Economic Impact of the Garden Parkway

April 28, 2011

John E. Connaughton, Ph.D

UNC Charlotte

TABLE OF CONTENTS

Economic Impact of the Garden Parkway

Prepared by: John E. Connaughton, Ph.D.

April 28, 2011

Economic Impact of the Garden Parkway

Section 1: Overview

This report estimates the economic impact of the Garden Parkway Toll Road on the Gaston County, North Carolina economy. The proposed Garden Parkway is a 21.8 mile limited access highway which begins in Mecklenburg County at I-485 near Douglas International Airport, heads west across the Catawba River through southern Gaston County, and turns north to intersect with I-85 west of US 321. The highway is scheduled to have nine interchanges, with eight of those interchanges located in Gaston County. The proposed construction plan is estimated to take four years, beginning in 2012, with the road open to traffic in late 2015. The estimated construction cost is $870 million, with roughly 85.9 percent of the construction costs occurring within Gaston County.

This study consists of four parts. The first part provides an overview of the Garden Parkway and an outline of the report. The second section of the study focuses on the historical economic impact of similar highways built around the country. The Transportation Project Impact Case Studies (T-PICS) provides a national database of before-and-after case studies assessing the economic development and related impacts of transportation projects. The Economic Development Research Group (EDRG), Cambridge Systematics, Wilbur Smith Associates, Texas Transportation Institute and Susan Moses Associates prepared the database and case studies. This section also provides a detailed analysis of both the academic and professional literature on the subject of highways and economic development.

The third section reviews the economic structure and growth of the Gaston County economy within the Charlotte metropolitan statistical area (MSA). This section looks at snap shots of the MSA economy from 1980, 1990, 2000 and 2010. Over this thirty-year period, comparisons of economic structure, economic growth, population growth, and household growth are made for the MSA, Gaston, Cabarrus, Union, York counties. The comparisons focus on identifying the growth and development patterns of the four counties with respect to the overall MSA growth and provide insights into which counties had success tapping into regional growth and why. The

analysis in this section provides the framework for projecting economic growth and development into the future as infrastructure attributes among the counties change.

The final section of this report provides an economic forecast for Gaston County focusing on the differences in population, household, and employment based on the building of the Garden Parkway. The forecast present in this section use the findings of the previous sections of the report for the basis for projections. The forecast specifically focuses on the changing industrial structure of the Gaston economy within the larger MSA and the differing economic outcomes of the Build/No-Build Scenarios. It also answers the following questions:

- What have the structural changes in the Gaston economy meant and what role will the county play in the future economic growth of the region?
- What is the impact of removing a significant geographical barrier (the Catawba River) that separates southern Gaston County from the central county of the MSA?
- What impact will the Garden Parkway have by opening up a large area of limited developed land so close to the central county of the MSA resulting in ease of access to Mecklenburg County, the city of Charlotte, and the international airport?

Section 2: Review of the Literature

This section provides a review of the current literature as it relates to the relationship between new highway construction and economic growth. The articles reviewed look at a variety of economic measures from employment growth, income level, population growth, productivity, and property values. This section is divided into three parts. The first looks at scholarly articles, the second reviews professional reports, and the third section provides a quantitative review of a number of highway projects and the estimated economic impacts resulting from the existence of a new highway on the local economy.

Part A: Scholarly article literature review

In a 2000 study appearing in the journal, *Regional Science and Urban Economics*, Amitabh Chandra and Eric Thompson examine the relationship between large infrastructure spending, of

the type implied by interstate highway construction, and the level of economic activity. Their article, "Does Public Infrastructure Affect Economic Activity? Evidence from the Rural Interstate Highway System", uses historical data from the U.S. interstate highway program from 1969 to 1993. It tests whether interstate highway construction had a positive impact on local economic development and focuses on non-metropolitan counties. This restriction allowed them to avoid the problem of causality and analyze if high growth was a result of the highway. Otherwise, an area already experiencing high growth may build a highway which serves only to sustain the growth.

Chandra and Thompson identify 185 non-metropolitan counties which received at least one highway after 1969 that did not have a highway before. They also identify a set of 391 adjacent counties. Their constructed econometric model tests the effects of the highway on local income (they use income because output data was hard to find for all of the counties). Their econometric model includes national, regional, and local factors that influence the level of local economic activity. In addition, their model controls for state-level trends and time.

