Impacts of Bypass Highways on Small and Medium Size Cities in Florida:

Knowledge Search and Evaluation of Past Studies

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BYPASS IMPACTS

I. INTRODUCTION

Highway bypasses are constructed in small- and medium-sized cities in Florida and nationwide to reroute through traffic—particularly trucks—away from central business districts (CBDs) or other consistently congested locations. The traditional decision-making criteria regarding bypass construction usually focuses on redirecting vehicles that are traveling through the area with no intention of stopping, thereby improving regional travel time and mobility and reducing adverse impacts of traffic on communities.

A bypass also has the potential to positively or adversely affect the bypassed community or district economically, geographically, and aesthetically. By increasing accessibility of the surrounding area, for example, highway bypasses can dramatically alter land use and growth patterns in small- to medium-sized communities—particularly in growing metropolitan areas. Yet studies of potential bypass impacts tend to focus on evaluating aggregate economic impacts, without similar attention to potential land-use and livability impacts. This is likely due to the pressure on transportation agencies to demonstrate that a proposed bypass will not adversely impact businesses in these communities. Land use and livability impacts may be of less concern to smaller communities, who often actively seek growth to enhance their tax base or may feel the bypass will improve livability by reducing congestion. These latter issues are, however, also critical to economic development, as well as sustainability and growth management.

The Florida Department of Transportation (FDOT) has contracted with the Center for Urban Transportation Research (CUTR) at the University of South Florida to assess existing approaches for evaluating the impact of a potential bypass on small and medium sized communities in Florida and assist the Department in establishing a more multidimensional approach to bypass planning. The project involves a review of current practices and methodologies, identifying gaps in knowledge, and offering suggestions for enhancing current policy and technical practice relative to bypass impact assessment. The approach is to include methods for determining impacts of highway bypasses on land use and related considerations such as environmental preservation, quality of life, community character, and cultural assets. This information can then be weighed in selecting an alternative and in determining appropriate plans, strategies and mitigation measures to more comprehensively address the anticipated impacts of the bypass.

This report is the first task of the study. It contains a detailed review of the existing literature and on highway bypass impacts, identifies gaps in knowledge, and presents initial observations and suggestions for a more comprehensive approach to bypass impact evaluation. Subsequent reports will set forth methodology and policy considerations for consideration by FDOT in Project Development and Environment (PD&E) studies relative to proposed bypasses of small- and medium-sized communities in Florida.

A. METHODOLOGY

The research team conducted an extensive review of pertinent national research related to bypass impacts, as well as research on the impact of transportation projects on land use. The review examined details of study methodologies, findings on impacts, key insights, and gaps in the literature relative to understanding the impacts of bypass highways. Team members also looked at typically encountered beliefs and concerns of land use...
planners, community leaders, merchants, and transportation professionals as documented in the literature. This information was summarized in an annotated bibliography in Appendix D of this report with highlights presented in Tables 3 through 5.

The team also identified and documented characteristics of existing and proposed bypasses in Florida and policies and criteria used by FDOT and other state transportation agencies in relation to bypass highways around small- and medium-sized cities. Findings of this knowledge search will be used in the next task to develop a proposed methodology for assessing the impacts of bypass highways on small and medium sized communities in Florida.

B. BACKGROUND AND DEFINITIONS

Highway bypasses are constructed as relief routes to a prevailing roadway, and are adapted to suit specific travel needs of an area. Standard bypasses are characterized by “a segment of new highway that reroutes through-traffic around a central business district” and “is linked with the bypassed route at the opposite side of the city” (Helaakoski 1992). Most bypasses are built to design standards that allow traffic to flow at high speeds. The functional class of a roadway can vary from an arterial to a limited access highway. Bypasses can range in length from a few hundred yards to over one hundred miles. The length of the bypass depends on the size of the community being bypassed, the availability of existing roadways where the bypass will terminate, and socioeconomic and environmental concerns.

Some bypasses can be placed into subcategories, based on their operational purpose and route. Multiple-city bypasses skip more than one urban area using a single road segment. Business routes are designed primarily to divert truck traffic. Business routes often have limited access points, and may be intended to bypass areas that lack truck dimensions (i.e. low overpasses) or are noise/vibration sensitive. A beltway is a type of bypass that encircles the entire city.

This study is intended to focus on bypasses around small- and medium-sized communities. Because there is no official definition of “small-” or “medium-sized” communities, a definition was developed for purposes of this study through review of the literature on bypasses federal metropolitan planning rules, and Census Bureau definitions. In addition, consideration was given to current population characteristics of communities in Florida where bypasses have been built or proposed, as indicated in the FDOT work program.

Urban areas are defined by the Census Bureau as a cluster of block groups that has a population density of at least 500 people per square mile and a total cluster population of 1,000. This is the smallest geographic unit with readily available information on commonly studied economic factors (i.e. job type, housing mix, etc). In addition, traffic analysis zones (TAZs) used in travel demand modeling are fashioned to have approximately 1,000 people. The literature includes few communities with populations below 1,000 and the lowest community population for planned bypasses in Florida is 1,400. Therefore, the lower population limit for “small” communities in this study will be 1,000.

In the FDOT 2009 Quality/Level of Service Handbook, an urban area includes places with a population between 5,000 and 50,000. The transportation planning process changes considerably when the urban area population reaches 50,000 people. At this threshold, a metropolitan planning organization (MPO) takes primary responsibility for planning and programming regional transportation facilities. In areas less than 50,000 people, the state DOT

1 For more information on Census definitions, visit: http://www.census.gov/prod/cen2000/phc-2-a.pdf
has primary responsibility. The majority of case examples from both the literature and the Florida DOT work program involve communities with populations well under 50,000 people. Therefore, for purposes of this study, small- and medium-sized communities are considered those with populations with a lower limit of 1,000 and an upper limit of 50,000.

II. BYPASS PLANS AND POLICY IN FLORIDA

A. FLORIDA BYPASSES

FDOT presently has no method to track planned or completed bypass projects. In addition, there is no consistent method of indicating bypass or beltway facilities within FDOT work programs. Beltways and bypass projects are noted in Florida’s Adopted Five Year Work Program, July 1, 2010 through June 30, 2015 and the Strategic Intermodal Funding Strategy, First Five-Year Plan FY 2010/2011 through FY 2014/2015 (SIS 5 Year); however, these terms are not defined. Several other projects may actually be bypasses, but are described simply as “new roads” that connect to existing roadways.

Table 1 lists the pending and recently completed bypass projects for small- to medium-sized cities in Florida, as identified in the FDOT Work Program or from anecdotal knowledge. The table contains common independent variables of bypasses and includes route, FDOT District, county, and town.

Below are some highlights of recently completed bypasses:

- They tend to circumvent communities with populations ranging from 10,780 to 94,406, with a median population of 21,015.
- The bypassed town may be from 25 to 60 miles away from the central city of the nearest Metropolitan Statistical Area (MSA).
- Project development websites consistently cite redirecting commercial and industrial traffic, reducing congestion, and alleviating existing or anticipated travel demand as reasons for the bypass.
- The length of recently completed bypasses ranges from 2.3 to 10.9 miles, with a median length of 4.1 miles.

Below are characteristics of planned bypasses:

- They will circumvent communities having populations ranging from 1,427 to 82,500 with a median population of 5,141.
- The bypass location may be 11 to 50 miles away from the nearest major city.
- Project websites for future bypasses cite redirecting commercial and industrial traffic, reducing congestion, enhancing hurricane evacuation, and alleviating existing or anticipated travel demand as reasons for a bypass.
- The length of a proposed bypass ranges from 1.5 to 21.738 miles with a median length of 9.8 miles.

On an aggregate level, most of the Florida bypasses fall into the category of small- or medium-sized city (1,000 to 50,000 people). Most of the existing bypasses are found toward the upper population limit of this category, while proposed bypasses trend toward the lower end.
TABLE 1. Characteristics of Florida Bypasses

<table>
<thead>
<tr>
<th>Location</th>
<th>FDOT District</th>
<th>County</th>
<th>Town</th>
<th>Population of Central City</th>
<th>CBD→Major CBD Distance (mi)</th>
<th>Length of Bypass (mi)</th>
<th>Objectives of Bypass and Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR 29</td>
<td>1</td>
<td>Collier</td>
<td>Immokalee</td>
<td>19,763</td>
<td>50</td>
<td>17+**</td>
<td>ATD</td>
</tr>
<tr>
<td>SR 29</td>
<td>1</td>
<td>Henry &amp; Glades</td>
<td>Labelle</td>
<td>4,480</td>
<td>32</td>
<td>15+**</td>
<td>ATD; RCIT; HE; RC</td>
</tr>
<tr>
<td>SR 70</td>
<td>1</td>
<td>Okeechobee</td>
<td>Okeechobee</td>
<td>5,784</td>
<td>40</td>
<td>13**</td>
<td>RCIT; HE; RC; ATD</td>
</tr>
<tr>
<td>SR 26*</td>
<td>2</td>
<td>Alachua</td>
<td>Newberry</td>
<td>3,360</td>
<td>20</td>
<td>21.738</td>
<td>ATD; RCIT</td>
</tr>
<tr>
<td>SR 26*</td>
<td>2</td>
<td>Gilchrist</td>
<td>Trenton</td>
<td>1,722</td>
<td>30</td>
<td>21.738</td>
<td>ATD; RCIT</td>
</tr>
<tr>
<td>US 301</td>
<td>2</td>
<td>Bradford</td>
<td>Starke</td>
<td>5,769</td>
<td>30</td>
<td>16+**</td>
<td>RCIT; HE; RC; ATD</td>
</tr>
<tr>
<td>US 301</td>
<td>2</td>
<td>Duval</td>
<td>Baldwin</td>
<td>1,634</td>
<td>22</td>
<td>n/a</td>
<td>ES; ATD; RC</td>
</tr>
<tr>
<td>SR 12</td>
<td>3</td>
<td>Gadsen</td>
<td>Quincy</td>
<td>6,975</td>
<td>24</td>
<td>1.5+**</td>
<td>RCIT</td>
</tr>
<tr>
<td>US 19</td>
<td>3</td>
<td>Jefferson</td>
<td>Monticello</td>
<td>2,572</td>
<td>30</td>
<td>n/a</td>
<td>RCIT; RC; ATD</td>
</tr>
<tr>
<td>SR 85</td>
<td>3</td>
<td>Okaloosa</td>
<td>Crestview</td>
<td>82,500</td>
<td>0</td>
<td>n/a</td>
<td>RCIT; RC; ATD</td>
</tr>
<tr>
<td>SR 87</td>
<td>3</td>
<td>Santa Rosa</td>
<td>Milton</td>
<td>8,044</td>
<td>25</td>
<td>5.6-10.5**</td>
<td>RCIT; HE; RC; ATD</td>
</tr>
<tr>
<td>US 331*</td>
<td>3</td>
<td>Walton</td>
<td>Freeport</td>
<td>1,427</td>
<td>36</td>
<td>5.6</td>
<td>RCIT; RC; ATD</td>
</tr>
<tr>
<td>US 331*</td>
<td>3</td>
<td>Walton</td>
<td>Defuniak Springs</td>
<td>5,141</td>
<td>45</td>
<td>5.6</td>
<td>RCIT; RC; ATD</td>
</tr>
<tr>
<td>SR 710</td>
<td>4</td>
<td>Okeechobee &amp; Martin</td>
<td>Indiantown</td>
<td>5,588</td>
<td>28</td>
<td>9.8</td>
<td>RCIT; RC; ATD</td>
</tr>
<tr>
<td>SR 25</td>
<td>5</td>
<td>Marion</td>
<td>Belleview</td>
<td>3,856</td>
<td>11</td>
<td>9.2</td>
<td>RCIT; RC; ATD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>FDOT District</th>
<th>County</th>
<th>Town</th>
<th>Population of Central City</th>
<th>CBD→Major CBD Distance (mi)</th>
<th>Length of Bypass (mi)</th>
<th>Objectives of Bypass and Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>US 98</td>
<td>1</td>
<td>Polk</td>
<td>Lakeland</td>
<td>94,406</td>
<td>0</td>
<td>2.3</td>
<td>RCIT; RC; ATD</td>
</tr>
<tr>
<td>US 41</td>
<td>1</td>
<td>Sarasota</td>
<td>Venice</td>
<td>21,015</td>
<td>25</td>
<td>3.1</td>
<td>RCIT; RC; ATD</td>
</tr>
<tr>
<td>US 27</td>
<td>1</td>
<td>Highlands</td>
<td>Sebring</td>
<td>10,780</td>
<td>50</td>
<td>4.1</td>
<td>RCIT; RC; ATD</td>
</tr>
<tr>
<td>SR 19</td>
<td>2</td>
<td>Putnam</td>
<td>Palatka</td>
<td>10,796</td>
<td>60</td>
<td>5.3</td>
<td>RCIT; RC; ATD</td>
</tr>
<tr>
<td>SR 15A</td>
<td>5</td>
<td>Volusia</td>
<td>Deland</td>
<td>24,375</td>
<td>25</td>
<td>10.9</td>
<td>RCIT; RC; ATD</td>
</tr>
</tbody>
</table>

* Multi-City Bypass  
** Per proposed alternatives  
n/a Proposed without information  
ATD: Alleviate Travel Demand  
HE: Hurricane Evacuation  
RCIT: Redirect Commercial and Industrial Traffic  
ES: Enhance Safety  
RC: Reduce Congestion  

Populations collected from U.S. Census from available data during 2000-2008. MSAs determined from U.S. Office of Management and Budget. Information on distances involved was calculated using mapping software. The location of a bypass was calculated from the Central Business District (CBD) of the bypassed town to the CBD of the central city of the nearest Metropolitan Statistical Area (MSA).
B. PLANS AND POLICIES

Certain FDOT plans and policies may lead to the consideration of bypass construction. Florida's Strategic Intermodal System (SIS) comprises transportation facilities deemed critical to interregional mobility and, therefore, the economic vitality of the state. The SIS Strategic Plan “sets policies to guide decisions about which facilities are designated as part of the SIS, where future SIS investments should occur, and how to set priorities among these investments given limited funding.” Florida's SIS Strategic Plan and investment policies direct the DOT to spend 75% of all discretionary capital funds on SIS facilities by 2015. As a result, local government officials often push for SIS designation of roadways in their community that meet SIS criteria to ensure federal and state funding for improvements on those roadways.

Maintaining a high level of service (LOS) standard is the primary requirement for projects on the SIS to receive funding. Roadway level of service standards adopted in Rule 14-94, Florida Administrative Code (F.A.C.) play a crucial role in the consideration of bypass construction, because congestion in urban areas may cause a SIS facility to fall below the required LOS.

According to the Adopted SIS Criteria and Thresholds, “to be designated as a SIS highway corridor, a roadway must meet minimum size criteria and community and environment screening criteria.” The SIS Highway criteria, detailed in Appendix A, address vehicle volume, truck percentage of traffic, and connectivity of segments between SIS corridors. Roads providing major connections to Georgia or Alabama are also part of the SIS. All SIS roadways must currently meet or be brought up to design and level of service (LOS) standards.

Emerging SIS facilities—defined as those roads that may become part of the SIS in the future—also have specific thresholds which are generally lower than SIS Highway Criteria thresholds. A non-FIHS facility that is on the State Highway System (SHS) may be considered an emerging SIS facility if, among other criteria, it is an interregional corridor that connects rural areas of critical economic concern (Ch. 288.0656 (7), F.S.) to the SIS.

Community and environment screening criteria for SIS facilities address community livability and environmental quality. These screening criteria are provided in Appendix B. Notably, one of the criteria specifies:

“Corridors and connectors should be designated, designed, and constructed in such a way as to avoid or minimize negative impacts and preserve the function and character of local communities, using processes such as the Efficient Transportation Decision-Making process as a tool beginning in early planning phases of a project. SIS corridors serving high volumes of freight traffic should consist of facility types designed to accommodate freight movements, and should not pass through residential and commercial areas with high levels of pedestrian activity or other activities sensitive to the noise, vibration, emissions, and safety impacts associated with freight movement. Except where supported by local community plans or necessary for connections to transit hubs, through passenger trips should be accommodated by major arterials and limited access facilities, and should be discouraged from using streets primarily intended to serve local vehicular, bicycle and pedestrian traffic.....” (emphasis added)

5 http://www.dot.state.fl.us/planning/sis/strategicplan/criteria.pdf
An implication of this policy is that a limited access bypass is indicated where the SIS is also the "Main Street" of a small- or medium-sized community. Many Florida main streets have been designated a SIS or Emerging SIS facility. As growth occurs in these areas, traffic volume—particularly freight—also increases on the roadway. The resulting traffic conflicts with the residential, commercial, and pedestrian activity of the community's Main Street, leading to a degradation of LOS and quality of life. When physical and policy constraints limit the feasibility of widening the roadway, a bypass becomes an attractive alternative.

Roadway design and levels of service standards can also influence the decision to build a bypass. Roads that are part of the FIHS (and therefore by definition the SIS) have roadway design specifications of 50 mph in urban areas and 65 mph in rural areas. Since small communities are too small to be considered "urban," the differing design speeds allow for wide, high speed roads through town which adversely impact pedestrian activity and increase the appeal of a bypass.

