts of its highway improvements on land use. There is potential for confusion over what it means to say that a highway project "creates changes in land use." Development may occur in areas served by state highways whether ODOT improves those highways or not. Plans allow and even support those changes; public policies allow or provide incentives for growth. The fact that change occurs, by itself, is not evidence that new highway improvements significantly contributed to that change.[1] Thus, "change in land use" must indicate how future land use will be different from what it would have been without the highway improvement. For these case studies, ODOT projects were consistent with local plans for development, and unplanned growth did not occur.

Environmental Impact Statements and Environmental Assessments may state that highway improvements may "create pressure for land use change." Indeed, they may: the bigger the improvement, access benefits, and travel-time savings are, the greater is the pressure. But when does the pressure become an impact? Clearly, there is an impact when plans are changed to allow different (probably more intensive) development than the plan previously allowed. Otherwise, these pressures are hard to measure. The case studies did not find there were many petitions for changing plan designations or rezoning.

Moreover, the pressure itself is not as important as whether plans were actually changed in response to that pressure. The evidence from the case studies (with the possible exception of Bend) is that they were not changed. Particularly important is that the case studies show no evidence of land development outside of UGB's which was not allowed by existing plans.

Finally, there is the question of whether any change that does occur is, by definition, undesirable. Local plans change frequently. Planners and citizens making those changes often believe they are making things better. Plan changes to allow more intense development in areas where public investments have provided facilities to accommodate it may make sense, or may lead to premature obsolescence of the transportation improvement. Development may impede through-traffic movements as local travel consumes available capacity. ODOT's role in preserving overall system function requires that these issues be considered. ODOT has a much greater role than just preserving system function; hence a great deal of interest in the transportation-land use connection, livability, compact urban development, etc.

[1] Not addressed in this report is a larger question of whether ODOT improvements made 20 to 50 years ago affected land use. They certainly did, but their big effect was a result of the substantial travel time savings that new, paved roads and limited access highways afforded.

4.0 GENERAL CONCLUSIONS

The growth trend analysis and four case studies support the conclusion that most highway capacity increases, by themselves, do not cause development to be dramatically different from what local plans envision, or from what would have occurred in the absence of those improvements. More specifically, the case studies suggest that local governments in Oregon have ample tools to plan land uses with or without the improvements. Given market demand and reasonable land prices, development will occur if public services like sewer and water, and some minimal level of access (i.e., a paved road to a site with a curb cut) are available.

Capacity increases by themselves are unlikely to result in land development. Rather, they are more likely to facilitate whatever development comprehensive plans and zoning ordinances already allow. That is not to say that plan designations, zoning, city limits, and/or UGBs will not change in a corridor where a capacity increase has occurred. However, the four case studies undertaken so far illustrate that capacity changes are neither a necessary nor a sufficient condition to predict whether such policy changes will occur.

Additional case studies conducted in Phase III of this project will further test these conclusions.

4.1 NEXT STEPS IN THE RESEARCH

The final product of Phases I, II, and III of this research project will be a methodology that can be applied by ODOT to assess the indirect land use impacts of highway projects. The methodology will include data collection and analysis procedures for land use change forecasts, and it will provide guidance based on lessons learned from the growth trend analyses and case studies.

The proposed methodology will be structured as a guidebook for planners responsible for assessing the potential land use impacts of highway projects and documenting them in EISs and EAs. The guidebook will include an example write-up for a hypothetical highway project (taken from case study elements) that incorporates the results from the proposed methodology.

Data for both the highway project corridor and the urban area (city) will be required for the analysis. The guidebook will list data types and possible sources that are needed . In order for the analysis to have geographic specificity, we envision a GIS as the ideal database manager and analytical tool. An appropriate unit of analysis will also need to be specified (i.e., geographic zones – grid cells, census tracts, Transportation Analysis Zones, etc.).

The general process will involve dividing the study area into analysis zones with accompanying land use information (e.g., current land use, zoning designation, environmental suitability, surrounding land use mix, availability of public services, etc.). With this information, a planner can generate development scenarios based upon highway project and local area assumptions which can then be evaluated..

The analysis tool is not intended to be a predictive land use model; rather, it will indicate areas that have increasing levels of development potential, relative to the location and the proposed highway improvements. An inventory of areas having the highest development potential will be useful in assessing overall land use impact levels.

The study also proposes that an archive of impact assessment case studies be developed for impact monitoring purposes. With an increased body of information, new inferences about potential land use changes related to capacity increasing highway projects may be drawn.

5.0 REFERENCES

Sanchez, Thomas and Terry Moore, “Indirect Land Use and Growth Impacts of Highway Improvements: Phase 1 Report” Oregon Department of Transportation, 1999.

Sanchez, Thomas and Terry Moore, “Indirect Land Use and Growth Impacts of Highway Improvements: Albany Case Study Report” Oregon Department of Transportation, 1999.

Sanchez, Thomas and Terry Moore, “Indirect Land Use and Growth Impacts of Highway Improvements: Bend Case Study Report” Oregon Department of Transportation, 1999.

Sanchez, Thomas and Terry Moore, “Indirect Land Use and Growth Impacts of Highway Improvements: Grants Pass Case Study Report” Oregon Department of Transportation, 1999.

Sanchez, Thomas and Terry Moore, “Indirect Land Use and Growth Impacts of Highway Improvements: McMinnville Case Study Report” Oregon Department of Transportation, 1999.