Their findings are consistent and fall into two general areas. First, they find that construction of a new interstate highway raises economic growth, as measured by total earnings, in counties that the highway directly passes through. These counties also experienced an increase in earnings in the manufacturing, retail trade, services, and TCPU (transportation, communications, and public utilities) industries. Also, manufacturing earnings increased in counties adjacent to highway counties. Second, they establish that adjacent counties experienced a reduction in retail trade and government earnings due to the highway's opening.

In non-metropolitan areas the overall economic activity may not increase as a result of the interstate highway. The positive effects to the counties located along the highway seem offset by declines in economic activity to counties adjacent to the new highway. This is an interesting result and suggests that in nonmetropolitan areas there are clearly winners and losers as a result of new highway construction. The winners are those counties that get the road.

Not only is there an ex-post impact of new highway construction for non-metropolitan counties that receive an interstate highway, but there also appears to be an ex-anti impact. Chandra and Thompson's research finds that there are significant ''run-up'' effects in local economic activity in the years immediately preceding the opening of a new interstate.

They also acknowledge that while their empirical estimates were for non-metropolitan counties, they may also be instructive regarding the impact of highway infrastructure on metropolitan area economies. Their research indicates that the manufacturing sector might grow in metropolitan areas that receive a new interstate highway. In addition, a metropolitan area also might not see the losses in the retail industry that occur in non-metropolitan regions, in part due to the leakage of retail activity down the highway to nearby metropolitan areas. As a result, they suggest that the potential for new highways located in metropolitan areas will likely lead to a net increase in economic activity. However, metropolitan areas may also experience the same rearrangement of economic activity within the region and among the industries identified in the study.

This research clearly suggests that interstate highways have a positive effect on local economic development and there are measurable differences in economic activity between counties on the interstate and counties adjacent to the interstate.

A 2003 study in the *Journal of Planning Education and Research* titled "The Economic Benefits of Public Investment in Transportation: A Review of Recent Literature," by Saurav Dev Bhatta and Matthew P. Drennan reviews recent empirical articles on the long term benefits of the subject of the article. The central question of all the literature reviewed is whether there are long term economic benefits yielded by public investments in transportation.

The article points out that much of the literature focusing on these impacts has been published in economic and academic journals. As a result, planners who could utilize this information in winning funding have not traditionally had easy access to the information. It further points out that the benefits of these investments should be obvious but are often difficult to measure with the masses of raw data.

The authors explain the short term and long term benefits to investment in transportation infrastructure. Possible short term benefits are the employment, earnings, and spending stimulating the construction industry and their suppliers. The article's main focus is on the long term, however, and organizes the literature into five categories depending on the particular long term benefit studied: output; productivity; production costs; income, property values, employment, and real wages; and rate of return. A sixth benefit is mentioned, reductions in noncommercial travel time and improved quality of life, but is not discussed in the scope of the review due to the difficulty in providing analytical data on the subject.

The article goes on to review the long term benefits under defined headings and points out the literature studied and its findings. Fifteen studies used output as their measurement of the long term benefits. The studies used applied theory of production to measure the output based on measures of input, in this case public infrastructure investment. Twelve of the fifteen studies found a positive and statistically significant effect of investment on output. Productivity studies are measured in real output per unit of labor. Six of the eight studies reviewed found a positive significant relationship between public capital and productivity. All nine of the studies dealing with costs of production demonstrated a negative, statistically significant relationship between public investment and cost of production. In other words, the higher the investment, the lower the cost of production. The article reviewed fourteen studies dealing with income, property values, employment, and real wages. Nine of the studies found a positive, statistically significant benefit. Only two studies provided empirical estimates on rates of return, and they both find the true rates of return are higher than the estimated rates of return.

Of all the studies reviewed in all the categories, only two found a negative relationship between public investment and long term benefits. The few remaining that were not positive could not prove or disprove a positive relationship. The authors also point out that the most useful studies deal in geographic analysis below the state level. They conclude that the vast majority of studies demonstrate different numerical answers but arrive at the same conclusion: there is a positive and statistically significant relationship between public investment in transportation and long term economic benefits.

In a 1999 annotated bibliography for the U.S. Department of Agriculture entitled "Highway Investment and Rural Economic Development," Dennis M. Brown summarizes studies on the rural economic development of highway investment. Most of the articles summarized were written within the last twenty years. While the primary area of study is rural areas, some urban studies are included.