Requirements for level of service are established in Rule 14-94, F.A.C. and described in more detail in the FDOT 2009 Quality/Level of Service Handbook. All roadway segments on the SIS must operate at the minimum established level of service which varies based on the area and type of a roadway segment as shown in Table 2. Note that the minimum standard is LOS B in rural areas and LOS C in urban areas. Rural two-lane facilities are also set at LOS C. If additional roadway capacity through a small- or medium-sized community cannot be achieved by adding lanes, a bypass may be considered to improve operating conditions by diverting traffic away from the congested area.

**TABLE 2. Statewide Minimum LOS Standards**

<table>
<thead>
<tr>
<th></th>
<th>SIS and FIHS facilities</th>
<th>TRIP-funded facilities and other State roads</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Limited Access Highway</td>
<td>Controlled Access Highway</td>
</tr>
<tr>
<td>Rural Areas</td>
<td>B</td>
<td>B(^1)</td>
</tr>
<tr>
<td>Transitioning Urbanized Areas, Urban Areas, or Communities</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Urbanized Areas under 500,000</td>
<td>C(D)</td>
<td>C</td>
</tr>
<tr>
<td>Urbanized Areas over 500,000</td>
<td>D(E)</td>
<td>D</td>
</tr>
<tr>
<td>Roadways parallel to exclusive transit facilities</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>Inside TCMA(^2)</td>
<td>D(E)(^2)</td>
<td>E(^2)</td>
</tr>
</tbody>
</table>

Level of service standards inside of parentheses apply to general use lanes only when exclusive thru lanes exist.

1. For rural two-lane facilities, the standard is C.
2. Means the Department must be consulted as provided by Section 163.3380(5), (7), or (15), Florida Statutes, regarding level of service standards set on SIS or TRIP facilities impacted by TCMA\(^s\), MMITD\(^s\), or TCEA\(^s\) respectively.

**Source:** FDOT 2009 Quality/Level of Service Handbook, pp. 111

Although mobility and safety are a primary focus of FDOT in determining the need for a bypass, the potential for these facilities to promote sprawl development, harm local economies, or adversely impact the livability of smaller towns are also of concern. The National Environmental Policy Act (NEPA) and related Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act require consideration of secondary and cumulative effects of transportation projects, including land use,

community character and aesthetics. Florida’s Efficient Transportation Decision Making (ETDM) process was developed by FDOT in the early 2000s to accomplish NEPA requirements. In general, land use impacts are considered as part of the Sociocultural Effects Evaluation within the ETDM process to: a) define the required study area boundary; b) ensure compatibility with local comprehensive plans; and c) ensure that aesthetics and open space are not negatively affected.

Sociocultural Effects (SCE) Evaluations are thoroughly described in the FDOT Social Cultural Effects Handbook, 2005, the FDOT Public Involvement Handbook, and the Project Development and Environmental (PD&E) Handbook. Land use considerations noted include urban form, sprawl, local plan consistency, and open space preservation (FDOT PD&E 2). Existing and future land use is used to define the study area for the ETDM process, although the default initial study area is 500 feet from the project’s proposed alignment. Questions addressing land use in the process are:

1. Would the project result in a change in the character or aesthetics of the existing landscape?
2. Would the amount of recreation/open space be expected to increase or decrease as a result of the project?
3. Would the project be compatible with local growth management policies?
4. Would the project be compatible with adopted land use plans?

SCE evaluation objectives relative to land use include:

- Assess foreseeable project effects to transform the aesthetic character of the study area;
- Assess potential for changes in recreation/open space acreage in conjunction with the project;
- Assess potential for sprawl;
- Determine project consistency with local growth management plans; and,
- Determine consistency with adopted land use plans.

NEPA-required secondary and cumulative impact assessments are accomplished through the ETDM process. If a project meets certain criteria, the secondary and cumulative impact assessments of the NEPA process can be avoided. This is called a “categorical exclusion,” and the exact types of projects eligible to sidestep the NEPA review are found in 40 CFR 1508.4. In general, projects eligible for categorical exclusion include those that have no environmental impacts, do not infringe on cultural resources, or are entirely consistent with state and local law. Presumably, bypasses would not fall into this category and therefore would be subject to secondary and cumulative impact assessments.

III. APPROACHES FOR EVALUATING BYPASS IMPACTS

A detailed review of the literature was conducted to document existing approaches for evaluating the impact of potential bypass construction. The results of this review were used to develop initial concepts for a multidimensional approach to bypass decision making that addresses policy, transportation, and land use considerations. The assessment of current practice began with a review of reports and studies regarding bypass

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routes. The bulk of this literature focused on the economic impact of the bypass on bypass communities, although some of the studies also addressed land use and related considerations.

A. ECONOMETRIC AND OTHER ANALYSES

In 2000, the Texas Department of Transportation funded a series of four studies on the economic effects of highway “relief routes” on small- and medium-sized cities in Texas indicated below:


The research approaches and findings of the Texas reports are highly relevant to this research for Florida. In the first of the four reports, the Texas researchers identify issues and summarize current literature (Handy, Literature 2). The literature review of bypass studies conducted in this report provided an excellent and thorough discussion of studies prior to 1993, which the team used as a baseline. CUTR then supplemented this information with a detailed review of studies published in 1993 to date.

The first report in the series noted that members of the community expressed a variety of views regarding the impact of such routes. As noted by Handy (*Literature 6*), “This difference in assessments relates in part to a difference in perspective of the community’s goal in the face of a planned relief route: preservation and enhancement of the overall tax base versus preservation of traditional business and local character.” In addition, it was further noted that TXDOT was seeking to maintain mobility on the roadway, while community members had varying interests and objectives.

Handy determined that different studies tend to use different approaches based on the type of information being sought by the community. The report “…describes the different methodologies, discusses their strengths and weaknesses, and notes some of the studies that use these different methodologies…” (Handy, Literature 2). The methodologies described include:

- Before-and-After Approach
- Case Study Approach
- Econometric Models, both cross-sectional and time-series
- Projected Development Models
- Matched-Pairs and Survey-Control Studies
- Input-Output Models

Table 3, adapted from the report, illustrates the type of bypass studies performed in the case examples for the Texas study. Econometric analyses were by far the most prevalent – used in 10 out of 16 studies. Before and after and case study approaches were each used in 4 of the 16 studies with two of each type in combination with econometric analyses.
<table>
<thead>
<tr>
<th>Study</th>
<th>Author</th>
<th>Year</th>
<th>Before &amp; After</th>
<th>Case Study</th>
<th>Econometric</th>
<th>Interview</th>
<th>Matched Pair</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>An Investigation of Some Economic Effects of Two Kentucky Bypasses: The Methodology</td>
<td>Holhouser</td>
<td>1960</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measuring the Economic Impact of a Limited-Access Highway on Communities, Land Use, and Land Value</td>
<td>Bardwell &amp; Merry</td>
<td>1960</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>The Road Around: A Study of the Economic Impact of Highway Bypasses on Rural South Carolina Cities and Towns</td>
<td>Whitehurst</td>
<td>1965</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Adverse and Beneficial Effects of Highways on Residential Property Values</td>
<td>Gamble</td>
<td>1979</td>
<td></td>
<td></td>
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<tr>
<td>Demographic Response to Transportation Innovation: The Case of the Interstate Highway</td>
<td>Lichter &amp; Fuguitt</td>
<td>1980</td>
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<tr>
<td>Interstate Highway System and Development in Nonmetropolitan Areas</td>
<td>Briggs</td>
<td>1981</td>
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<tr>
<td>Socio-Economic Reactions to Highway Development</td>
<td>Burkhardt</td>
<td>1984</td>
<td></td>
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<tr>
<td>Highway Bypasses: Wisconsin Communities Share Their Experiences</td>
<td>Wisconsin DOT</td>
<td>1988</td>
<td></td>
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<td>X</td>
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<tr>
<td>Transportation and Economic Development</td>
<td>Stephaned es &amp; Eagle</td>
<td>1989</td>
<td></td>
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<tr>
<td>Role of Transportation in Manufacturers’ Satisfaction with Locations</td>
<td>Hartgen et al.</td>
<td>1990</td>
<td></td>
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<tr>
<td>Interstate Highway System: Reshaping the Nonurban Areas of Pennsylvania</td>
<td>Everly et al.</td>
<td>1990</td>
<td></td>
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<tr>
<td>Employment and Income Impact of Expenditures on Bypass, Loop, and Radial Highway Improvements</td>
<td>Buffington &amp; Burke</td>
<td>1991</td>
<td></td>
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<td>Highway District and Economic Sector Employment Effects of Transportation Economics</td>
<td>Crane et al.</td>
<td>1991</td>
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<tr>
<td>Economic Effects of Highway Bypasses on Business Activities in Small Cities</td>
<td>Halaakoski et al.</td>
<td>1992</td>
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</table>

Source: Chart adapted from “Economic Impacts of Highway Relief Routes on Small- and Medium-Size Communities: Literature Review and Identification of Issues” (Handy et al., 2001a: 43).

Handy observed that the economic factors analyzed were dependent on “the purpose of the study and on data availability” (Handy, Literature 2, 20). She also observed, “The economic impacts of highway facilities can be divided into two basic classes: user and nonuser benefits. Primary, or user, benefits consist of travel-time savings through congestion relief, reduced operating costs owing to better gas mileage, and improved safety through design improvements. User benefits attributable to the new route include benefits to users of both the new route and the old route, who derive travel-time savings from the diversion of through traffic to the new route.”
Secondary, or nonuser, benefits, such as employment changes, increased wages, increased land values, and population increases, are also commonly associated with highway improvements and are derived from user benefits. (Handy, Literature 20).

Using the format from the Texas study in Table 1, CUTR assembled Table 4 to illustrate the bypass studies performed from 1993 through the present that were reviewed for this research. Table 4 illustrates that although econometric analyses are still the most prevalent, they have often been combined with case studies in recent years. Econometric analyses, performed in 18 of the 21 studies, were combined with the case study approach in 12 of those.

The Texas report identified a number of independent variables commonly used as determinants of economic impact were identified, including:

- Year of completion
- Length of the new route
- Length of the old route
- Access type: controlled versus uncontrolled
- Distance of route from the city or regional center
- Distance of city from nearest metro center
- Dollars of transportation investment
- Income of region
- Tax rates
- Population of study area (Handy, Literature 23).

The second report in the series, described the methodology and findings of an econometric analysis performed on a total of 42 cities, 23 with bypasses and 19 without (Kockelman 10). The methodology aimed to use more sophisticated modeling by controlling for a number of explanatory variables. Kockelman concluded that “These models provide important insights that may help to guide the planning and design of relief routes in small- and medium-size communities, but they do not tell the entire story.” The models “...evaluate net changes in these sectors but do not assess underlying changes, such as geographic shifts, changes in ownership, or openings and closings in the local business community,” (Kockelman 42).

The third report, which used a case study approach, contained more insight into the land use impacts of bypass routes than the previous reports. Ten communities were studied by compiling existing data from the Handbook of Texas, U.S Census of Retail Trade, and U.S Census of Population and Housing along with site visits and interviews. Findings included that “…communities where relief routes have not been built suggest that the ten case study communities would have changed significantly even if the relief route had not been built, but the evidence also suggests that the relief routes contribute to and reshape these changes.” (Handy, Case 93) Residents, business owners, and civic leaders “…recognize that the relief route was both necessary and ultimately beneficial for the community” and “…reduced traffic through town by as much as 75%” (Handy, Case 93).

Additional findings addressed what had happened to downtown areas as well as along the bypass routes. “In six out of the ten case studies, the downtown area has changed dramatically over the past couple of decades, from a center of retail and services for the community to a center of specialized activity,” (Handy, Case 95). They became legal centers (county seat) or tourist-related downtowns. However, similar changes occurred in the towns without relief routes “losing traditional businesses to competition from Wal-Mart and other discount stores,” (Handy, Case 97). In many cases, some community interests believed that a lot of development would occur along the relief route. Although development occurred on the relief routes in all of the communities, the amount was considered limited in 8 of the 10 cases (Handy, Case 97).
### TABLE 4. Methodologies Used in Highway Bypass Impact Studies Since 1992

<table>
<thead>
<tr>
<th>Study</th>
<th>Author</th>
<th>Year</th>
<th>Before &amp; After</th>
<th>Case Study</th>
<th>Econometric</th>
<th>Interview</th>
<th>Matched Pair</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case Studies of the Economic Impact of Highway Bypasses in Kansas</td>
<td>Babcock &amp; Davalos</td>
<td>2004</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impacts of Highway Bypasses on Kansas Towns</td>
<td>Burress</td>
<td>1996</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>Economic Impact of Freeway Bypass Routes in Medium Size Cities</td>
<td>Collins &amp; Weisbrod</td>
<td>2000</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
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</tr>
<tr>
<td>Business Impacts of Highway Bypasses</td>
<td>Comer &amp; Finchum</td>
<td>2001</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>New Highways and Land Use Change: Results from a Quasi-Experimental</td>
<td>Funderburg et al.</td>
<td>2010</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>Suburban Bypass Roads and Intergovernmental Politics: A Case Study</td>
<td>Lichtenstein et al.</td>
<td>2006</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>The Economic Impacts of Bypasses on Communities: An Integrated Approach</td>
<td>Mills &amp; Fricker</td>
<td>2009</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>The Economic Impact of Rural Highway Bypasses: Iowa and Minnesota</td>
<td>Otto &amp; Anderson</td>
<td>1995</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Bypass Study 2002: Analysis of Oregon’s Existing Bypasses</td>
<td>OR DOT</td>
<td>2002</td>
<td>X</td>
<td>X</td>
<td></td>
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<td>X</td>
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<tr>
<td>Economic Impacts of Highway Bypasses on Communities in Iowa</td>
<td>Pettit</td>
<td>2007</td>
<td></td>
<td>X</td>
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<tr>
<td>Methodology for Determining the Impact of Highway Bypasses in</td>
<td>Rogers &amp; Marshment</td>
<td>2001</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
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<tr>
<td>Oklahoma</td>
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</tr>
<tr>
<td>The Impacts of Bypasses on Small and Medium-Sized Communities: An</td>
<td>Srinivasan &amp; Kockelman</td>
<td>2002</td>
<td></td>
<td>X</td>
<td></td>
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<tr>
<td>Econometric Analysis</td>
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<tr>
<td>California Bypass Study: The Economic Impacts of Bypasses</td>
<td>System Metrics Group</td>
<td>2006</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>The Impact of a New Bypass Route on the Local Economy and Quality of</td>
<td>Thompson et al.</td>
<td>2001</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Life</td>
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<td></td>
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</tr>
<tr>
<td>The Economic Impacts of Highway Bypasses on Communities</td>
<td>Yeh et al.</td>
<td>1998</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
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</tr>
</tbody>
</table>

Source: Chart adapted from “Economic Impacts of Highway Relief Routes on Small- and Medium-Size Communities: Literature Review and Identification of Issues” (Handy et al., 2001a: 43).
The findings of this report identified key factors regarding highway-related development. Structural factors included “...the decline of rural populations and growth of metropolitan areas, increases in the scale of stores and shopping centers in the retail industry, and consolidation in distribution channels for gasoline,” (Handy, Case 100). The most rural communities seem to continue to decline while those on the “expanding fringe of metropolitan areas have seen growth in their populations and in the portion of the local economy that serves the local population,” (Handy, Case 100). Among the measured local conditions, geographic factors were deemed the most significant. In terms of local policies, communities that provided new infrastructure, modified commercial zoning, and deployed marketing campaigns experienced greater growth along bypass facilities. Those that actively preserved historic downtowns and marketed them were successful in having more active downtowns.

The fourth report summarizes the previous reports and states that “...research findings suggest that TxDOT and local communities through their actions may be able to avoid or at least partially offset the negative impacts of relief routes but also enhance the positive impacts through thoughtful planning efforts,” (Jarrett 1). The report recommends “... possible planning approaches for TxDOT and communities in Texas” to use when planning a bypass (Jarrett 1). Ideas include policies related to facility location and design, signage, annexation and utility provision, and economic development programs (Jarrett 1). Finally, the report suggests that downtown businesses benefit most from signage and advertising along the new route. Access control and infrastructure are key to maintaining mobility on the reliever and attracting new development. Community planning, including public involvement, is essential (Jarrett 2). A collaborative approach between the state and the community including the use of a community impact assessment is suggested (Jarrett 33).

Many more studies were reviewed regarding the impact of bypasses on communities and the majority of these focused primarily on economic impacts. An annotated summary of these studies is provided in Appendix C. Section B addresses some of the typical concerns and actual findings. Basic information regarding these studies is captured in Table 5: Bypass Methodology Matrix. The Matrix organizes the methodological review into five key components: population(s), state(s), topic(s), method(s), data source(s) and author(s).

The existing literature includes populations which parallel the small- and medium-sized populations of bypassed Florida cities in Table 1. The most common states within the previous studies lie in the middle- to upper-band of the United States--mainly Kansas, Oklahoma, Iowa and Wisconsin. Econometric models, case studies, and before and after studies are the key methods for investigating the impacts of bypasses on small- to medium-sized cities. The key topic of economic impacts are investigated through labor data, retail sales data, U.S. Census data, and field visits to provide mixed-methods economic analyses.
<table>
<thead>
<tr>
<th>POPULATION</th>
<th>STATE</th>
<th>TOPIC</th>
<th>METHODS</th>
<th>DATA SOURCE(S)</th>
<th>SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>723-2,600</td>
<td>KS</td>
<td>Economic Impacts</td>
<td>• Econometric Models</td>
<td>Economic Census</td>
<td>Babcock &amp; Davalos (2004)</td>
</tr>
<tr>
<td>53,000-203,000</td>
<td>VA, IN, WI</td>
<td>Economic Impacts</td>
<td>• Case studies of 3 small-medium sized cities, assessing bypass effects (not processes)</td>
<td>Vacancy rates, US Census, State/city labor statistics</td>
<td>Collins &amp; Weisbrod (2000)</td>
</tr>
<tr>
<td>6,494-102,275</td>
<td>CA</td>
<td>Land-Use Impacts</td>
<td>• Before &amp; After</td>
<td>Property appraiser, Windshield survey, Dunn &amp; Bradstreet business data</td>
<td>Funderburg et al. (2010)</td>
</tr>
<tr>
<td>613-11,420</td>
<td>WA</td>
<td>Economic Impacts</td>
<td>• Interviews</td>
<td>Department of Revenue, Business leaders</td>
<td>Gills &amp; Casavant (1994)</td>
</tr>
<tr>
<td>2,500-50,000</td>
<td>TX</td>
<td>Economic Impacts</td>
<td>• Econometric models, 10 Case studies, 4 controls</td>
<td>Pooled panel data, Interviews, Analysis using common framework</td>
<td>Kockelman, Srinivasan &amp; Handy (2001)</td>
</tr>
<tr>
<td>7,500</td>
<td>TX</td>
<td>Economic Impacts</td>
<td>• Econometric models, Geolocation</td>
<td>Retail sales, Gasoline sales, Gas station location (GIS)</td>
<td></td>
</tr>
<tr>
<td>Small to Medium</td>
<td>IN</td>
<td>Impact on Small Cities</td>
<td>• 2 Case studies, Econometric models</td>
<td>Annual employment and payroll data, County Business Patterns, SIC, BEA, Adjusted against state data</td>
<td>Mills et al. (2009)</td>
</tr>
<tr>
<td>110-51,040</td>
<td>OR</td>
<td>Economic Impacts</td>
<td>• Aerial Photograph Analysis, Case Studies</td>
<td>Land cover change, Environmental Impact Statements, Building permits</td>
<td>ODOT (2002)</td>
</tr>
<tr>
<td>244-1,848</td>
<td>IA</td>
<td>Economic Impacts</td>
<td>• Case Study, Econometric Models</td>
<td>Business permits, Sales and gas tax data</td>
<td>Pettit (2007)</td>
</tr>
<tr>
<td>519-1,848</td>
<td>OK</td>
<td>Economic Impacts</td>
<td>• Econometric models, 3 Case-controls, Sales Tax Database</td>
<td>Sales Taxes by city, US Census, Ad velorem taxes</td>
<td>Rogers &amp; Marshment (2001)</td>
</tr>
<tr>
<td>0-50,000</td>
<td>CA</td>
<td>Small Town Economic Impacts</td>
<td>• Theoretical Overview, Case Studies, Highway Bypass, Econometric Model (HBI)</td>
<td>Local data collection: Windshield surveys, Pictures, Interviews with key informants and local residents, Taxable sales data</td>
<td>System Metrics Group (2006)</td>
</tr>
<tr>
<td>Community ranges:</td>
<td>KY</td>
<td>1,273 to 7,419</td>
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<tr>
<td>County ranges:</td>
<td></td>
<td>10,361 to 24,416</td>
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<tr>
<td>Bypassed small communities</td>
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<td>Effect on aggregate economic growth</td>
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<tr>
<td>Allocation of business activity</td>
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<td>Community attitudes</td>
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<tr>
<td>Literature review</td>
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<tr>
<td>Mahanalovitz matrix used to match 21 bypassed counties with similar control counties</td>
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<tr>
<td>Total employment</td>
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<tr>
<td>Average growth rate for population, employment in key industries, and retail sales</td>
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<tr>
<td>Regression of the change in relative employment and retail sales growth rates before/after</td>
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<td>Downtown vacancy rate</td>
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<td>Business mix</td>
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<tr>
<td>Share of business</td>
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<tr>
<td>Population, unemployment, poverty, labor force participation, education level</td>
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<tr>
<td>US Census</td>
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<tr>
<td>Telephone interviews with business owners, political leaders, and media representatives</td>
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<tr>
<td>Performed original data collection in field</td>
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</table>

<table>
<thead>
<tr>
<th>304-11,469</th>
<th>WI</th>
<th>Economic and Community Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADT</td>
<td></td>
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<tr>
<td>Population</td>
<td></td>
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<tr>
<td>Employment rates</td>
<td></td>
<td></td>
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<tr>
<td>Retail trade</td>
<td></td>
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<tr>
<td>Focus Groups</td>
<td></td>
<td></td>
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<tr>
<td>Case studies</td>
<td></td>
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<tr>
<td>Surveys</td>
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<tr>
<td>WisDot</td>
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<td></td>
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<tr>
<td>WI Demographic Services Center; WI Dept. Workforce Development; US Census Bureau</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Thompson, Miller & Roenker (2001)
B. TYPICALLY ENCOUNTERED BELIEFS AND CONCERNS

Anecdotal and case study observations have yielded several preconceptions about the before and after effects of bypasses. The literature included multiple studies that tested these preconceived notions relative to the impacts of bypasses. Some of these preconceptions were supported in the literature. Others were found to be false. In many cases, the results are mixed. The most common preconceptions encountered during the literature review and key findings are synthesized below:

- **Congestion:**
  
  Preconception: Bypasses reduce traffic congestion on the original route through the CBD;
  
  Finding: In all cases, peak hour traffic through the CBD was reduced. The difference in travel time between the old facility and the bypass will determine how many vehicles will divert to the bypass (System Metrics Group, Inc. 2006).

- **Freight Movement:**
  
  Preconception: Bypasses improve the speed and reliability of freight movement;
  
  Finding: Because the bypass circumvented traffic congestion and traffic control devices, trucks tended to choose the bypass instead of the original route. Thus, travel time and reliability of freight movement improved. The removal of trucks from the CBD tended to improve quality of life in the CBD by reducing noise and allowing the road to be redesigned in a more aesthetic fashion (Handy et al 2000).

- **Economic development:**
  
  Preconception: Bypasses provide an opportunity for economic development and increased tax base;
  
  Finding: The actual impact of bypasses on the economy of small communities is mixed, although “...from a local officials point of view the combination of enhanced mobility...and newly accessible land provides an opportunity for growth” (Mills 2009). The economies of smaller communities (<2000 population) are more likely to be adversely impacted by a bypass (Leong 2000).

- **Sprawl:**
  
  Preconception: The new bypass roadway will encourage urban sprawl and adversely impact community character;
  
  Finding: Some bypasses induced urban sprawl, while others seemed to have no impact. The likelihood of sprawl depended on the region’s growth rate, the functional class of the roadway, the comprehensive plans in place before the bypass was constructed, and the scale of development permitted near the bypass (ODOT 2002). Faster growing areas experienced some development pressure along the bypass (Weisbrod 2001).

- **Population loss:**
  
  Preconception: The bypass route will draw away population from the bypassed CBD;
Finding: Bypassed cities did not experience universal population loss. The smallest communities (less than 500) were the most prone to population loss. Larger communities were the least likely to lose population, and some even showed moderate gains (Pettit 2007). In areas with no or slow population growth, little residential development chose to build next to the bypass.

- **Business activity:**

  Preconception: There will be a decline in sales and loss of business activity along the bypassed route, particularly among highway-oriented businesses (gasoline, fast food, etc);

  Finding: Travel-related businesses tend to relocate to the bypass. Further, total sales for the sector often increased (Srinivasan 2002). Downtown business districts in communities with a well-developed local customer base are less adversely impacted by a state route bypass than communities highly dependent on drive-by traffic (Gillis 1994). Perceptions of bypass impacts on business activity varied by industry. Babcock (2004) found that convenience stores and the motel industry perceived bypasses as negative to their business; whereas truck, auto and restaurant establishments perceived bypasses as positive.

- **Business relocation:**

  Preconception: Businesses will relocate out of the CBD to the bypass route, incurring relocation costs and reducing local tax base;

  Finding: Regional retail (big box) and travel-related businesses usually relocated to the bypass route (Weisbrod 2001). Service industries were the least affected by the presence of a bypass, and tended to stay in the CBD (Srinivasan 2002). CBDs with a strong identity as a destination for local shoppers were strengthened due to a reduction in traffic delays, and exhibited little retail flight (Leong 2000).

- **Property values:**

  Preconception: Property values and occupancy rates of property along the bypassed route will decline;

  Finding: No clear consensus was reached during the knowledge search. The overall tax base increased in virtually every circumstance, but the reasons for the increase differed. In some cases the property values in the CBD rose, while in others the CBD stagnated but the loss was offset by increased value adjacent to the bypass (Otto 1995).

- **Community support:**

  Preconception: Residents of the CBD will oppose a bypass due to concerns relating to economic and quality-of-life factors.

  Finding: Although pre-construction opposition was not uncommon, community opinions on bypasses tended to be more supportive after construction of the facility. As noted by Pettit (2007) in a recent study of Iowa bypasses: “Overall the communities do not blame the bypass for much of anything and instead praise them for having removed traffic, congestion, and pollution from their towns.”

### IV. LAND USE IMPLICATIONS OF BYPASS CONSTRUCTION
A transportation project such as a bypass may impact land use in terms of direct and indirect impacts. Direct or primary impacts include the actual conversion of productive land to transportation use, the removal of existing uses to accommodate the facility, and any immediate changes to the overall character of the affected area due to construction. Indirect impacts, also known as secondary impacts, tend to occur over a long period and may involve changes in the overall development and growth patterns of an area. Indirect impacts from transportation improvements can also be cumulative. It is clear that attention to detail on the part of the state DOT can help mitigate several of the known impacts. For this reason, qualitative evaluations of bypass impacts on land use are warranted along with traditional qualitative measurements (Handy 2000a).

While the various approaches to studying the impacts of bypass construction discussed above focused on the economic impacts, some literature and guidance also addresses how to assess the indirect land use effects of transportation projects or investments. Most of these approaches address secondary and cumulative effects of transportation projects as required by NEPA and outlined in detail in FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process, April 1992.

Many states have developed specific guidance to meet this requirement based on NCHRP Report 423A: Land Use Impacts of Transportation, A Guidebook (Parsons Brinckerhoff Quade & Douglas, Inc. 1998) and/or NCHRP Report 466: Desktop Reference for Estimating the Indirect Effects of Proposed Transportation Projects (The Louis Berger Group, Inc. for NCHRP 2002). For example, Maryland developed guidance entitled, Secondary and Cumulative Effects Analysis Guidelines for Environmental Impact Statements and Environmental Assessments (Maryland State Highway Administration 2000), Washington developed Land Use in Environmental Documents – Indirect and Cumulative Effects Analysis for Project-Induced Land Development, Technical Reference Guidance Document (Wisconsin Department of Transportation 1996), and California developed Guidance for Preparers of Growth-related, Indirect Impact Analyses (Caltrans 2006) The guidebook developed by Oregon is discussed below.

- A Guidebook for Evaluating the Indirect Land Use and Growth Impacts of Highway Improvements (ECONorthwest and Portland State University for the Oregon Department of Transportation 2001)

The Guidebook is intended to assist planners and environmental specialists at the Oregon Department of Transportation (ODOT) “in describing and estimating the potential indirect impacts of highway improvement on land use.” (ECONorthwest 1) It establishes sound reasoning for why such an assessment is necessary and suggests a 9-step process as illustrated in Figure 1. As the project advances through project development phases, a set of “basic demand drivers” (i.e. population and employment forecasts) are identified using planning processes. Using this land use and transportation data paired with policies in current comprehensive plans, the project goes through an alternatives analysis cycle. The alternative analyses can include a no-build scenario. Using information collected during the alternatives analysis, the governments responsible can implement a set of changes to mitigate (or take advantage of) the indirect land use impacts.
Oregon, like Florida, has comprehensive planning requirements to ensure consistency between local government land use plans and transportation plans. This Guidebook accounts for this planning process making it a useful reference for developing similar guidance for Florida. Although the document provides detailed guidance to assess the indirect land use impacts of transportation projects, users are cautioned that indirect land use impacts are, in fact, a subset of land use impacts which is just one of many factors that must be analyzed to meet NEPA, CEQ, and Oregon DOT requirements (ECONorthwest 12).

- *Forecasting Indirect Land Use Effects of Transportation Projects,* (Avin 2007)

The authors reviewed guidance documents regarding secondary and cumulative impacts from several states and recommend “a framework for conducting indirect land use effects analyses.” (Avin 26) The framework may be applicable to evaluating the indirect land use effects of bypasses. The researchers evaluated the guidance documents in terms of numerous criteria deemed common to all of the guidebooks criteria including, among other things, the “level of prescreening and right-sizing guidance (how to determine the level of detail needed for the analysis and the proper tools to use)” and “land use forecasting methods and tools.” (Avin 14) They followed up by interviewing practitioners on many of the same criteria. Findings were used to identify the gaps in current guidebooks that should be covered in their recommendation.
Avin recognizes that no single methodology will apply in all situations, so the approach recommended allows for case by case adjustments. First, the researchers describe “six approaches or tools for forecasting land use change in response to transportation improvements.” (Avin 26) The first three, planning judgment, collaborative judgment, and elasticities are identified as “foundational,” while the remaining three, allocation models, four step models, and integrated transportation-land use models, are identified as “discretionary.” (Avin 27). An overall framework for indirect land use forecasting is then detailed as illustrated in Figure 2. “The approach ... is organized around three primary decision points, (A – C on the Figure), corresponding to three sequential steps in any analysis – the overall extent of induced travel, the overall extent of indirect land use change that accounts for a portion of this travel, and the location of this land use change.” (Avin 29) These refer to the three steps that are outlined in detail:

1. Prescreening – initial assessment of how significant the amount of induced travel the transportation improvement is likely to generate” (Avin 29);
2. Forecasting Indirect Land Use Change – the extent of the land use change (choose the approach to be used) (Avin 31); and
3. Allocating Growth – determining what types of land use might go where (Avin 33).

The remainder of the report discusses the use of the six land use forecasting tools in detail. For the size of communities that are proposed for bypasses in Florida, the foundational approaches would be the most appropriate. In cases where the community is in close proximity of an urban area, use of discretionary approaches becomes more important.
FIGURE 2. Relationship of various approaches to the forecasting process for indirect land use effects
In this study, Cervero proposes and tests a path model of induced travel. Freeway expansion projects constructed between 1980 and 1994 were studied, along with building records from the 2000 US Census. Variables considered in the study included lane miles of road, new building permits, and vehicle miles of travel (VMT). The study established 4-mile buffer zones around the project sites then used census date to gauge the magnitude of change/growth in municipal land.

Cervero concluded, “The path model presented in this article attempts to sort through the ways in which road improvements affect travel demand and vice-versa. As with past research, evidence of induced travel, induced growth, and induced investment was uncovered. Roads and the prominent fixtures of America’s landscape they serve—such as big box retail, edge cities, and corporate campuses—are clearly co-dependent. While the magnitude of induced-growth effects found in this study is generally consistent with that of previous research, the magnitude of induced-travel effects is less.” (Cervero, 2003:159).

Cervero also noted gaps and difficulty in this line of research, “How induced demand varies between urban and suburban settings, by type of facility (e.g., radial highway versus beltway), size of metropolitan area, or level of traffic congestion. All that can be said with certainty is that induced-demand effects exist (i.e., elasticity exceeds zero) and they generally accumulate with time. Being able to draw generalizations much beyond this will require far more research, conducted in different settings and at different resolutions of analysis. Because of data limitations, this will be no easy feat” (Cervero, 2003:160).

V. STATE-LEVEL BYPASS POLICIES

Nationwide, some states have policies directly relating to bypasses in state statutes of other policy documents (Appendix D). The content of these policies vary with a few simply authorizing the state transportation agency to construct bypasses while others require a public hearing and/or community consent. Some recognize the importance of signage to bypassed areas and establish specific signage criteria.

The State of Vermont authorizes but limits bypass construction to the “Primary Network” in conformance with “highway performance goals” (Vermont 4:8). Chapter 4:8 of the Vermont Highway System Policy Plan states the following:

“Bypasses should be considered only on the Primary Network. They should be considered primarily in cases where the investment is needed to reach one of VTrans highway performance goals (Safety or Mobility). Bypasses may be appropriate in a small number of circumstances where there is a high percentage of through trips and the bypass would provide significant relief from traffic congestion without generating undue environmental impacts. Bypasses should be considered in cases where there are marked adverse effects on historic villages due to heavy truck traffic. They should be implemented only when strict access management controls can be implemented to support concentrated development patterns and maintain downtown vitality. Local agencies should be encouraged to implement supportive land use controls in conjunction with bypass projects.” (emphasis added)
Montana, New Mexico, and South Dakota require community consent prior to construction of a bypass by the state. The State of Montana requires that the state obtain the consent of a local government prior to construction of a bypass if the bypass is not part of the interstate system or if it will "divert motor vehicles from an existing highway route through a municipality incorporated prior to January 1, 1965."\(^\text{10}\) The local government has 60 days from the notification date to inform the state of its acceptance or refusal of the proposed bypass. In Texas, community consent is required where the community population exceeds 2,500.

Both Texas and Utah require the state transportation agency to conduct a public hearing in the community that will be bypassed. The results of the hearing and any decisions made are then reported to the community. The policy contains no criteria to guide the decision whether or not to construct a bypass. Virginia authorizes the construction of bypasses. The statute also requires that communities participate in the construction and maintenance costs of any portion of a bypass constructed within a community’s jurisdiction. This requirement is applicable to communities with a population over 3,500.