The article begins by noting that it is a commonly held view that highway investment is an effective economic development tool and the Federal Government recognizes this with substantial funding for projects with that stated end. The author goes on to summarize the economic theories used in studying the impacts of highway investment. These include regional development theory, regional growth theory, growth pole theory, location theory, trade theory, and econometric modeling. The difficulties with these theories lies in parceling out whether the development would have occurred without the construction of the highway and looking at the effects in a narrow framework by not taking into account the larger regional growth process.

The articles included in the summary are divided into categories: aggregate economic effects, industrial location decisions, industry studies, spatial effects and studies of temporal effects. The author then cites several studies under each heading and describes the main findings of the individual studies.

Aggregate economic studies deal with those effects on employment, income, output, population, and rates of migration. Most of the articles used regression analysis to explore how highway construction affects regional economies. Industrial location studies focus on how highways affect a business entity's decision to locate within proximity. These articles used surveys to assess this decision. Industry studies focus on how transportation investment affects an industry or sector. The articles are usually divided into manufacturing, retail, wholesale, and services. Studies of spatial effects focus on local impacts. These explore patterns of industrial, commercial, and residential development and their impacts on employment, income, and population. Studies of temporal effects take both short term and long term effects and analyze how highway construction affects the studied time periods.

A discussion of the costs of new investments is included as well. A main concern is that new investment diverts economic activity from an existent road. Also, in situations with low population sizes there may be a burden of highway maintenance costs spread amongst too few residents. The article notes this can be mitigated with good foresight and planning.

In conclusion, the studies summarized find transportation infrastructure is important in generating local economic development. The primary impacts in rural areas are increased employment, particularly in manufacturing and retail, and that new highways specifically benefit rural counties in close proximity to metro areas. This growth results in higher wages for workers and increased net income for local business owners. In rural areas, other benefits include improved access for residents and businesses, reduced transportation costs and travel time, safety and environmental gains, and cost savings due to more competitive pricing.

An article by David A. Aschauer, the senior economist for the Federal Reserve Bank of Chicago, entitled "Highway Capacity and Economic Growth," posits that, "the quality and quantity of highway transportation systems have a direct bearing on economic growth." The author begins the paper by pointing out that shorter commuter trips spurred by the decentralized location of firms along the freeway system have had positive impacts on regional economic growth.

The article works under three empirical implications: 1) infrastructure capital brings a positive marginal product in a "private-sector neoclassical production technology"; 2) infrastructure capital compliments private capital and can enhance the marginal product of private capital; and 3) infrastructure investment likely stimulates private investment in plant and equipment.

The article begins by establishing a conceptual approach for the connection between the level of highway capacity and the growth rate of per capita output. The analysis centers on "the linkages among highway capacity and the production of transportation services, private sector investment, and economic growth." The author then details the economic concepts by explaining the formulas and models used for this approach.

The data analyzed in the article is on sample averages of real per capita income growth and measures of highway capacity and quality (measured as the total road mileage in a state relative to the square mileage of the state) throughout the lower forty-eight states from 1960 to 1985 to determine the long term relationship between the transportation infrastructure and economic growth. The conclusion of the data is that a more extensive and higher quality highway system expands transportation services and "raises the marginal product of private capital." This, in turn, induces investment in physical capital and grows per capita income and output.

"The Economic Impacts of LULUs," a paper published in *Environment and Planning C: Government and Policy* in 2000, written by Terance J. Rephann, examines locally unwanted land uses (LULUs) and their effects on communities. The paper studies five different kinds including large dams, prisons, commercial nuclear power plants, gambling casinos, and of particular importance to the scope of this literature review, interstate highways. The author uses "quasi-experimental control-group methods" to investigate the economic impacts of LULUs on US counties from 1972 to 1994.

The author points out the criticisms leveled at these projects in the form environmental, social, and distributive effects. The paper then goes on to discuss some of the reasons these projects are underappreciated in terms of economic growth and development effects. In terms of highways, the areas which are more urbanized and centrally located experience more growth and the retail trade and service sectors benefit the most from their development.

The methodology used in the paper takes a control group of counties and compares them to a group of counties with a similar makeup that received investment in LULU infrastructure. The goal of the comparisons is to monitor the growth rates of the counties with the perceived undesirable project with those that did not receive any such investment. In addition, the control counties must be at least sixty miles from a county with a LULU facility and must be similar in terms of industrial structure, spatial characteristics, and demographics. The economic impacts were then measured using data from the Regional Economic Information System.