Much of the bypass literature discussed the importance of signage to the community or portion of a community that is bypassed. California, Colorado, Idaho, and Wyoming address signage on the bypass. California directs the transportation department to “erect and maintain appropriate directions signs” (California 90-100.9). In both Colorado and Wyoming, the statutes stipulate that the original road maintain the state highway designation and the new route be given a bypass designation. Communities not farther than five miles from the bypass facility may be granted a billboard on Idaho highways to direct traffic to bypassed communities.

The State of Oregon has a complete Bypass Policy adopted as an amendment to the 1999 Oregon Highway Plan in 2003 (http://www.oregon.gov/ODOT/TP/TP/orhwyplan.shtml#Bypasses_). The policy establishes objectives, classification, and policy options for both existing and new bypasses. Rather than establishing a hard and fast policy, the overall policy provides guidance that is to be tailored to the situation at hand.

These state level bypass policies illustrate the possibilities of a state level bypass policy for Florida. Such a policy could be limited to the Strategic Intermodal System or be broad enough to address the entire State Highway System. Such a policy should address access control and land use considerations, which are essential to maintain mobility and reduce sprawl, as well as signage, which is essential to supporting bypassed business districts.

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VI. OBSERVATIONS AND SUGGESTIONS

Numerous bypasses have been constructed in the US and abroad since the early 1950s. In some cases, research was conducted to identify and quantify the impacts of these facilities – primarily from an economic perspective. Since the late 1990’s, there has been a growing body of work on the indirect land use impacts of highway projects. Much of this work was oriented toward providing guidance to transportation professionals on assessing secondary and cumulative impacts per NEPA requirements.

Major highways can affect the rate of growth and the development patterns of an area. Some types of development may be directly induced by the project. However, most land use impacts are not direct consequences of the projects, but rather occur indirectly due to changes in travel time and increased land accessibility. The result may be shifts in the spatial distribution of development over time, including such common changes as the introduction of new activity centers along a widened arterial highway or localized commercial development around a new highway interchange.

Regional growth patterns depend on a range of factors, including the availability of water and sewer service, access to an educated workforce, the health of the regional and local economy and the quality of transportation infrastructure. Regardless of the actual influence of transportation infrastructure on growth, it is clear that land use and transportation are interdependent. The rate and pattern of development in urban areas is a key factor in predicting the need for additional roadway capacity. At the same time, the availability and efficiency of transportation systems is a major factor in development decisions. Although it is not possible to determine precisely how a transportation project will affect growth patterns, the assessment effort will uncover information that could be of significant value to transportation, economic development, and growth management plans and policies.

This study uncovered numerous sources of information on evaluating bypasses, ranging from economic factors to indirect land use impacts. The methodologies varied from highly quantitative to qualitative, and limitations or gaps appear to be related more to data and resource availability than to technical deficiencies. In addition, extensive guidance is available on impact assessment methodologies that could be adapted for use by FDOT staff. Although the literature is well developed in this area, it is not clear from this initial review to what extent these practices are being applied in Florida.

Given limited time and resources, any approach to bypass impact assessment should be both practical and cost effective. In addition, different approaches to bypass impact assessment may be needed at different points in the planning and project development process. Below are some initial suggestions for accomplishing a more comprehensive, yet practical approach to bypass impact assessment.

A. METHODOLOGY AND POLICY CONSIDERATIONS

1. Overall, the samples, methodologies, and data sources reveal study designs that can be generalized and adapted for the current investigation. However, findings varied according to context, and were in some cases contradictory. Studies also used varying data sets and variables and often focused only on those issues of importance to key stakeholders. As noted by Handy (25), “While the seemingly contradictory findings among these studies are sometimes explained by differences in methodologies, they also point to actual variations in impacts that depend on both time and place. Perhaps more than anything else, these studies highlight the complexity of the relationships between highway investments and local economies and the challenges
researchers face in attempting to isolate the effects of highway investments.” Therefore, findings from past studies are not necessarily generalizable to the Florida context or even from community to community. Additional considerations in developing a methodology for use in Florida in evaluating the impacts of bypasses on small and medium sized communities include:

a. Assessments of bypass alternatives should include development and testing of future land use scenarios. Although it is not possible to determine precisely how a transportation project will affect growth patterns, the assessment effort will uncover information that could be of significant value to the decision-making process.

b. Impact assessments of highway bypasses can be data intensive and costly. Guidance on how these assessments may be accomplished should be practical and strategic, given limited agency time and resources.

c. Both qualitative and quantitative methods should be employed.

2. Potential impacts of bypasses are currently examined by FDOT through the ETDM process. This process examines impacts on land use, community cohesion, aesthetics, mobility, livability, civil rights, and the economy. Observations on this process include:

a. Guidance is provided in various Department handbooks and manuals relative to assessment of secondary and cumulative effects of highway projects. It is not clear to what extent this existing guidance is currently followed. A comparative review of plans and studies prepared for Florida bypasses would provide insight as to the depth and quality of the assessments and suggest additional enhancements. It would also clarify to what extent such facilities have been determined to be categorical exclusions from the NEPA process and therefore exempt from sociocultural effects evaluation requirements. State specific step-by-step guidance would likely be beneficial for topics such as evaluation of indirect land use effects of bypasses. Such guidance has been prepared in Oregon, Wisconsin, California, Maryland and North Carolina.

3. Florida may benefit from new state policies or modification of existing policies influencing the consideration and construction of bypass roadways. Some specific policy considerations include:

a. Bypass construction is often proposed by FDOT to return state highway operation to established LOS standards. These standards call for no less than LOS C on SIS highways in rural and small urban areas. The result is that even short periods of peak hour congestion may trigger an LOS deficiency in these areas, calling for major transportation improvements or a potential bypass. A more flexible approach to LOS in small communities should be considered.

b. In areas where a bypass would pose unacceptable community and environmental impacts, Department policy could require small- and medium-sized communities to coordinate in establishing a corridor management plan. These plans could address local network expansion, truck rerouting plans, transportation demand management strategies, and alternatives to transportation concurrency (i.e. transportation concurrency exception area (TCEA), transportation concurrency management area (TCMA), multi-modal transportation district (MMTD), or long-term concurrency management system). Such alternatives should be accompanied by strategies to support and fund mobility and be supported by intergovernmental agreements between the Department and impacted communities.

c. In some cases, travel demand on highways that traverse small- and medium-sized communities could be alleviated by improvements on parallel facilities that are not part of the SIS or the SHS. A policy change should be considered to allow SIS funding to be spent off-SIS on facilities/projects that would relieve demand on SIS facilities.
d. Florida has no specific policy in place guiding the construction of bypass routes. Rather, bypasses are driven by state-mandated level of service standards, particularly in rural areas. Consideration should be given to drafting a bypass policy for the state.

e. Once a bypass alternative is chosen, FDOT and local governments with jurisdiction over land in the vicinity of the planned bypass should enter into various agreements. These agreements could include plans and strategies to address land use and transportation considerations along the bypass corridor, such as interchange management plans, access management plans, and master plans and/or overlay zones for the bypass corridor.
BYPASS IMPACTS BIBLIOGRAPHY


California Streets and Highways Code. §90-100.9 (2009).


Colorado Revised Statutes § 43-2-146 (2010).


Delaware Code §17- 5.4.3 (2010).


Handy, S. L., J. Jarrett, and S. Vanka. “Planning for the Impacts of Highway Relief Routes on Small- and Medium-Size Communities: Literature Review and Identification of Issues.” Research Project 0-1843-1. Conducted for the Texas Department of Transportation in co-operation with the U.S. Department of Transportation by the Center for Transportation Research, University of Texas at Austin, Austin, Texas, 2000a.

Handy, S. L., J. Jarrett, and S. Vanka. “Planning for the Impacts of Highway Relief Routes on Small- and Medium-Size Communities.” Research Project 0-1843-3. Conducted for the Texas Department of Transportation in co-operation with the U.S. Department of Transportation by the Center for Transportation Research, University of Texas at Austin, Austin, Texas, 2000b.
Handy, S. L., S. Kubly, D. Larsen, J. Sralla, S. Vanka, and M. Oden. “Planning for the Impacts of Highway Relief Routes on Small- and Medium-Size Communities: Case Studies.” Research Project 0-1843-3. Conducted for the Texas Department of Transportation in co-operation with the U.S. Department of Transportation by the Center for Transportation Research, University of Texas at Austin, Austin, Texas, 2000.


Idaho Statutes § 40-102.4d (2010).

Kockelman, K.M., S. Srinivasan, and S.L. Handy. “Planning for the Impacts of Highway Relief Routes on Small- and Medium-Size Communities: An Econometric Analysis.” Research Project 0-1843-2. Conducted for the Texas Department of Transportation in co-operation with the U.S. Department of Transportation by the Center for Transportation Research, University of Texas at Austin, Austin, Texas, 2000.


New Mexico Statutes §67-3-60 (2010).


Revised Code of Washington §47.17.001 (D) III (1993).


Utah Code §72-3-110 (2010).


Wyoming Statutes § 24-1-129 (2010).

Wyoming Statutes § 24-7-101 (2010).

# APPENDICES

## APPENDIX A: SIS HIGHWAY CORRIDORS – FLORIDA INTRASTATE HIGHWAY SYSTEM (FIHS) FACILITIES CRITERIA*

*(MUST MEET VEHICLE VOLUME OR TRUCK PERCENTAGE ON AT LEAST 75% OF SEGMENT LENGTH)*

<table>
<thead>
<tr>
<th>CRITERION</th>
<th>DESCRIPTION</th>
<th>THRESHOLD</th>
<th>RATIONALE</th>
<th>SOURCE</th>
<th>YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIHS facility</td>
<td>Designated FIHS facility</td>
<td>Yes</td>
<td>Meets statutory criteria for high-volume, high-speed interregional limited access or controlled access facilities</td>
<td>FDOT Systems Planning Office</td>
<td>2007</td>
</tr>
<tr>
<td>Vehicle volume</td>
<td>Average annual daily traffic (AADT)</td>
<td>≥ 9,000 AADT</td>
<td>Approximately equal to the average AADT on Federal-aid highways nationwide</td>
<td>FDOT Roadway Characteristics Inventory (RCI)</td>
<td>2000</td>
</tr>
<tr>
<td>Truck percentage of traffic</td>
<td>Percent trucks</td>
<td>&gt; 20% trucks</td>
<td>Represents the generally accepted definition of a truck corridor</td>
<td>FDOT Roadway Characteristics Inventory (RCI)</td>
<td>2000</td>
</tr>
<tr>
<td>Connectivity on segments between SIS corridors</td>
<td>Percentage of segment length required to meet SIS criteria for full segment to be designated</td>
<td>75%</td>
<td>Ensures that highway segments that do not fully meet criteria are included only when they connect to other SIS highways and where a supermajority of the segment’s length meets the criteria</td>
<td>FDOT Roadway Characteristics Inventory (RCI)</td>
<td>2000</td>
</tr>
<tr>
<td>NHS facility</td>
<td>Designated NHS facility</td>
<td>Yes</td>
<td>Ensures connectivity with comparable NHS roadways in neighboring states</td>
<td>Federal Highway Administration – Office of Planning</td>
<td>2007</td>
</tr>
<tr>
<td>Connection to Georgia or Alabama</td>
<td>Interstate connection to major markets not already secured by SIS facilities</td>
<td>Yes</td>
<td>Ensures connections to major markets in Alabama and Georgia</td>
<td>Federal Highway Administration – Office of Planning</td>
<td>2007</td>
</tr>
</tbody>
</table>

**Source:** The Florida Department of Transportation. “Florida’s Strategic Intermodal System Strategic Plan.” 20 July 2008: 26-27. Print.

* “To be designated as a SIS highway corridor, a roadway must meet minimum size criteria and community and environment screening criteria. The community and environment screening criteria, which are the same for all types of SIS facilities, are documented on pages B-36 through B-38. The minimum size thresholds for highway corridors are summarized in the table below” (FDOT, 2008, p.26).
## APPENDIX B: COMMUNITY AND ENVIRONMENT SCREENING CRITERIA*

<table>
<thead>
<tr>
<th>MEASURE</th>
<th>DESCRIPTION</th>
<th>SOURCE</th>
<th>YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Livability – Character and Function</td>
<td>Corridors and connectors should be designated, designed, and constructed in such a way as to avoid or minimize negative impacts and preserve the function and character of local communities, using processes such as the Efficient Transportation Decision-Making process as a tool beginning in early planning phases of a project. SIS corridors serving high volumes of freight traffic should consist of facility types designed to accommodate freight movements, and should not pass through residential and commercial areas with high levels of pedestrian activity or other activities sensitive to the noise, vibration, emissions, and safety impacts associated with freight movement. Except where supported by local community plans or necessary for connections to transit hubs, through passenger trips should be accommodated by major arterials and limited access facilities, and should be discouraged from using streets primarily intended to serve local vehicular, bicycle and pedestrian traffic. Where the SIS designation process identifies an existing transportation connector between two SIS facilities that does not conform to this criterion, the process shall identify the nonconformity as a gap in the SIS to be filled by a connector conforming to the criteria.</td>
<td>FDOT District Work Programs; FDOT – RCI; Department of Revenue property classifications; Local comprehensive plans and local land use plans</td>
<td>2000 2000 2002 Latest available</td>
</tr>
<tr>
<td>Community Livability – Land Use</td>
<td>The SIS and local comprehensive plans should be mutually compatible and supportive. SIS hubs should be located in areas where intense economic activities exist or are planned in local comprehensive plans, and in amendments and updates to comprehensive plans. Access to SIS facilities should be provided only where existing and planned land uses support the facility’s purpose.</td>
<td>FDOT District Work Programs; FDOT – RCI; Department of Revenue property classifications; Local comprehensive plans and local land use plans</td>
<td>2000 2000 2002 Latest available</td>
</tr>
<tr>
<td>Environmental Quality – Air Quality</td>
<td>In air quality non-attainment and maintenance areas, greater weight will be given to connectors that link the SIS to public transit facilities and services and nonhighway freight facilities. During the selection process, greater weight will be given to transportation facilities and services that utilize Intelligent Transportation Systems technology (related to incident management, traveler information, electronic toll collection, commercial vehicle logistics and security) to reduce vehicle idling times, increase vehicle throughput and increase travel speeds to allow for more efficient energy use and lower emissions.</td>
<td>FDOT District Work Programs; FDOT-RCI</td>
<td>2000 2000</td>
</tr>
<tr>
<td>Environmental Quality – Natural Resource Lands, Cultural and Historical Sites, Agricultural Areas</td>
<td>Transportation facilities that do not negatively impact important natural resource lands, cultural and historic sites, and agricultural areas will be given a higher rating than those that do. Negative environmental impacts include: habitat fragmentation; increasing the difficulty of using vital habitat management techniques such as prescribed fire; reduction in water quality or quantity; reduction in air quality; increase in noise and vibration; or decreasing aesthetic value. Lands to be protected include: (a) Important natural resource lands, such as: National Wildlife Refuges, Preserves, Parks and Seashores; State Parks, Preserves, Reserves, Forests and Recreation Areas; County and Local Parks, Preserves, Reserves, Forests and Recreation Areas; Wildlife Management Areas, Aquatic Preserves, Marine Protected Areas, and other Conservation Areas listed by the Florida Fish and Wildlife Conservation Commission; Strategic Habitat Conservation Areas and Biodiversity Hotspots, as defined by the Florida Fish and Wildlife Conservation Commission; Florida Ecological Network lands as identified by the University of Florida; Conservation Needs Assessment areas, as defined by Florida Natural Areas Inventory; and Aquifer recharge zones, (b) Historic sites and gardens, cultural sites, and archaeological resources as identified by the appropriate state agency(ies), and Native American Traditional Cultural Properties and sites containing human remains of Native Americans. (c) Agricultural protection agreement areas, conservation easements, and rural protection easements as recorded by the Florida Department of Agriculture and Consumer Services.</td>
<td>FL Fish and Wildlife’s Strategic Habitat Conservation Areas, elements of Department of Environmental Protection’s Greenways, the FNAI Conservation Needs Assessment areas, University of FL research, and areas on such conservation lists; FL Department of Environmental Protection; FL Department of State; FL Department of Agriculture and Consumer Services</td>
<td>2000 2002</td>
</tr>
</tbody>
</table>

*The community and environment screening criteria are intended to influence choices where possible and manage impacts where there are no choices, ensuring that the SIS rests lightly on the natural and built environment. The criteria apply to the initial selection of connectors and alternative facilities within corridors, to the operation of SIS facilities and services and to future improvements and additions to the SIS* (FDOT, 2008, p.36).
### APPENDIX C: STATE BYPASS POLICIES

<table>
<thead>
<tr>
<th>STATE</th>
<th>POLICY</th>
</tr>
</thead>
</table>
| **CALIFORNIA CODE**<br>STREETS AND HIGHWAYS CODE § 90-100.9           | "When any state highway is relocated in such a manner as to bypass a city or business district, the department shall erect and maintain appropriate directional signs, at the junction of the bypass and the road leading into such city or business district, and at a reasonable distance in advance of such junction, for the guidance of traffic desiring to enter the city or business district. Upon relinquishment of the bypassed highway to the county or city concerned, the signs, other than those designating the state or federal route number of such highway, previously erected on such highway shall be left in place by the department and thereafter shall be maintained by such county or city. When relinquishing any such bypassed highway, the department shall direct the attention of the county or city concerned to the provisions of this section regarding continued maintenance of such signs by the county or city."
| **COLORADO REVISED STATUTES**<br>§ 43-2-146                            | "(1) It is the public policy of the state of Colorado that where the transportation commission has authorized a highway bypass to be built around any incorporated city or town or unincorporated business community of the state of Colorado, the original state highway or state and federal highway markings shall remain on the existing highway through such incorporated city, town, or unincorporated business community and the existing highway shall be maintained, and the new bypass highway shall carry the designation "bypass" or other similar markings.\n
"(2) In all cases where such relocation has been authorized as a part of the national system of interstate and defense highways, the original state highway may be retained as part of the state system or a new and more direct approach road may be constructed to maintain service to such incorporated city, town, or unincorporated business community. In the event a new and more direct approach road is constructed, such approach road shall be placed on the state highway system and the original state highway may be deleted from the state system as provided in section 43-2-106. The markings of the relocated system of highways shall be accomplished in accordance with the practice established under section 42-4-104, C.R.S."
| **IDAHO STATUTES**<br>TITLE 40<br>HIGHWAYS AND BRIDGES               | "(d) An official or public structure erected near a city or county, and within its territorial or zoning jurisdiction, which contains the name of the city or county, provided the same is maintained wholly at public expense. Where a city has been bypassed, but remains within five (5) miles of an interstate highway or primary freeway, the Idaho transportation board, in its discretion, may grant the city the right to erect and maintain a billboard displaying the name of the city at a location not to exceed one (1) mile from an interchange primarily serving that city. Billboards erected must be at locations consistent with department regulations and safety standards."
| **MISSISSIPPI CODE OF 1972**<br>§ 65-4-5                              | "(c) ‘High economic benefit project’ means:

"(v) Any project which would benefit from the construction of any highway bypass which would aid in economic development and would provide an alternate route to avoid an existing route which underpasses a railroad and which would aid in existing or proposed industry;"
| **MONTANA CODE**<br>§ 60-2-211                                        | "(1) The department may not construct highway bypasses or highway relocation projects without prior consent of the governing body of an incorporated municipality when the bypasses or projects:

"(a) are not part of the national system of interstate highways built under the National Defense Highway Act; and

"(b) divert motor vehicles from an existing highway route through a municipality incorporated prior to January 1, 1965.

"(2) The department shall notify the governing body of the municipality by certified mail that it proposes to bypass the municipality. A contract may not be let or work commenced until the governing body notifies the department of its consent or until the lapse of 60 days after the notice has been sent by the department to the municipality, whichever first occurs. The failure of the municipality to act and notify the department of its action within the 60-day period is implied consent to the bypass.

"(3) Actual consent or refusal to bypass shall be in the form of a resolution duly adopted by a majority of the members of the governing body of the municipality.

"(4) The governing body may not withdraw consent once the department has been notified of the consent."
<table>
<thead>
<tr>
<th>Code</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEW MEXICO STATUTES</td>
<td>“The purpose of Sections 67-3-60 and 67-3-61 NMSA 1978 is to foster and insure the correlation of state highway construction programs closely affecting smaller municipalities and unincorporated communities with the future economic growth, livelihood, development, safety and general welfare of the communities by limiting the use of public funds for the construction of highway bypasses or relocation projects diverting traffic and commerce from existing state highway routes through the communities in accordance with the provisions of all existing agreements between a municipality or county and the state transportation commission relating to obtaining the consent of the municipality or county pursuant to the provisions of Section 67-3-61 NMSA 1978.”</td>
</tr>
<tr>
<td>SOUTH DAKOTA CODIFIED LAWS</td>
<td>“No change may be made in the state trunk highway system, except that the transportation commission may make relocations, additions, and alterations in portions of the system it considers necessary for the purpose of bringing into and connecting the system with all presently unconnected first and second class municipalities having a population of more than one hundred fifty according to the last federal census and for shortening the system distances between the interconnected county seats and connected municipalities of four hundred fifty or more population. The commission may also make relocations, additions, and alterations which make continuous the route of any state trunk highway through any municipality of over twenty-five hundred population or to improve the highway grade, or to eliminate a railroad crossing or crossings, or to avoid heavy city street traffic, or to construct a bypass around or alternate route through a municipality, with the consent of the governing body of such municipality affected and with a limitation of a maximum of five miles in length on each addition.”</td>
</tr>
<tr>
<td>TEXAS TRANSPORTATION CODE</td>
<td>“(a) For a highway project that bypasses or goes through a county or municipality, including a home-rule municipality, the commission shall hold at least one public hearing in the locality before an authorized representative of the commission.</td>
</tr>
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<td>“(b) Notice of the hearing shall be by publication in the locality. The hearing shall be held not less than three or more than 10 days after the date of publication.</td>
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<td>“(c) At least seven days before the date of the public hearing, the department shall file with the governing body of the county or municipality the design and schematic layout of the project.</td>
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<td>“(d) A person interested in the development of the project is entitled to attend the hearing and discuss and inspect the design and schematic layout filed with the governing body.”</td>
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<tr>
<td>UTAH CODE</td>
<td>“(1) Whenever the department proposes to construct a highway bypassing any city or town, or to provide an alternate route through or outside any city or town, the commission shall notify the governing officials of the city or town and hold a public hearing, on a date set, for the purpose of advising the citizens of the city or town of the reason or reasons for the highway proposed to be constructed.</td>
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<td>“(2) The hearing shall be held within the city or town to be bypassed, except that if the highway proposed will bypass or provide an alternate route through or outside of several cities or towns located within close proximity to each other, the commission may combine the hearings and hold them in one city or town centrally and conveniently located to the others at which time each city and town shall be given ample opportunity to be heard.</td>
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<td>“(3) Subsequent to the hearing, the commission shall notify in writing the officials of the city or town, or of each of the cities or towns if the hearings are combined, of the decision reached as a result of the hearing within 10 days from the time the decision is reached.”</td>
</tr>
<tr>
<td>NORTH CAROLINA CODE</td>
<td>“(a) The Intrastate System is established to provide high-speed, safe travel service throughout the State. It connects major population centers both inside and outside the State and provides safe, convenient, through travel for motorists. It is designed to support statewide growth and development objectives and to connect to major highways of adjoining states. All segments of the routes in the Intrastate System shall have at least four travel lanes except those for which projected traffic volumes and environmental considerations dictate fewer lanes. When warranted, segments of the Intrastate System shall have vertical separation or interchanges at crossings, more than four travel lanes, or bypasses. Access to a route in the Intrastate System is determined by travel service and economic considerations.”</td>
</tr>
</tbody>
</table>
The Commonwealth Transportation Commissioner may acquire by gift, purchase, exchange, condemnation or otherwise, such lands or interest therein, necessary or proper for the purpose, and may construct and improve thereon such bypasses or extensions and connections of the primary system of state highways through or around cities and incorporated towns, as the Board may deem necessary for the uses of the State Highway System; provided, that the respective cities and the incorporated towns of 3,500 population, or more, by action of their governing bodies agree to participate in accordance with the provisions of § 33.1-44 in all costs of such construction and improvement, including the cost of rights-of-way, on that portion of any such bypass or extension which is located within any such city or incorporated town. The maintenance of that portion of a bypass or extension located within a city or incorporated town shall be borne by the city or town. However, the Board shall contribute to such maintenance in accordance with the provisions of law governing its contribution to the maintenance of streets, roads and bridges in such cities and incorporated towns. The location, form and character of informational, regulatory and warning signs, curb and pavement or other markings and traffic signals installed or placed by any public authority shall be subject to the approval of the Commissioner. At both ends of bypasses through or around cities and incorporated towns the Commissioner shall erect and maintain adequate directional signs of sufficient size and suitable design to indicate clearly the main route or routes leading directly into such cities and incorporated towns.

Notwithstanding the above, in any case where a municipality refuses to contribute to the construction of a bypass or an extension or connection of the primary system within said municipality the Commonwealth Transportation Commissioner may construct such bypass or extension and connection without any contribution by the municipality when the Board determines that such bypass or extension and connection is primarily rural in character and that the most desirable and economical location is within said municipality. Any bypass or extension and connection built under this provision shall be maintained by the Commissioner as a part of the primary system and the municipality shall receive no payment for such bypass or extension and connection under § 33.1-41.1.”

Bypasses should be considered only on the Primary Network. They should be considered primarily in cases where the investment is needed to reach one of VTrans highway performance goals (Safety or Mobility). Bypasses may be appropriate in a small number of circumstances where there is a high percentage of through trips and the bypass would provide significant relief from traffic congestion without generating undue environmental impacts. Bypasses should be considered in cases where there are marked adverse effects on historic villages due to heavy truck traffic. They should be implemented only when strict access management controls can be implemented to support concentrated development patterns and maintain downtown vitality. Local agencies should be encouraged to implement supportive land use controls in conjunction with bypass projects.”

Whenever the general route of any state highway shall be designated and laid out as running to or by way of certain designated points, without specifying the particular route to be followed to or by way of such points, the department shall determine the particular route to be followed by said state highway to or by way of said designated points, and shall be at liberty to select and adopt as a part of such state highway, the whole or any part of any existing public highway previously designated as a county road, primary road, or secondary road or now or hereafter classified as a county road. The department need not select and adopt the entire routes for such state highways at one time, but may select and adopt parts of such routes from time to time as it deems advisable. Where a state highway is designated as passing by way of a certain point, this shall not require the department to cause such state highway to pass through or touch such point but such designation is directional only and may be complied with by location in the general vicinity. The department is empowered to construct as a part of any state highway as designated and in addition to any portion meeting the limits of any incorporated city or town a bypass section either through or around any such incorporated city or town.”

It is declared to be the policy of the state of Wyoming that where the Wyoming department of transportation has by law authorized a bypass to be built around any incorporated city or town, or an unincorporated community of the state of Wyoming, regardless of the population of such city, town or unincorporated community, the officially designated state highway and federal highway markings shall remain on the existing highway through the incorporated city or town or unincorporated community and the existing highway shall be retained and the new bypass highway shall carry the designation "bypass" or other similar markings.”

“(a) It is hereby declared to be the public policy of the state of Wyoming that no state highway or state and federal highway now traversing or passing through any incorporated city or town of the state of Wyoming shall be so moved or relocated in such city or town as to divert the present route of the same in such city or town nor to bypass such city or town except with the express approval of the people thereof.”

- Objective – measure employment and business impacts of highway bypasses on a sample of small Kansas towns with bypasses. Specific variables examined included:
  1. total employment of bypassed towns
  2. retail sales of travel-related businesses
  3. employment of travel-related businesses
- Impacts on the town “as a whole” Methodology: Studied 9 Kansas towns (pop. range: 723-2,600) which had bypasses (7 US Highways) constructed near them in the 1990s.
  - Regression analysis for measuring impact on total employment of bypass towns:
    - The ES-202 Labor Market Information Service of the KS Dept. of HR for employment and payroll data grouped by zip codes
    - KS Dept. of Revenue state sales tax collection data for each town in Kansas since 1999
    - Decennial population data from U.S. Bureau of the Census
  - Interviews and surveys with business owners (n=54) by industry on perceptions of businesses regarding business activity and employment since the bypasses.
- Findings
  - No statistically significant effect on total employment of the bypass towns (Babcock & Davalos, 2004:60).
  - Perceptions of bypass impacts varied by industry. Convenience stores and motel industry perceived bypasses as a negative force on their business, whereas truck, auto and restaurants perceived bypasses as positive.
  - “The loss of transient auto traffic permanently reduces the demand for travel-related business located in a bypass town. Of course, an alternative adjustment for travel-related business is to relocate to the bypass. Very little of this occurred in the 1999-2001 period in the nine bypass towns. Only four travel-related firms opened for business on the bypasses during the period” (Babcock & Davalos, 2004:68).
- Gaps: “The limited literature on the impact of highway bypasses on small towns often relies on secondary data and indicates that bypasses either have a negligible effect or an inconclusive impact on affected communities.” (Babcock & Davalos, 2004:56).


- Objectives
  - The economic effects of a new highway bypass on a typical rural community
  - The time and cost savings for through traffic resulting from a typical rural bypass
  - A technique for predicting the economic impacts of a bypass
  - A technique for predicting small community through traffic from existing data on average daily traffic
  - Policy implications regarding the decision to build a bypass
• Methodology
  o Recommends pooled time series-cross section approach
    ▪ Provides relatively large sample size at affordable cost
    ▪ Allows for simultaneous controls on the year of data points and on the particular city or county
    ▪ Allows the possibility of simultaneous control of spatial and temporal auto-correlation, i.e. persistent but temporary influences across time or locations that were not directly measured.
  o Recommends careful statistical review or meta-analysis of case studies for optimum and accurate contextualization and predictive value
  o Review literature on economic impact assessment and methodologies (meta-analysis)
  o Use Taxable Sales Data Set: Standard Industrialization Classification code for large firms
  o Use Total Retail Sales by County for small firms
  o Travel-related retail data: service stations, restaurants and bars, motels/hotels
  o Use Regression Models: Fuller-Batese, Parks, and Da Silva

• Findings
  o “Effects of bypasses on county consumption sales are so small that they should not be viewed as important policy concerns” (Burress, 1996:44).
  o Long term effects on counties and towns: “Bypasses in Kansas typically have not had significant negative effects on the local economy” (Burress, 1996:Executive Summary 2).

• Gaps
  o Models predicting and managing effects of highways construction on individual firms could be developed to help address business concerns, assist owners in decisions relative to relocation of their businesses, and potentially help reduce private resistance to highway projects.
  o Create database on individual firms and their environment before and after they were affected by highway construction projects.
  o Consider state level research on the costs incurred by travel-related firms when adjusting to a bypass decision, such as types of items to count as adjustment costs, rules for measuring those costs and testing whether measurements based on those rules are sufficiently accurate to be used in routine policy decisions; also proposes alternative procedures for including adjustment cost measures in the bypass decision model (:108)
  o Need for more accurate information on the value of travel time and incorporating this into b/c analysis
  o Recommends a more comprehensive benefit/cost analysis for highway projects that includes potential impacts on growth and economic development.


• Objective – Document the land development impacts along bypass routes. This study was limited only to freeways, and focused on interchange development.
• Methodology: Case study and interviews
• Findings
New bypasses are “seldom devastating or a savior” for the central business district.

- Net economic impacts are negligible. Some businesses relocate to the bypass, while other more local establishments go into their old locations.
- Bypasses did not necessarily reduce downtown traffic. They did reduce through traffic, but often this “encourages more local traffic, which had previously avoided the downtown area due to heavy traffic. The result is often little or no change in total traffic levels, which is often associated with improved travel opportunities for local residents and access for downtown businesses.”
- “A new bypass route without supporting infrastructure seldom ignites a development explosion. In the absence of water and sewer services, local interchanges and local access roads, bypasses around small cities usually do not facilitate sprawled development in outlying areas. In the longer term, outer beltway bypasses can be expected to have profound effects on development patterns, but in smaller cities this impact could take 20 or more years.”
- “Regional planning controls can be important to prevent sprawl and overdevelopment of retail space, although in practice such controls require significant effort and are not always in place. In cases where a bypass goes through several jurisdictions, there is likely to be competition for tax-producing retail and other commercial businesses.”

- Downtowns with a regional shopping identity benefitted from less truck traffic.
- Downtowns have often been emptied of retail due to the emergence of exurban/suburban malls. Cities need to continue to invest in infrastructure to help them be competitive with “greenfield” areas for new development.

**Case examples:**
- Danville, VA (pop. 950,000). Concluded that the bypass opened up large tracts of land, which made possible some large office parks and technology manufacturing. If the bypass lengthens the route, little traffic is diverted.
- Ft. Wayne, IN (pop. 300,000). Very little new development occurred at the new interchanges. This is attributed to slow or no population growth.
- Appleton, WI (pop. 72,000). The bypass attracted some office development that may have otherwise gone into the CBD. Plans for industrial uses never came to fruition. Retail on the bypass tended to be “category killers” and big box stores. However, this sapped customers from a regional mall, as downtown had little retail before the bypass.


**Objectives**
- A comprehensive database from which to obtain socioeconomic data for impact assessments (Comer & Finchum, 2001:235)
- User-friendly interface that would allow ODOT personnel to trace alternative bypass routes directly on a computer screen and simultaneously produce output with socioeconomic and business data relevant to the traced route (Comer & Finchum, 2001:235)

**Methodologies**
- Sample: 6 bypass towns and 14 control towns (5 small, 5 medium & 4 large)
- Fieldwork in 12 small towns to tabulate the number of business in various categories (along main route and bypassed towns).
SIC/NAICS codes were not used because of the perceived inaccuracy of Census data for small towns, used a business classification system (traffic dependent, traffic related, and non-traffic related businesses). Communities under 2,500 are not differentiated in the Economic Census due to the possibility of identifying respondents.

Exploratory analysis created size categories:
- small <2500 people; medium 2500-7500 people; large towns > 7500 people

Findings
- Most small towns have declined to the point where only small local businesses remain: “Higher small town vacancy rates, along with a preponderance of lower order activities such as video stores, antique/boutique stores, and auto repair shops in downtown buildings that were clearly constructed for some other purpose, indicate that the economic bases of these towns are in steep decline and are serving primarily a local clientele. Few of the activities in the small towns except gas stations seem likely to catch the attention of passers-through.
- “Fieldwork indicates that older residents of these small towns keep the local economy alive, and those businesses cater to a largely local clientele.”