The results of the data comparisons show that counties with highway investment showed an ability to influence the location decisions of firms and residents. The conclusion of the study is that few negative effects come from these LULUs, and interstate highways actually stimulate aggregate employment.

Part B: Professional reports review

A report titled the "DRA (Delta Regional Authority) Delta Development Highway System Plan" explores the considered development of the highway system in a 240 county and parish region in eight states. The report proposes economic opportunities that result from highway investments should be a key factor in the building decision process and provides a cost-benefit analysis and literature review.

A table in the report details that the 3,843 mile highway system's total economic benefit in annual terms is $3.5 billion in personal income, 130,000 full time job at an average annual salary of $27,000, and 104,000 temporary construction jobs. The personal income category is divided into increased travel efficiency and increased economic development. The travel efficiency is measured through travel time savings, vehicle operating cost savings, and safety benefits. The economic development is measured through business attraction or expansion and improved connectivity to economic centers. The industries most likely to see increases in long term employment are tourism (hotels/motels), retail and eating, warehousing and distribution, food product manufacturing, professional services, and non-durable manufacturing.

The report goes on to describe the sources of the economic impact which are direct impacts, increased economic efficiency, and business attraction impacts. Direct impacts are those associated with the immediate construction of the highway system. Increased economic efficiency comes from improving freight movements and connectivity while mitigating congestion. This frees up resources and offers more competitive pricing which leads to a region's overall economic competitiveness. Business attraction comes in the forms of firm location/relocation and increased tourism and roadside service industries (gas stations, restaurants, hotels). The report is careful to note that the benefits of infrastructure investments

are not evenly distributed throughout the economy and different industries benefit more than others.

In the literature review section of the report, the text provides a summary of "rules of thumb" from the economic reports on highway construction. These rules are:

- Infrastructure improvements are necessary but not sufficient conditions for economic growth.
- Aggregate multi-county studies have found higher employment and earnings growth rates in counties served by the highways than those not served.
- The benefits industries derive from highway improvements differ across industries.
- Most industries enjoy reduced costs as a result of highway improvements.
- Retail and manufacturing seem to especially benefit from highway improvement.
- Highway construction has shown a tendency to increase property values and development densities for locations in close proximity to highways.
- Industrial returns to infrastructure improvements diminish over time.
- Changes in highway network investment lead to larger changes in productivity growth in vehicle-intensive industries.
- Cost reductions due to an increase in highway capital may lead to a reduction in output price.
- Highway capital and private capital are complements.

In conclusion, the report finds that the construction of the highway system would facilitate economic development. It should be viewed as part of a larger context in the form of a regional economic development plan for the eight-state region.

The Federal Highway Administration, part of the U.S. Department of Transportation authored a report titled "Economic Development History of I-81 Corridor" to overview the history, associated socioeconomic data, and major changes as a result of the construction. I-81 is a north-south interstate that runs from the US-Canada border to I-40 in Tennessee. The report focuses on the 234 mile portion through eight counties in Pennsylvania.

The history section focuses on the construction, the reason for the project development, and a regional profile with sections on the different metropolitan statistical areas (MSAs). Construction began in 1958 and finished in the mid 1970s. In 2001 there was also a widening project undertaken in parts of the highway. The main reason for the project was to provide a north-south route that connects the east-west routes of I-40, I-70, I-80, and I-90. It has since become a major shipping route for agricultural products and an alternative for shipping and travelers wishing to bypass the crowded I-95 corridor around the New York City area.

The section on socioeconomic data focuses on population, employment, personal income, industry mix, property value changes, and residential construction. In aggregate, the populations of the southern counties grew while those in the north shrunk. Between 1969 and 2002 the employment along I-81 increased by 251,461 jobs, and from 1972 to 1992 the employment growth in all but one southern county outpaced the state's annual growth. Personal income in the northern region is lower than the southern region, but both incomes are on the rise. As in the rest of the country, the employment mix of the eight counties has increased in the service sector and decreased in the manufacturing sector. In the 1990s the property value in the southern region increased. The value in the northern region during the early to mid 90s actually decreased due to the restructuring of the economy, but has actually increased from 1998 to 2002 by 60%. There was a statewide decline in construction during the 1990s that was reflected in the counties studied.

The major changes due to the highway's construction are associated with economic development. In the southern region traffic freight has increased due to Harrisburg being a strategic location with links to Baltimore, Philadelphia, New York, and New England. Also, military supply depots have expanded in the area and several new businesses have located around the two intermodal hubs. In the northern region the trucking and warehousing industries grew while the manufacturing industry went through a decline throughout the state. Recreation, amusement, and commercial development has also occurred.