Objective – “Examine the association between new highway investments and land use change in three California counties. Our study areas provide a mix of urban, small town, and exurban highway projects in order to explore the different effects across project types and geographic contexts” (Funderburg 76).

Methodologies
- Design
  - Analyze counties separately, noting observations near the highway as treatment group
  - Examine changes in population growth before and after highway investment using quasi-experimental techniques for matched pairs
  - Analyze district corridors defining treated group at distances from new highways (0-0.50 mi and 0-3.00 mi)
- Sample -3 sets of highway projects in California during mid-1990s
  - Santa Clara County, CA: S.R. 87; S.R. 85; S.R. 237
  - Merced County, CA: HWY 99
  - Orange County, CA: San Joaquin Hills Corridor; Eastern Corridor; Foothills Corridor
- Data Sources
  - 1990 & 2000 employment variables from Census Transportation Planning Package (CTPP) from the Bureau of Transportation Statistics
  - Merced Co.: Point-location microdata aggregated to one square km grid cells; employment data from Dun & Bradstreet to show street address of each establishment in the county, the industry code for the principal product it produces, the number of workers it employs and the total sales of the year 1980, 1990, 2000. Residential inventory from Merced County Assessor—parcel number, year the structure was built and square footage of living space. (unit: one square km)

Findings
In Merced County (rural), there is a “large decline in employment very close to the new bypass relative to counterfactuals; the loss of 44 jobs is significant at 95% confidence. At distances greater than 0.75 mile from the new bypass, the effect on our population proxy is much smaller and insignificant” (Funderburg 87).

“In the case of Orange County, a typical census tract within a half mile of a new toll road added 4828 more jobs after the highway investment than comparable tracts located further away and the estimate is significantly different from zero with 95% confidence. The positive employment effect persists at quarter-mile increasing intervals through 0–1.25 miles from a new toll road, where we estimate with 90% confidence 2688 more jobs than the comparables. The damping of the size of employment difference from 0–0.50 mile to 0–1.25 mile distance bands suggests a highly localized positive effect on growth that can be attributed to the new highways. At 0–2.00 miles, the positive employment effect resumes, continues to be significant at 95% confidence levels until 0–3.00 miles, and peaks at 0–2.50 miles, with tracts near the toll roads having 2190 more jobs than those located further than 2.50 miles from a toll road” (Funderburg, Nixon, Boarnet & Ferguson, 2010:88).

“While improvements in surface transportation infrastructure can have large impacts on growth patterns, the nature of the effect depends on the context of the highway investment” (Funderburg, Nixon, Boarnet & Ferguson, 2010:76).

- **Gaps**
  - “We leave for possible future research the identification of companion effects in each of the two cases: (1) at which region(s)’ expense has exurban development projects in Orange County benefited? (2) which region(s) have gained at the expense of Livingston’s experience with Highway 99 improvements?” (Funderburg 96).
  - “Replication of these methods for other regions and other transportation investments could be facilitated by a national inventory of highway improvements and national measures of land development impact. To our knowledge, such a repository for data covering the National Highway System does not currently exist and so construction of such a database is also left for possible future research” (Funderburg 96).

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- **Objectives** – “Identifies strategies to maximize the positive economic impacts as well as minimize possible detrimental impacts of state route mainstreets and state route bypasses through small towns” (Gillis 2004)

- **Methodology**
  - Case studies of 7 eastern Washington communities with state route bypass or state route main street: background on the region’s economic base; recent population change; growth or decline in the community’s overall economic activity; implications of the state highway mainstreet or bypass on current economic conditions.
  - Personal interviews of business, government and citizen leaders; included interview guide
  - Analysis of available economic data; taxable retail sales data available from the Washington State Department of Revenue

- **Findings**
o State route mainstreets allow for the development of certain specialized businesses that would otherwise not be economically feasible in small towns.

o To maximize economic benefits from a state route mainstreet, transportation plans should include actions to minimize problems such as accidental damage to parked vehicles, poor traffic flow during peak travel periods and safety problems in crossing the street.

o Downtown business districts in communities with a well-developed local customer base are less adversely impacted by a state route bypass than communities highly dependent on drive-by traffic.

o Bypass routes that improve access to major trading centers can create opportunities for small towns.

o Systematic development of highway-related businesses and other retail businesses along bypass interchanges can help mitigate possible economic losses that occur from the diversion of traffic from the downtown business district.

o Annexing property associated with new interchange developments is can be used by cities to mitigate tax base losses associated with possible business closings and land use changes in the downtown business district.

o Land use plans should be flexible enough to accommodate new types of downtown uses in communities that are impacted by a state route bypass.

o Enticing tourists and shoppers to travel into the central business district is important to the economic and overall quality of life in bypassed communities.

Handy, S. L., Jarrett, J., & Vanka, S. (2000a). Planning for the Impacts of Highway Relief Routes on Small- and Medium-Size Communities: Literature Review and Identification of Issues. Research Project 0-1843-1. Conducted for the Texas Department of Transportation in cooperation with the U.S. Department of Transportation by the Center for Transportation Research, University of Texas at Austin, Austin, Texas.

In the first of four reports on the economic effects of highway relief routes on small- and medium-sized cities in Texas, the authors summarize current literature on the topic and discuss specific issues identified through an interview process.

- Objective – “The purpose of this report is to provide TxDOT planners and engineers with reliable information they can use to address the questions and concerns of local residents and business leaders” regarding the potential effects of a relief route. (2)

- Identification of Issues

  o “…researchers interviewed officials of a variety of state and local organizations that represent or work closely with small- and medium-sized communities …and TxDOT engineers who work with these communities in planning, designing, and building highway relief routes…” (3)

  o “…asked about the kinds of benefits local residents see in relief routes, the concerns they express about possible negative impacts, the different views held by different groups within these communities, and examples of communities that have been positively or negatively affected…” (3)

  o Members of the community expressed a variety of views regarding the impact of such routes. “This difference in assessments relates in part to a difference in perspective of the community’s goal in the face of a planned relief route: preservation and enhancement of the overall tax base versus preservation of traditional business and local character.” (6)

- Methodologies
The report “…describes the different methodologies, discusses their strengths and weaknesses, and notes some of the studies that use these different methodologies…” (13-22)

- Before-and-after approach, case study approach, econometric models (two types: cross-sectional, time-series), projected development models, matched-pairs and survey-control studies, input-output models.
- Representation of Economic Impacts – The choice of factors usually depends on “…the purpose of the study and on data availability.” (20); User Benefits include travel-time savings, travel-cost savings, and decreases in accidents. Non-User Benefits include employment, sales, wages, income, land values or development, population (22)

- Selected Independent Variables (“commonly used”): year of completion, length of the new route, length of the old route, access type: controlled versus uncontrolled, distance of route from the city or regional center, distance of city from nearest metro center, dollars of transportation investment, income of region, tax rates, population of study area (23)

- Impacts of Transportation Investments
  - Reported outcome of NCHRP synthesis – “…there is no clear consensus on appropriate methodologies for bypass studies, the impacts on businesses along the older bypassed routes seem to be limited, and, for the most part, bypasses appear to have a favorable impact on rural communities, although the evidence is weak.” (25)
  - “A look at the findings of some of the key studies sheds more light on the range and extent of impacts of highway relief routes on congestion, safety, industrial location, employment, sales, wages, land value and development, and population. While the seemingly contradictory findings among these studies are sometimes explained by differences in methodologies, they also point to actual variations in impacts that depend on both time and place. Perhaps more than anything else, these studies highlight the complexity of the relationships between highway investments and local economies and the challenges researchers face in attempting to isolate the effects of highway investments.” (25)

- Summary and Conclusions
  - “The initial phase of research … points to the complexity of the relationships between highway investments and economic growth and to the challenges researchers face in identifying and understanding these relationships.” (35)
  - “These findings suggest three major categories of impacts to explore and evaluate in the research phases that follow:
    - improvements to quality of life in the existing community resulting from a decline in traffic through town,
    - declines in existing businesses in the town center resulting from a decline in traffic through town or from increased competition from new businesses along the relief route, and
    - overall changes in economic activity in the community resulting from new development generated by the relief route.” (35, 36)
  - An important statement concludes this report – “The review of findings from previous studies presented in Chapter 4 shows that conclusive answers about the economic impacts of highway relief routes and highway investments are more generally difficult to determine. This research is therefore unlikely to succeed in resolving all the questions raised by the extensive body of prior research and is therefore unlikely to provide a basis for predicting impacts for specific communities.” (36, 37)
In the fourth of four reports on the economic effects of highway relief routes on small- and medium-sized cities in Texas, the authors “explores possible strategies for minimizing the negative impacts and maximizing the positive impacts of highway relief routes on small- and medium-size communities...” (Abstract) “...research findings suggest that TxDOT and local communities through their actions may be able to avoid or at least partially offset the negative impacts of relief routes but also enhance the positive impacts through thoughtful planning efforts.” (1)

- **Objectives** – develop “recommendations for possible planning approaches for TxDOT and communities in Texas.” (1,2) “Based on findings in the previous three studies plus an additional search for techniques used in other states.” (1) Ideas include policies related to facility location and design, signage, annexation and utility provision, economic development programs. (1)
  - “…possible objectives for planning, depending on the characteristics and goals of the community:
    - Preserve the downtown as a business district.
    - Protect the viability of existing highway-oriented businesses.
    - Promote (or prevent) new development along the relief route. (2)

- **Methodologies** - “...a survey of state departments of transportation (DOTs), further correspondence with selected state DOTs, and a review of some of the rules and programs that determine the options for Texas communities.” (3) Included review of signage and annexation regulations and the Texas Main Street Program.

- **Findings**
  - Ideas from the Literature – “minimizing the negative impacts and enhancing the positive impacts:
    - Signage and advertising, important for downtown businesses
    - Access, both along the new route and between the new route and the old route, important for new development and for downtown businesses, respectively
    - Infrastructure along the new route, important for new development
    - Community involvement in the planning process, important for the community as a whole.” (6)
  - Planning Strategies in Texas – Several options were explored including lessons from the case studies, policies on signage, annexation, zoning, and infrastructure, and the Texas Main Street Program
  - Making It Work – a collaborative approach is suggested including the use of a community impact assessment (33)

- **Future Research Directions**
  - “planning techniques that have proven successful in other fields” (34)
  - “…ability to measure more precisely the adverse impact on specific businesses and organizations.” (34)
  - “…longitudinal studies, in which baseline data are collected before the construction of the relief route and additional data are collected at several points afterwards, could more accurately pinpoint the causal role that relief routes play in the changes observed in these communities. These longitudinal studies could also include an assessment of the effectiveness of any planning strategies adopted by the communities to address the potential impacts of the relief route.” (35)

In the third of four reports on the economic effects of highway relief routes on small- and medium-sized cities in Texas, the authors use a case study approach “to explore in more depth the impacts of the relief routes within the communities and the factors contributing to those impacts.” (2)

- **Methodology** – Case study of 10 communities chosen with “even geographic coverage,” size range up to 50,000 population, eight had populations between 3,636 and 7,605; the other two had 15,591 and 48,465 people; “few cities with relief routes in Texas fall into the 10,000 to 40,000 population range.” (3) Four communities without relief routes were also studied to provide a comparison.
  - Data collection- “compilation of information available through chambers of commerce and other sources, phone and on-site interviews with selected members of the community, and on-site observations of the community.” (3) Other sources included *Handbook of Texas*, U.S. Census of Retail Trade, U. S. Census of Population and Housing. (3)
- **Findings**
  - Changes in communities with relief routes are “relatively consistent” with “key factors that determine those changes.” (93) “…communities where relief routes have not been built suggest that the ten case study communities would have changed significantly even if the relief route had not been built, but the evidence also suggests that the relief routes contribute to and reshape these changes.” (93)
  - Resident, business owners, and civic leaders “…recognize that the relief route was both necessary and ultimately beneficial for the community.” (93)
  - “…reduced traffic through town by as much as 75%” (93)
In six out of the ten case studies, the downtown area has changed dramatically over the past couple of decades, from a center of retail and services for the community to a center of specialized activity.” (95) They became legal centers (county seat) or tourist-related downtowns.

- Similar changes occurred in the towns without relief routes “losing traditional businesses to competition from Wal-Mart and other discount stores.” (97)

- “The greatest hope of communities facing the construction of a relief routes is that it will open up a new corridor of development and attract new business to the community.” (97) Although development occurred on the relief routes in all of the communities, the amount was considered limited in 8 of the ten. (97) Two factors attributed to minimal relocations: 1) locally owned with limited resources, and 2) owners approaching retirement age and not interested in relocating. Also new businesses “were national or regional chains or locally owned franchises of national chains.”

Key Factors – “Two categories of factors emerged from the case studies: structural factors relating to trends in the national economy and demographic pattern, and local factors relating to the geography of the community, the characteristics of the facility, and the policies of the local government.” (100)

- Structural – “Three trends seem to have had a notable effect on the case study communities: the decline of rural populations and growth of metropolitan areas, increases in the scale of stores and shopping centers in the retail industry, and consolidation in distribution channels for gasoline.” (100) The More rural communities seem to continue decline while those on the “expanding fringe of metropolitan areas have seen growth in their populations and in the portion of the local economy that serves the local population.” (100)

- Local Factors – geographic factors (most significant), facility characteristics and local policies.
  - In terms of local policies, those communities that provided infrastructure, commercial zoning, and marketing measures experienced greater growth along relief facilities. Those that actively preserved historic downtowns and marketed them were successful in having more active downtowns.
Table 5.1. Summary of Changes and Key Factors

<table>
<thead>
<tr>
<th>Case Study</th>
<th>Changes in Downtown Businesses</th>
<th>Development on Relief Roads</th>
<th>Net Change in Highway-Related Employment</th>
<th>Key Factors*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bastrop</td>
<td>change</td>
<td>slow</td>
<td>decline</td>
<td>uncontrolled access</td>
</tr>
<tr>
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<td>slow</td>
<td>decline</td>
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* - negative impact on community, + positive impact on community

Kockelman, K.M., Srinivasan, S., & Handy, S. L. (2000). Planning for the Impacts of Highway Relief Routes on Small- and Medium-Size Communities: An Econometric Analysis. Research Project 0-1843-2. Conducted for the Texas Department of Transportation in co-operation with the U.S. Department of Transportation by the Center for Transportation Research, University of Texas at Austin, Austin, Texas.

In the second of four reports on the economic effects of highway relief routes on small- and medium-sized cities in Texas, the authors use an econometric analysis “to identify and understand the various factors that influence the economic impacts of highway relief routes…” (1)

- Objectives
  - “... to quantify the impacts of relief routes specifically for Texas communities using more recent data and more sophisticated modeling techniques that have been used in previous studies.” (2)
  - “The analysis involves the identification of indicators of economic impact and a set of explanatory variables that determine those impacts. Econometric modeling is used to estimate the marginal
effects of the explanatory variables, that is, the effect of each variable when controlling for the effects of the other variables.” (2,3)

- Caveats, the models: 1) “provide a test of the hypothesis that relief routes negatively impact the local economy” 2) “test only those impacts and explanatory variable that can be quantified and for which data are available” 3) “demonstrate statistically significant associations between impacts and explanatory factors but do not prove causation” and 4) “reflect the average impact of relief routes and other factors over a sample of communities where relief routes have been constructed some time in the past. They will not always provide an accurate prediction of the impact of a new relief route in a specific community.” (3)

- Methodologies
  - Issue identification – both community and TDOT concerns were identified in the previous report and summarized here. “...the business community is concerned about a potential net loss in tax base and the possibility of the closure of downtown establishments due to a reduction in pass-by traffic and possible competition from new establishments along the relief route.” (5)
    - “The location of the relief route and the nature of access provided seem to be issues of specific concern to residents and community leaders.” (5)
    - TDOT concerns are improving statewide mobility and safety, as well as, NEPA compliance. (6)
    - “The challenge, therefore, is to improve the mobility at a regional level by rerouting traffic around a community without adversely impacting the economy of the community.” (6)
  - Sample – “...small- and medium-sized cities in Texas where relief routes have been constructed.” (6) Also control cities “...to better account for factors not related to the relief routes.” (6)
  - Indicators chosen: total retail sales, sales at gasoline service stations, sales at eating and drinking places, and total service receipts. It is important to note that any changes indicated are on an aggregate level because data is not available to track such changes on a corridor level. “It is possible that even when the total sales levels in the city do not change, a significant impact on the local economy occurs in the form of business openings, closings, relocations, and so on.” (7)
  - The researchers suggest that use of modeling results regarding impacts to bypassed cities to predict how a yet unbuilt bypass may affect a city should be regarded with extreme caution due to the individual nature of cities.
  - Identification of Study Cities – “A list of cities in Texas with populations between 2,500 and 50,000 was created, and traffic maps were reviewed to classify these into those that have relief routes and those that do not.” (9) Only cities with single-relief routes constructed between 1965 and 1990 and adequate data available were considered – a total of 23.
  - Explanatory Variables – Variables “expected to impact the sales and number of establishments in the city...classified into city demographics, traffic levels and the location of the city, relief-route characteristics, and regional trends.” (14)
  - Limitations – “...models capture only city-level changes and do not capture any relocation of businesses...” no information on rerouted traffic, assumption “that the influence of the relief route is the same regardless of when the relief route opened”, the “effects of local policies are not directly taken into consideration.” (19)
  - Econometric Modeling (25-36): per capita total retail sales, number of retail establishments, total retail sales, per capita gasoline service stations, number of gasoline service stations, gasoline service station sales, per capita sales at eating and drinking places, number of eating and drinking places,
sales in eating and drinking places, per capita service receipts, number of service industries, service receipts

- **Findings**
  - "The models show that relief routes have both positive and negative impacts on these sectors of the economy. For small cities, the impacts are mostly negative, but for medium-sized cities, the results are more mixed. The models also show the marginal impact of different characteristics of the relief route. Most notable, a shift in traffic to the relief route (measured as the ratio of the traffic on the relief route to the total traffic entering the city) leads to a decline in several indicators, particularly those for total retail. In other words, the better the relief route works from a traffic standpoint, the greater the adverse impact on the economy of a community." (41)
  - "relative to uncontrolled-access facilities, controlled access facilities (with frontage roads) have a positive impact on the number of retail eating/drinking establishments and a negative impact on per capita sales in eating and drinking places." (41)
  - "Most indicators decline with time after the opening of the relief route, suggesting that initial positive impacts may eventually disappear." (41)
  - Marginal effects of other factors – “Demographics of the local population, including income per capita, the fraction of elderly persons, and unemployment rates, proved significant in many of the models. Several of the models suggest a positive impact from the nearby presence of a large city.” (41, 42)
  - "These models provide important insights that may help to guide the planning and design of relief routes in small- and medium-size communities, but they do not tell the entire story.” The models “...evaluate net changes in these sectors but do not assess underlying changes, such as geographic shifts, changes in ownership, or openings and closings in the local business community.” (42)

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- **Objective** – To discuss the history of transportation policy and how it contributed to regional transportation networks. The paper discusses the roots and purposes of beltways and bypasses.
- **Methodology**: Historical research and direct reading of legislation and manuals issued by the Federal Government.
- **Findings:** "The Interstate Highway Act specifically stated that central city bypasses must be built around congested cities” and 2,300 of the 40,000 planned system miles would be beltways. Manuals and legislation establish bypasses and beltways as essential parts of the highway network.