In summary, the report emphasizes that the highway has grown from a regional connector to a major interstate trucking route which has supported economic growth for the regions surrounding the highway. Currently, 36,000 to 79,000 vehicles use I-81 per day with 30% of them trucks.

Another report authored by the Federal Highway Administration, "Economic Development History of Interstate 43 Corridor," looks at the north-south highway located in Wisconsin. The report covers the original section between Milwaukee and Green Bay. It is divided into discussions about the history, socioeconomic data, and major events.

The history section discusses reasons for project development, the details of construction, traffic counts and profiles of the regions located along the highway. In the 1960s the Federal Government approved the interstate, and the eastern route was completed in 1981. When the report was published, the western route was still under construction. Previously, the interstate system only linked the state's two largest cities, Madison and Milwaukee. The route runs through five counties, with four of them considered metropolitan. Based on traffic counts, the Green Bay portion of I-43's use has increased faster than other regions along I-43.

The socioeconomic data section discusses population, employment, personal income, industry mix, business establishments, property value changes, and residential construction. From 1960 to 2000 the data suggests steady population growth in all but Milwaukee County which experienced a gradual decline. The largest concentrations of employment are in Green Bay and Milwaukee. However, employment grew in all of the counties and even in Milwaukee County where the population declined. Average per capita income along the highway corridor is higher than the state average and Ozaukee County is highest in the state. The economic shift in the areas along the highway is the same as the state overall: the service sector grew while the manufacturing sector decreased. In conjunction, the service and construction businesses located along the corridor increased from 1990 to 2000 while agriculture, mining, transportation, and utilities declined. From 1984 to 2002 property values increased. This is a leading indicator of economic growth. Residential construction growth was mixed. The report notes this may be related to the higher prices of housing towards the end of the time period studied.

The major events section focuses on the economic developments located along the I-43 highway. Most of the events have occurred around Green Bay, the city that was linked to the interstate transportation network by the highway. These have been in the form of start-ups, expansions, and relocations. The other counties have also benefited in the form of growing retail, industrial, services, and hospitality industries. Milwaukee County, an already densely populated center, has enjoyed the benefits of increased commuter access for suburban residents to the urban city center.

In conclusion, the report notes I-43 has become a major route of goods and transportation and contributed to the economic development of the counties along the highway, especially in Green Bay. With the exception of Milwaukee County, which was already well connected with highway infrastructure, the other counties have grown rapidly as well.

A 2008 project by Mulatu Wubneh from the Urban and Regional Planning Program, Department of Geography at East Carolina University, titled "US Highway 17 and its Impact on the Economy of Eastern North Carolina," explores the economic impact of an improved highway through trends in demographic and economic growth. It uses these figures to analyze a region which has historically lagged behind the rest of the state by exploring how much of the $2.4 billion federal and state investment has contributed to economic growth. The study gives an overview of infrastructure and economic development, discusses the short and long term impacts, looks at transportation and socioeconomic characteristics of Eastern North Carolina, and provides economic impact models and estimates.

The project begins by providing the different perspectives on the links of investment in infrastructure and economic development. While it is well recognized that infrastructure plays a critical role in economic development, it is difficult to quantify. The author cites several studies that link positive development to highway investment and mentions two that show no relationship. Those that show no relationship argue that other factors could contribute to economic growth. Therefore, the project focuses on identifying the actual measurable benefits that accrue as opposed to attempting to guess relationships and determine causality.

The study divides the benefits into short term and long term. The quantifiable short term benefits are demonstrated in output, earnings and employment. Total output is estimated over $5.5 billion, total earnings over $1 billion and total jobs over 20,000. The long term benefits include increased safety, reduced travel time, dollar savings for businesses due to reduced transportation costs, and enhanced regional capacity. The last benefit can be explained by new business attraction, retaining existing businesses, enhancing property values, additional tax revenues, and improving employment capacity. Long term benefits are more difficult to quantify than short term ones.

In terms of socioeconomic data, the study defines the region as the 41 counties serviced by the Office of Economic Development (OECD) of East Carolina University. Many of these counties lag behind the state average in population growth, per capita income, total earnings, unemployment, and percentage of adults with no high school or college education. In addition, the counties that Highway 17 runs through have the lowest average road density of the region and overall state. In a comparative analysis the aforementioned counties did better than the whole of eastern North Carolina in several social and economic characteristics.

The modeling section explains the terms outlined in the benefits section and the input-output models used to measure those benefits. Direct impact is the spending on the highway construction directly introduced into the local economy. The indirect impact consists of the effects from the direct spending based on an input-output model that represents “inter-industry linkages.” The induced impact represents the expenditures of households as employees spend their wages and salaries. The total impact is the sum of all three impacts. The author uses the Regional Input Output Modeling System II (RIMS) to estimate the impacts.

The project concludes that the highway will provide a transportation infrastructure that will advance the local economy by improving the investment climate of the region. Its presence will attract new businesses due to reduced transportation costs, support existing ones, and increase local output and employment. In addition, investment in infrastructure has a multiplier effect that continues to grow over time and will provide benefits to the region in the long term.

A 2010 report by the Center for Business and Economic Research at the University of Alabama and commissioned by the Coalition for Regional Transportation explores the impact of the 21-year construction of the 52.5-mile Northern Beltline (NB), or I-422 in Jefferson County, Alabama. The authors of the report are Samuel Addy, Ph.D., Ahmad Ijaz, Carolyn Trent, Kathleen Gabler, and Jonathon Law. The report provides an existing conditions review, population projections and economic forecasts, impacts, and concludes with a section on environmental justice.

The report begins by describing Jefferson County and the Northern Beltline corridor. During the last 20 years the county's population grew at a slower rate than the rest of the state with most of the growth occurring in suburban metro areas. Due to these demographics, average commuting time has increased. As of April 2010, the county unemployment rate was 10.2%.

Next, the report provides population projections and economic forecasts in five-year increments through 2040 derived from baseline growth in business activity and population change. The population projections use census data from the previous decade, and the authors predict the NB Corridor will grow faster than the rest of the county with increased job prospects from the new highway boosting that growth. The study provides economic data for the county, metro area, and state since the corridor is too small an area to allow for accurate forecasting. Total employment is projected to grow by 43% in the state, 16% in the metro area, and 22% in the county.

The section on impacts presents the potential impact of the NB on the economy, population, business growth, and communities. The construction phase is a one-time only benefit and depends on the length of time the project takes while the post-completion effects are continuous and those are presented on an annual basis. The authors divide their impact estimates into household or economy-wide impacts. A construction cost estimate of $3 billion was used in conjunction with multipliers from the RIMS II to determine economic impacts.

The study concludes that nearly 70,000 construction jobs will be generated during the construction phase, and 20,000 new jobs created annually due to the economic growth attributed to the completion of the beltline. In addition, the economic impact will result in $155 million in

additional tax revenue for the state, county, and local governments during the construction phase, with $54 million of additional annual tax revenue for local governments after the completion of the project.

Part C: T-PICS

The following section highlights seven highway transportation projects, and the pre and post data regarding their economic impacts on the local counties. The projects included are the Verona Bypass, the Wichita Northeast Bypass, the final leg of the Henderson I-515, the Georgetown Bypass, US Highway 281 in San Antonio, US 460, and the I-785 Bypass in Danville, Virginia.

Transportation Project Impact Case Studies (T-PICS) provides a national database of before-and-after case studies assessing the economic development and related impacts of transportation projects. It allows users to search for relevant case studies that fit specific criteria and to review a wide range of impacts for specified types of projects. The database includes narratives and pre and post-construction data describing economic, community development, and land use characteristics of the cases, and provides a searchable and downloadable data base that can be used by both planners and policy-makers.

The system was designed and developed by Economic Development Research Group (EDRG) and ICF Consulting. Case studies were prepared by EDRG, Cambridge Systematics, Wilbur Smith Associates, Texas Transportation Institute, and Susan Moses Associates.

The Verona Bypass in Wisconsin is a 2.7-mile four-lane semi-circular beltway around Verona, a growing suburb of Madison, which began construction in 1990 and ended in 1995. Both federal and state sources funded the project. The bypass was part of a series along Highway 18/151 in the 1980s and 1990s to provide four-lane highway access between Madison and the Iowa border. The project cost $30 million and resulted in more even growth to the south of Verona. In addition, there was a 60% reduction in traffic through the downtown area with only the loss of a few fast food and gas stations that served the commuter traffic. The city annexed 88 acres served by the bypass to the south and zoned it for commercial and industrial development. In that space

developers built 1.8 million square feet of retail, industrial, and office space with an additional 4,000 new jobs.