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- **Objective** – Summary of economic impacts of bypasses in five states
- **Methodology**: Review of 5 case studies
A study of bypassed towns in Texas by Johann Andersen et al. used statistical models incorporating data on retail sales, gasoline sales, restaurant sales, and service receipts to analyze the economic base, changes in business volume, and related economic impacts of highway bypasses on six small Texas cities.

1991 study for the Office of Advanced Planning of the Iowa Department of Transportation examined 11 communities where highway bypasses had been constructed. Populations of the communities ranged from 673 to nearly 7,900.

1996 study conducted by David Buress, of the Institute for Public Policy and Business research at the University of Kansas addresses some of the economic impacts of bypasses on 21 small Kansas towns.

- Findings
  - Locational shift in traffic can cause some existing businesses to close up or relocate, but it can also create some new business opportunities; Net economic impacts on the broader community are usually relatively small (positive or negative); CBDs having a strong identity as a destination for visitors or for local shoppers are the ones most likely to be strengthened due to the reduction in traffic delays through their centers.; Broad perception that adequate signage to the bypassed business center is an important need (and concern) for ensuring its continued success.
  - "In most communities, highway bypasses have little adverse impact on overall economic activity. The economies of smaller communities [less than 2,000 population] have a greater potential to be adversely impacted by a bypass.
  - Over the long term, average traffic levels on the "old routes" in medium and large bypassed communities are close to or higher than pre-bypass counts, indicating continued strong economic activity in those communities and the opportunity for retail trade to flourish.
  - Very little retail flight has occurred in bypassed communities, meaning that few businesses have relocated or developed new operations in areas adjacent to the bypass route.
  - Communities view their bypasses as beneficial overall, while at the same time communities and individual businesses understand that the bypasses presented changes that must be addressed proactively."


This study explored the dynamics between two communities affected by a bypass loop to the New Jersey Turnpike. Whereas most highway bypasses completely circumvent towns, this case study addresses a unique multi-city, partial bypass bisecting two small suburban districts providing access to a state turnpike.

- Objective – “Examines before and after case study examines the impacts of a suburban New Jersey bypass road that are embedded in a broader regional context” (15).
- Methodology: Sample: multi-town suburban bypass linking to New Jersey Turnpike
  - Quasi-experimental case-study approach using a mixed-methods approach
    - Qualitative: “[S]urveys and interviews with different stakeholders, including residents, visitors, business owners/employees, and government officials” (17).
    - Quantitative: longitudinal data at the municipal and county level for the period 1970 to 2000, as well as traffic count data. In addition, 1974, 1985 and 1995 land cover maps and 2002 aerial photographs were used to assess land use changes” (17).
- Findings
  - Traffic flows - “Before and after traffic counts carried out in 1994 and 2002 along the bypassed corridor...showed that east-west weekday traffic decreased in downtown...However, traffic entering
the junction from the south on South Main Street increased by a little over 18 percent” (20). “…A majority of the surveyed residents, [municipal engineer] and business owners responded that they had not noticed a decrease in downtown through-traffic” (20).

- Land use development - “None of the development that has occurred adjacent to the roadway was induced by the improved access the bypass provided. The bypass does not appear to have contributed to sprawling housing or commercial development either adjacent to the bypass or at any of the interchanges” (24-5). “…The bypass has induced corporate and industrial development at both ends” (25).

- Economic revitalization - “The vast majority of residents and visitors responded that they were aware of new businesses that have opened on the main street since the opening of the bypass. Business owners and employees, however, were more reserved about the changes to the downtown. Although a majority was satisfied with the business environment downtown, very few attributed the changes to the bypass. Only a small minority felt that the impact of the bypass on main street businesses has been positive and that the bypass has had a positive impact on their own business” (25-6). “East Windsor Township has successfully taken advantage of the bypass for its own benefit through the development of corporate and industrial ratables, while mitigating the negative impacts of increased through-traffic on both the bypass and Route 130” (27).

- Social and community development. - “Surveys of residents showed limited enthusiasm for the impact of the bypass on both the downtown and the community. Less than half the respondents felt that the impact on the main street has been positive, and only half the respondents felt that the effect on the community as a whole has been positive. Despite the improvements to the streetscape, the vast majority of respondents thought that the main street could be made more attractive by the addition of more restaurants, coffee shops, specialty shops and improvements to the streetscape” (26). “Because of political differences between Hightstown and East Windsor Township, the bypass remains underutilized and considerable traffic, especially truck traffic, still pass through Hightstown’s downtown. The impacts of bypass roads in built-up suburban neighborhoods that cross municipal boundaries are multiple and complex. Planners of bypass roads must be cognisant of the possibility of unforeseen and induced outcomes, which can jeopardize the intended goals of a bypass project” (27-8).


This paper provides two specific case studies from a larger study of twelve communities in Indiana.

- Objective – “This paper describes an integrated approach [“combining case studies with advanced statistical methodologies”] to documenting and quantifying the impacts of bypasses on small communities.”

- Methodology
  - Case studies
  - Econometric analysis

- Findings
  - The overall economic impact was positive; however, the downtown business district struggles
  - Residents pay higher taxes than previously due to utility incentives granted to new businesses
This paper discusses a more detailed study that identified “changes that resulted from bypasses built around several small cities.” (Abstract 2)

- Objective – “This paper aims to document the long-term impacts of bypasses on small- and medium-sized communities.” (3)
- Methodology: Case studies
- Findings
  - “One of the primary lessons from this study is the importance of planning in anticipation of a bypass. Where will the access points be along the bypass right-of-way? What changes in zoning and other land use strategies will allow the local economy to take advantage of (or at least minimize the harmful economic effects of) the bypass?” (15)
  - “A bypass’s primary raison d’être may be to divert through traffic from city streets unable to handle large volumes of traffic, but from a local official’s point of view, the combination of enhanced mobility (which lowers transportation costs, a key selling point for attracting basic industry) and newly accessible land provides an opportunity for growth.” (15)
  - “Development along a bypass, with or without access control, will draw business away from the central business district of the affected community.” (15)


- Objective – “To examine whether the original purposes and needs for each of the 16 existing bypasses listed in the proposed Bypass Policy are being achieved... whether the bypasses were functioning as they were intended and, if not, whether modifications to the proposed policy should be made to achieve the objectives of future bypasses” (ODOT, 2002, Case Study Summary p. 1)
- Methodology
  - “20-Site Analysis: Analysis of historical aerial photographs and highway maps to show the association between highway improvements and land use changes over 20 years in 20 Oregon cities” (ODOT, 2002, Case Study Summary p. 1).
  - “Case Study Analysis: More detailed analysis of highway projects and land use changes in six Oregon cities. The case studies evaluate the impacts of major improvements to state highways at the urban fringe [primarily inside, secondarily outside, urban growth..."
boundaries (UGBs)]. Six case studies were completed for this project: five for highway widening...and one which was partially a widening project and partially construction of a new alignment” (ODOT, 2002, Case Study Summary p. 1)

- “Each case study included a focus group to assist with a qualitative assessment of changes associated with the transportation project. The focus groups generally consisted of city staff, county staff, ODOT staff, and local developers or realtors. The purpose of the focus group session was to get comments on the preliminary conclusions made from review of secondary data sources, and to gain insights into the public policy decisions and market factors that contributed to the observed development patterns” (ODOT, 2002, Case Study Summary p. 6).

- Case study data sources (ODOT, 2002, Case Study Summary p. 4-5)
  - “Environmental Impact Statements or Environmental Assessments for the case study project;
  - Local Comprehensive Plans and zoning ordinances;
  - Transportation system plans;
  - Interviews with city/county staff and other knowledgeable persons; and
  - Other planning documents
  - County property tax assessment data to identify the location, timing and value of residential development;
  - Building permit and development data;
  - Maps showing city limits, urban growth boundaries (UGBs), and zoning/land use designations at various times; and
  - Planning documents that show changes in land use and public policy.”

- Conceptual Methodology for Case Study Analysis (ODOT, 2002, Case Study Summary p. 4)

- Findings
  - “All the case studies illustrate that the development that occurred after the highway improvement was generally consistent with the development envisioned in local plans before the improvement. In other words, the highway improvements, at most, facilitated making the expectations or hopes about future development a reality” (ODOT, 2002, 6).
  - “All the case studies illustrate that interactive, iterative, and incremental nature of most urban development. The plan says what kind of development is wanted or acceptable; the highway improvement facilitates that development. But the plan may be what it is in response to past highway improvements, and future plans may change in response to the way that current plan gets implemented” (ODOT, 2002, 6).
  - “The case studies support the hypothesis that the scale of land use change will correlate with the scale of the improvement to accessibility. Where access already existed (as in all of the case studies), widenings did not cause any obvious changes in the type of development” (ODOT, 2002, 7).
  - “Good accessibility is a necessary but not sufficient condition for local development. Some of the case studies illustrate what is common knowledge among planners and developers: the amount development responds to the availability of other key public facilities (especially water and sewer) and their costs (including how such facilities will be funded and who will pay for them)” (ODOT, 2002, 7).
  - “In all of the case studies, development of all types was dispersed throughout the communities. Those development patterns were also envisioned by local comprehensive plans. While some of the study areas contained the majority of commercial or industrial land, in all of the case studies all types of development were dispersed among the appropriate zones” (ODOT, 2002, 7).
  - “All of the case study highway improvements were completed in the late 1980s or early 1990s, mostly before Oregon’s economic boom in the 1990s. All of the case study communities had higher growth
rates in the 1990s than in the 1980s. Thus, while substantial development occurred after the highway improvements, the growth cannot be solely attributed to the influence of the improvements” (ODOT, 2002, 7).

- “As implemented by counties, state policies that restrict development of resource lands have been effective in limiting development associated with highway improvements outside [Urban GrowthBoundaries]. The case studies did not identify any major new developments outside UGBs” (ODOT, 2002, 8).
- “The following techniques would be helpful in protecting through movements in other areas:
  - A clear purpose and need project statement, including clear direction regarding local trips,
  - Use of access control to protect the mobility purpose of the bypass,
  - Public road spacing designed to maintain the long-term function of the highway,
  - Coordinated development review of private and public development actions, and
  - Cooperative city, county and ODOT long-range planning of the transportation system, including measures that maintain the function of the bypass such as good local street networks and planning for the bypass endpoints.” (ODOT, 2002, 2).

- **Gaps**
  - “Study indirect impacts of highway improvements. The study provides an in-depth examination of land use impacts and sheds light on the changes in the existing bypasses” (ODOT, 2002, 1).
  - “All the case studies illustrate that the development that occurred after the highway improvement was generally consistent with the development envisioned in local plans before the improvement. All the case studies illustrate that interactive, iterative, and incremental nature of most urban development. . . . The case studies all paint a picture of incremental and iterative decisions: small changes in land use plans and highway improvements, each responding to previous changes in land use and transportation” (ODOT, 2002, 2).

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- Objective – Assess the impact of bypasses in rural areas
- Methodology: 11 Bypassed Iowa Communities, 10 Minnesota Bypassed Communities since the 1970s. Each bypass city matched against 2 control cities
  - Effect of overall retail sales in bypassed communities
  - Aggregate and disaggregate categorical retail sales to analyze the impacts upon different types of businesses attributable to the bypass
  - Effects of the bypass on individual merchants through survey of business operators in the bypass communities assessing attitude to the bypass impacts


This paper is a result of research performed by a graduate student at Iowa State University.

- Objective – “The purpose of this research is to evaluate and report on the economic impacts of highway bypasses on selected communities in Iowa.” (3)
The literature review focused on research related to bypasses in Iowa. Of interest, “The Iowa Department of Transportation has conducted bypass studies for many years compiling them into the Literature Review of Urban Bypass Cities. These reports are based on interviews with community leaders and businessmen whose towns have been bypassed. The report also includes summations of prior research projects.” (6) “This document ends with a “Summary of Findings” which compiles the observations and inferences from the surveys, report summaries, and letters from communities about the effect the bypasses had on their communities. Some of the findings included, larger cities (2000+) deriving greater benefits than adverse impacts from highway bypasses, communities with 500 or fewer residents felt the greatest adverse economic impacts because a greater percentage of their total area trade comes from through traffic, advertising on the bypass helps to alleviate the 7 negative impacts, service stations which do more than just sell gas experience little or no noticeable decrease in overall sales. An additional note about gas stations is that some survey respondents felt that negative impacts on their businesses could also be attributed to automobiles getting better gas mileage requiring fewer stops to fill up.” (6,7)

Also, a review of newspaper articles in the mid-to late 1990s left the writer with this conclusion, “From these articles it appears that as more communities are bypassed in the state, and communities learn how to make the bypass benefit them, the more future bypass cities are open to the idea of having traffic routed around their town, although opposition will remain.”

Methodology

“This report … evaluates economic and population data from prior, during, and after the construction of the bypasses for the selected communities. The economic data consists of retail sales, number of firms, and pull factors all which provide a good look at the economic characteristics of a community. By correlating this data with the bypass completion dates it can be seen whether a community’s economy was affected by the bypass project. Bypass community data is then compared to a control city that is similar in population and location, but has not been bypassed.” (3) Bypassed communities are New London (pop. 1,800), Olds (pop. 250), Denver (pop. 1,600), and Raymond (pop. 637).

Data from the Office of Social and Economic Trend Analysis (SETA): retail sales, number of firms, pull factor (not defined), and population

Findings

There was no indication that a bypass directly caused an economic downturn in a community.

The communities that are located near metropolitan areas, have quick access to expressways, and have land use and zoning plans show signs of stronger growth than those without these elements.

Conclusion “As in the literature reviews, the data collected for this report shows that bypasses are not the likely reason for negative economic impacts felt by small communities. Interviews with community and business leaders revealed that negative economic impacts are attributable to events such as the farm crisis of the 1980’s. Many of the bypassed communities appear to be experiencing a transformation from a role as a local economic hub to a role as “bedroom” communities to larger towns and cities nearby that are connected by the bypass.

Overall the communities do not blame the bypasses for much if anything and instead praise them for having removed traffic, congestion, and pollution from their towns. This shows that the bypass communities value the quality of life their towns have to offer more than they desire to have retail merchants. That is not to say they wouldn’t mind having more options in their communities, but do not feel overly inconvenienced by shopping outside their community. Additionally communities who actively try to integrate the bypass into their community through
land use plans, signage directing traffic to business areas, or other methods appear to be more stable than those communities that do not attempt to integrate the bypass.” (19)


- **Objectives**
  - Develop a methodology to assess the economic impacts of highway bypasses on small communities
  - Evaluate the impacts of past bypasses in Oklahoma
  - Predict the economic impact of proposed bypasses along US 70 in Oklahoma.

- **Methodologies**
  - 3 Case studies
    - Use case-control approach with cities similar in population, proximity, infrastructure for baseline
    - Database of local tax base for all cities in OK to compares changes in sales tax base over time for cases and controls
    - Econometric models: group means tests in post-bypass period with difference in difference approach with cross-section time-series data
    - Site visits and personal interviews

- **Findings**
  - The Stonewall bypass impact was estimated using several model specifications for single-year and multi-year time periods. We could not reject the null hypothesis that the bypass investigated had no effect on retail sales, i.e., we could not find that the bypass had a significant influence on Stonewall's sales tax base. While the investigations of the Rush Springs and Snyder bypasses were limited to a post-bypass analysis, they were consistent with the results for Stonewall.