The Wichita Northeast Bypass in Kansas, a 10.5-mile four-lane bypass that runs northeast of the city through a suburban quadrant, began development in 1989 and completed construction in 1993. The state, county, and city all contributed to both the design and funding of the bypass. The purpose of the construction was to add capacity and improve mobility to an already congested area whose residents suffered lengthy commuter times. The project cost $103 million and resulted in a business park, upscale office space, retail, and residential complexes. This development contributed an estimated 24,000 new jobs to the region since its completion with $1.2 billion in additional annual income. It also decreased commute times from the suburbs to the downtown area.

I-515 in Henderson, Nevada is a 20-mile spur of Interstate 15 in the Las Vegas Valley of Nevada that began construction in 1982 and finished in 1994. The data regarding this project refers to the last leg of the highway, an almost six-mile section from I-215 to the South Boulder Highway in Henderson, NV. This portion, which cost $140 million, began construction in 1990 and ended in 1994. The overall goal of the project was to replace the Boulder Highway as the main southeastern access to Las Vegas. The project resulted in an estimated 850 jobs directly related to the highway due to commercial development around the new interchanges. Planners and realtors noted that residential development was not the result of the highway, however, since the city experienced massive growth in 27 planned communities, only one of which was in the studied corridor. The study concluded that it was difficult to distinguish the specific impact even though the adjacent zip code experienced less than half the employment growth of Henderson.

The Georgetown Bypass is a 5.5-mile four-lane alternative route to US 460 that runs south of Georgetown, KY. Construction began in 1991 and work completed in 1994 at a cost of about $24 million. Prior to construction, Toyota opened a manufacturing plant in the mid-1980s transforming Georgetown from a small town and doubling its population. The bypass served to reduce commuting bottlenecks to nearby Frankfort and Lexington from Georgetown, improve access to parts of the town, and accommodate future planned retail development. The project

opened up land for residential, retail, and industrial development to support the Toyota plant, however the study concluded the bypass was not responsible for any net job creation. The study does recognize it as a contributing factor in the county's overall growth since its construction.

The portion of US Highway 281 in San Antonio called the McAllister Freeway is an eight-mile portion constructed between 1969 and 1978. It cost approximately $40 million and used state funding since opponents challenged the use of federal funds due to conservation issues. The freeway serves as a connector between downtown and the wealthy northern edges of the city, including the airport that existed before the highway. The primary economic impact of the construction supported the tourism trade of downtown San Antonio by providing easy airport access and aided in the expansion of residential growth into farmland north of the city. In addition, estimates show the highway is responsible for over 10,000 jobs in the region with extensive development in retail, mixed-use development, office, and luxury condominiums.

US-460 is a bypass that serves as a connector between I-81 and Blacksburg, Virginia. Construction began in 1998 and ended in 2002, costing $187 million. The state transportation board approved the project to mitigate congestion and environmental degradation by providing a direct link from Blacksburg to Roanoke, a major freight thoroughfare. The construction helped spur growth in high tech businesses at a corporate park located on the bypass and provided additional traffic capacity for expansion of the football stadium at Virginia Tech University. The project contributed an estimated 748 jobs in the area and significantly cut down on congestion.

The Danville Expressway is a 15 mile-long four-lane highway constructed between 1987 and 2004 to bypass US 29. The project, costing $203 million, is part of a larger effort to connect Greensboro, North Carolina and Danville, Virginia to assist in the economic diversification and development of the region. Construction of the bypass served to ease job losses in tobacco and textiles by attracting industries that rely on interstate access to markets on the east coast. Such industries include food processing, building materials manufacturing, high technology vehicle manufacturing, plastics, furniture manufacturing, and precision parts manufacturing. The Expressway is responsible for over 2,100 jobs and $62 million in corporate and institutional investment. While the net increase in jobs is small, local officials maintain without the highway

the area would have faced significant job losses as evidenced in nearby Henry County where employment decreased 26% from 1987 to 2006.

Tables 2.1, 2.2, and 2.3 provide T-PICS data on the seven projects detailed above with an average of the relevant statistics for the affected counties. All seven of the areas demonstrated per capita personal income growth and growth in the number of jobs. The average income growth was 29% and the average job growth was 62%. With the exception of Danville, the population and population density of all the areas saw an increase (probably due to the job losses in Danville's shuttered industries prior to the highway construction). Average population grew by almost 39%.