- **Objective** – Examines the economic impacts of highway relief routes on small- and medium-size communities in Texas. Per capita sales in four different industry sectors were chosen as the indicators of impact

- **Findings**
  - The models developed suggest that of the four sectors examined, the impact of a bypass is most negative on the per capita sales in gasoline service stations. The impact on the per capita sales in the other three sectors studied depended critically on the magnitude of the traffic diverted. When about half the approaching traffic was diverted to the bypass, all three sectors were negatively impacted. So, the better a relief route works from a traffic standpoint, the greater its adverse impact on local per capita sales. Of all the sectors studied, the service industries were minimally impacted by the bypass. As expected, per capita traffic volumes are estimated to strongly influence local sales. As the traffic levels per capita increase, the negative impacts due to the bypass are lessened.
Objective – Impacts of bypasses on small-town economies and investigation into the economic impacts of recent bypasses nationally and in California.

Methodology
- Theoretical Overview to determine best practices
- Case Studies
  - Although bypasses are planned for California communities of all sizes, the study focused on small towns, where bypasses are more likely to affect the local economy. In these settings, disruptions to a few local businesses can result in large impacts. Smaller communities also tend to have fewer alternative highway routes, making the addition of bypasses more significant.
  - Each case study included the following information
    - General plans
    - Economic studies (economic development and cluster analyses)
    - Traffic studies (counts, forecasted impacts, and origin-destination surveys)
    - Consultant studies (e.g., sponsored by local chambers of commerce)
    - Tax receipts or other data that substantiates business impacts
    - Interviews with key informants
    - Site visits
- Highway Bypass Impact (HBI) Model

Findings
- What types of towns are impacted economically?
  - Highway-oriented towns have a much harder time transitioning their economies after bypasses are constructed than those that cater to local residents or offer tourist attractions.
  - Towns that serve as residential communities or as tourist destinations can benefit from reduced traffic and improved safety as a result of highway bypasses. Local government and the business community may need to engage in complementary efforts, such as marketing, downtown redevelopment, additional parking, and sidewalk improvements, to take advantage.
  - Towns that serve regional markets by providing services, such as big box retail, automobile dealers, department stores, or hospitals, may experience little or no economic impacts. If a bypass provides better access to regional services, the local economy may actually improve as the town expands its regional draw.
  - Towns with other economic bases, such as government employment, mining, agriculture, manufacture, etc. are not likely to be economically impacted by bypasses.
- Which businesses are impacted?
  - Gas stations and quick service or fast food restaurants cater the most to pass-through traffic. They are most likely to be impacted by the diversion of traffic due to bypasses. Other visitor-serving businesses, such as motels, art galleries, antique stores, and curio shops, cater more to visitors attracted to the community as a destination rather than those simply passing through. These businesses are less likely to be negatively impacted by bypasses and may find that business improves if the downtown is turned into a destination.
- Regionally serving businesses, such as big box retail and department stores, may benefit from improved access. Businesses that serve local residents, such as drug stores, banks, and grocery stores are generally not impacted by bypasses.

  - What other impacts occur?
    - Bypasses often have a short-term (and negative) impact on the local economy, but retail sales often improve in the longer term. However, some communities may never fully recover. The construction of a bypass may also provide an opportunity for revitalization of the local community. Bypasses are often promoted as improving pedestrian safety along Main Street. Since traffic accidents involving pedestrians are relatively rare events, Caltrans collision statistics may not reflect improved safety. However, bypasses may improve the perception of safety, which is a benefit in its own right.

  - What design features are most important?
    - Visibility. Negative economic impacts (losses of customers and sales) are likely to be small for businesses that remain visible from bypasses. In some cases, the goal of making downtowns visible from bypasses may conflict with the desire to protect communities from noise and visual impacts. Caltrans can provide some “visibility” for businesses through signage.
    - Distance from downtown. Bypasses located close to existing downtowns are less likely to hurt local economies. Travelers may be able to see businesses and access times are shorter.
    - Direct access. Highway interchanges can provide direct access from bypasses to downtowns and existing businesses. However, interchanges can also encourage the development of competition to existing businesses by offering new “prime” locations.
    - Time savings. The difference in travel time between the old route and the new bypass determines how many vehicles (and potential customers) divert to the bypass.

- Gaps
  - Cross-sectional /case studies are not longitudinal—the “snapshot” may ignore other factors to small town economies and impacts.

**Thompson, E., Miller, J., & Roenker, J. (2001). The Impact of a New Bypass Route on the Local Economy and Quality of Life (KTC-01-10/SPR219-002I). Center for Business and Economic Research, Carol Martin Gatton College of Business and Economics, University of Kentucky: Lexington, KY.**

- Objectives
  - Assess potential impacts of bypass construction on local economy and quality of life
  - Community population ranges: 1,273 to 7,419
  - County population ranges: 10,361 to 24,416

- Literature Review
  - “The general consensus of the literature was that bypass construction has either no significant effects or perhaps small business impact for the bypassed community.” – page 4
  - “…two shortcomings justify current research into the effects of bypasses: a lack of methodological consistency and a lack of adequate controls on bypass growth.”

- Methodology
  - This research was 3-pronged
    - The Effect of a Bypass on Aggregate Economic Growth
“...no previous studies have focused their research efforts on the state of Kentucky....this report considers growth rates in the pre-bypass period.”

This portion of the study looked at growth rates pre- and post bypass in comparison to counties of similar size.

Identified bypassed counties through KY Transportation Cabinet districts (10 of 12 responded) to list bypasses in their districts by year built, characteristics of each bypass—number of lanes and access limitation: 21 counties were used as cases

Mahanalovitz matrix used to find control counties “twins” based on similarity of the following key measures
- Population
- Distance to the nearest large town
- Share of employment in mining
- Share of employment in manufacturing
- Retail capture

The only significant finding from this pre/post bypass analysis was “that the opening of the bypass may have had a negative effect on retail sales growth in bypass communities.” No significant impacts on employment or population.

“the direct estimation of bypass impacts using Kentucky data found limited evidence that the opening of bypass roads influences community growth.” (p. 15)

Upon further investigation of “measures such as: access control, the size of the community being bypassed, and the distance of the bypass from the downtown area” (p. 13) “results simply imply that given that a bypass is being build, there may be faster total employment growth in the area if the bypass is built with partial access control, and built nearer to downtown.”

2. Allocation of Business Activity (p.16)

To determine the allocation of business activity, researchers visited 8 bypass communities and their 8 matched communities and analyzed:
- Number of vacant commercial properties
- Level of sprawl of commercial activity out to bypass area (proportion of retail/service businesses located at bypass rather than downtown)
- Nature of relocation of commercial activity out to the bypass areas

“The finding...was that the location of a bypass appears to influence the allocation of business activity within a community.” (p.22); “…the average vacancy rate in the downtown area of bypass communities was 18.4% versus 10.9% in similar communities without a bypass.” (p.22); effect on business mix in downtown – “Retail businesses were found to account for a much larger share of businesses on a bypass than in a downtown area.” New retail businesses rather than a relocation of downtown businesses.

3. Community Attitudes Toward Bypass Construction (p. 23)
- Telephone interviews were conducted with 6-8 members of 8 communities including business owners, political leaders, media representatives to discuss perceived impacts
- Those interviewed “...seemed largely pleased with their bypasses. Many viewed the bypasses as engines of growth for their communities, and most believe that the bypass has helped improve the quality-of-life in their community.” (p. 28)
- Census Data for Bypassed Communities (p. 29) “...A bypass appears to have little, if any, effect on the population, unemployment rates, poverty rates, labor-force participation rates,
or education levels of a town, at least in the few years immediately following its construction." (p. 29)

- Land Use Before Bypass Construction – generally, residential, agricultural, and undeveloped. Some has remained farmland, the remaining commercialized.

- Main Findings (from Executive Summary - p. ii)
  - "Estimates using Kentucky data found limited evidence that the opening of bypass routes influences county growth. The opening of a bypass route was found to reduce aggregate retail sales, but was not found to affect retail employment, overall employment or population. This finding was consistent with previous literature on the impact of bypasses."
  - "..., given the decision to build a bypass, the bypass would be more likely to encourage total employment growth if the bypass had partial access control and the bypass is located closer to the community’s central business district."
  - "The size of the community receiving a bypass was not found to influence total employment growth."
  - "While it may not have a major effect on the size of the local economy, a new bypass was found to reallocate economic activity within a local area. For example, the average vacancy rate in the downtown area of communities with a bypass was 18.4% versus 10.9% in similar communities without a bypass."
  - "Retail businesses accounted for larger sale of businesses on a bypass (57.4%) than in downtown are (31.1%). Retail businesses less common in downtown area of communities with a bypass than in communities with no bypass."
  - "The reallocation of retail activity from downtown out to a bypass results from the location of new businesses on the bypass, rather than the relocation of existing downtown businesses to the bypass. Only 7.6% of businesses located on the 8 bypass areas studied were previously located in the downtown area."
  - "Surveys of a group of 6 to 8 businesspeople, media representatives, and government officials in 8 bypass communities revealed a general satisfaction with a bypass. Most respondents were pleased with improved flow of traffic, and believed bypass promoted growth in the community."
  - "Even the majority of downtown business owners who were contacted believed either that the bypass had helped or that it had no significant effect for retail and service industries throughout the community, although they were more negative regarding the effect of retail downtown."
  - "Some interviewed were concerned that the severity of traffic accidents in the community had increased since construction of the bypass, while others were concerned that water-runoff had increased, or that industrial pollution had increased due to industry that located on the bypass. Bypass construction also occurred largely by displacing existing farmland."

- Gaps identified by researchers:
  - "The findings of this study...tended to be on a very aggregate level." (p.32) Subtleties were not addressed.


- Objective – Analyzed impact and effect of bypasses on Central Business Districts through synthesis of existing literature
- Methodology
The analyses of small town bypasses include a Wisconsin study of 17 communities (Wisconsin DOT, 1998), a Kansas study of 21 communities (Burress, 1996), an Iowa study of 11 communities (Anderson and Otto, 1991), a Washington State study of 3 communities (Gillis and Casavant, 1994), an Australia study of two communities (Bureau of Transport and Communications Economics, 1994) and statewide studies of bypassed communities in North Carolina (Blackburn and Clay, 1991) and Texas (Texas Transportation Institute, 1995).

- Findings
  - Bypasses do not necessarily result in a reduction in total traffic volume in the downtown area. Often, the removal of most truck movements and other pass-through highway traffic encourages more local traffic, which had previously avoided the downtown area due to heavy traffic. The result is often little or no change in total traffic levels, which is often associated with improved travel opportunities for local residents and access for downtown businesses.
  - Even in cases in which bypasses have a limited impact on redirecting traffic, development and economic impacts can be profound. Bypasses designed to serve local traffic can have a significant impact on the development and location of retailing and local services. But generally, retailers will locate only in areas with an existing population base.
  - A new bypass route without supporting infrastructure ignites a development explosion. In the absence of water and sewer services, local interchanges and local access roads, bypasses around small cities usually do not facilitate sprawled development in outlying areas. In the longer term, outer-beltway bypasses can be expected to have profound effects on development patterns, but in smaller cities this impact could take 20 or more years.
  - A new interstate highway corridor can open up sites for industrial development to attract investment from outside of the region. Proactive planning by local authorities can catalyze industrial development in the vicinity of interchanges. Regional planning controls can be important to prevent sprawl and over-development of retail space, although in practice such controls require significant effort and are not always in place. In cases where a bypass goes through several jurisdictions, there is likely to be competition for tax-producing retail and other commercial businesses.
  - Downtown areas hard-hit by the proliferation of shopping malls of the 1970’s and 1980’s are likely to have already restructured away from consumer retailing to new roles as office, financial, health and entertainment centers even before they were bypassed by more recent highway improvements. In response to those changes, city centers have become increasingly specialized centers for institutions and the service sector of the economy.
  - Outer beltways entail both benefits and costs for inner cities. Cities cannot always compete with open space (“green field”) sites for new industrial and commercial development when those businesses are seeking large lots. Cities must continue to reinvest in and upgrade their infrastructure and buildings to continue to attract new industrial, office and commercial development.

- Gaps
  - Focusing more on economic impact and not business planning and processes of bypasses and alternatives; Need more information on effect and coding of small v. medium cities.


- Objective – “A comprehensive literature search was undertaken by Wilbur Smith Associates to identify empirical evidence on the economic effects of highway bypasses on small communities. This working paper summarizes the findings of four representative studies that undertook to measure the economic influence on small towns and cities of bypasses.” (1)
- Methodology
The studies evaluated over 100 communities located in Iowa, Minnesota, Wisconsin and Texas that were bypassed at various times over the past thirty years.

Personal interviews with business owners and city leaders of twenty bypassed Iowa cities were conducted to gauge the impact on these communities.

Researchers at the University of Texas – Austin, conducted a study in 1993 that compared experiences of bypassed Texas cities with those of a select group of similar, unbypassed cities as a control. Economic models were employed to analyze general changes in retail sales, gasoline sales, restaurant sales, and service station receipts. The models incorporated both highway and non-highway related variables.

Findings

- The longer merchants had been in business, the more they favored the bypass.
- Overall, owners representing all business sectors were in favor of the bypass. If they could know then what they know now, three times as many owners would favor the bypass.
- Over half of the merchants believed their quality of life had improved since the opening of the bypass.
- Over half felt that the opening had no impact on the success or failure of local businesses. Rather, any decline was related to a general economic downturn.
- Merchants in four categories (food service, eating and drinking establishments, service stations, and motels) thought that they had lost customers since the opening of the bypass.
- Following an audit of actual receipts, only eating and drinking establishments had actually declined.
- The distance a city was from the bypass is important, as is the city’s distance from a larger urban center.
- The business community adopted a more universal support for the bypass emerged.


Objectives

- “To provide WisDOT and communities with an objective, data-driven analysis on the economic impacts of bypasses on communities.
- To provide WisDOT and communities with an analysis of bypass impacts based on perceptions of the community and businesses.
- To recommend a method for WisDOT to continue these types of analyses in the future.”
- “The study focused primarily on the economic impacts of highway bypasses. Issues and topics analyzed included impacts on retail trade, development, land use, general quality of life, and overall economic health of communities” (Yeh, Gannon & Leong, p. 5)

Methodology

- Sampling
  - 17 sites with bypasses in Wisconsin, population sized 304-28,089
  - Each site matched with one of three groups of controls (Yeh, Gannon & Leong, p. 6)
    - The control communities were grouped into categories of “small” (less than 2,000 population), “medium” (2,000-5,000) or “large” (more than 5,000).
- Economic data analysis
  - ADT counts from WisDOT;
  - Community population data from the Wisconsin Demographic Services Center;
  - Employment estimates from the Wisconsin Department of Workforce Development;
  - Retail trade data from the US Census Bureau.
- Focus Group Interviews
  - Conducted in 8 of 17 bypasses communities
  - “All interviews included basic questions asked concerning the bypass impacts on development, land use, commerce and general quality of life” (Yeh, Gannon & Leong, p. 6).
- Site visits to all bypassed communities
  - “Business databases, land use maps, and community profiles [were sourced to create] Geographic Information System (GIS) to identify relationships between the bypass facilities and businesses, developing areas, community boundaries, and other geographic elements of the community” (Yeh, Gannon & Leong, p. 6)
- Old Route Travel surveys for 5 communities with 44% mail-in response rate
- Findings
  - Travel Survey Results (Yeh, Gannon & Leong, p. 12)
  - (Yeh, Gannon & Leong, p. 4)
    - “In most communities, highway bypasses have little adverse impact on overall economic activity. The economies of smaller communities have a greater potential to be adversely impacted by a bypass.
    - Over the long term, average traffic levels on the ‘old routes’ in medium and large bypassed communities are close to or higher than prebypass counts, indicating continued strong economic activity in those communities and the opportunity for retail trade to flourish.
    - Very little retail flight has occurred in bypassed communities, meaning that few businesses have relocated or developed new operations in areas adjacent to the bypass route.
    - Communities view their bypasses as beneficial overall, while at the same time communities and individual businesses understand that the bypasses presented changes that must be addressed proactively.”
  - (Yeh, Gannon & Leong, p. 8)
    - “Most bypass communities had significant economic growth occurring before the bypass was constructed. This growth was one of the reasons the bypasses were needed.
    - There was no significant change in population, employment and retail trade trends in most communities after the bypass was opened.
    - Economic growth in bypass communities generally exceeded trends in the appropriate control group communities.
    - Medium and larger communities continued to show economic growth after the bypasses were opened. Almost all statistical and anecdotal evidence indicates that these places represent ‘destinations’ for the region. The presence of homes, employment centers, schools, government offices, parks, churches, hospitals, and stores defined these communities as commercial and cultural centers.”
  - (Yeh, Gannon & Leong, p. 16)
    - “For WisDOT:
      - Use these findings to respond in part to the budget mandate to study bypass impacts.
      - Continue to acknowledge local interest in planning issues for bypasses.
      - Take appropriate follow-up actions to ensure benefits of the bypass and minimize adverse impacts for the community.
  - For Communities:
    - Understand that bypasses are generally beneficial, with few adverse economic impacts.
    - Small communities need to develop and market themselves as “destinations” to minimize adverse economic impacts from a bypass.
• Several of the bypassed communities have created downtown development and restoration organizations, with some involved in the Main Street Program run by the Wisconsin Department of Commerce. Other communities have been proactive in placing directional and informational signs along the bypass to attract travelers into their city or village.
• Bypasses will create a number of changes and issues to a community that should be addressed proactively.
  ▪ For Businesses:
  • A bypass should be addressed just like any other market-related circumstance.
  • Opportunities for retail commerce will exist and need to be pursued.”