Table 2.1 shows the economic impacts of the seven projects as well as the average impacts. All of the projects positively influenced the studied areas in terms of both direct and indirect jobs, income, and output. The average direct job creation was just under 4,000, and the average indirect job creation was just over 2,000.

In conclusion, the seven highway construction projects proved to have positive impacts on the local and county economies, providing both employment and income growth. The construction of a major highway project even proved to mitigate the otherwise negative effects of job losses in the Danville area.

Table 2.1

Overview of Selected T-PICS Highways

Highway	Construction Start Date	Construction End Date	Actual Cost	Actual Cost 2008	Length In Miles
Verona Bypass	1990	1995	$30,000,000	$42,382,480	2.7
Wichita Northeast Bypass	1989	1993	$103,200,000	$163,137,074	10.5
I-515 Henderson	1990	1994	$140,550,248	$160,195,288	5.9
Georgetown Bypass	1991	1994	$24,440,000	$36,415,261	5.5
US Highway 281, San Antonio	1970	1978	$40,400,000	$176,434,912	8.0
US 460	1998	2002	$187,000,000	$233,807,555	10.0
Danville, Virginia, I-785 Bypass	1987	2004	$203,000,000	$278,562,836	25.0
Average			$104,084,321	$155,847,915	9.7

Table 2.2

Income and Employment Impacts of Selected T-PICS Highways

	Pre Personal Income Per Capita	Post Personal Income Per Capita	Percent Change	Pre Number of Jobs	Post Number of Jobs	Percent Change
Verona Bypass	$34,534	$41,904	21.34%	272,694	344,798	26.44%
Wichita Northeast Bypass	$32,624	$41,440	27.02%	258,783	321,289	24.15%
I-515 Henderson	$32,715	$40,883	24.97%	478,884	1,141,180	138.30%
Georgetown Bypass	$28,714	$35,309	22.97%	14,855	27,697	86.45%
US Highway 281, San Antonio	$18,544	$35,426	91.04%	383,019	951,890	148.52%
US 460	$22,890	$23,321	1.88%	52,096	56,689	8.82%
Danville, Virginia, I-785 Bypass	$24,187	$27,775	14.83%	51,655	53,550	3.67%
Average	$27,744	$35,151	29.15%	215,998	413,870	62.34%

Table 2.3

Population and Economic Distress Impacts of Selected T-PICS Highways

	Pre Population	Post Population	Percent Change	Pre Economic Distress	Post Economic Distress	Percent Change
Verona Bypass	368,444	428,642	16.34%	0.35	0.57	62.86%
Wichita Northeast Bypass	394,706	469,321	18.90%		0.97	
I-515 Henderson	857,357	1,777,170	107.28%	0.76	0.91	19.74%
Georgetown Bypass	23,943	32,048	33.85%	0.80	0.47	-41.25%
US Highway 281, San Antonio	821,568	1,555,190	89.30%		1.02	
US 460	97,764	105,155	7.56%	0.42	0.70	66.67%
Danville, Virginia, I-785 Bypass	107,658	106,256	-1.30%	1.09	1.86	70.64%
Average	381,634	639,112	38.85%	0.68	0.93	35.73%

Tables 2.4 and 2.5 present the construction impacts of the seven T-PICS highways. On average, during the construction phase of the highway each region gained 3,993 direct jobs and a total employment impact of 6,032 jobs. In addition, the average output impact during the construction period was over $1 billion, while the average income impact of the seven projects was almost $300 million.

Table 2.4

Employment Construction Impacts of the Selected T-PICS Highways

	Verona Bypass	Wichita Northeast Bypass	I-515 Henderson	Georgetown Bypass	US Highway 281, San Antonio	US 460	Danville, Virginia, I-785 Bypass	Average
Direct Jobs	300	17,126	850	1,376	5,453	748	2,100	3,993
Indirect Jobs	212	6,851	816	124	4,547	542	1,176	2,038
Total Jobs	512	23,977	1,666	1,500	10,000	1,290	3,276	6,032

Table 2.5

Output and Employment of the Selected T-PICS Highways

	Verona Bypass	Wichita Northeast Bypass	I-515 Henderson	Georgetown Bypass	US Highway 281, San Antonio	US 460	Danville, Virginia, I-785 Bypass	Average
Direct Output	$35,861,301	$3,105,840,088	$113,044,998	$601,008,972	$724,286,987	$74,826,797	$213,690,994	$695,508,591
Indirect Output	$25,341,999	$1,242,439,941	$108,523,003	$54,160,702	$603,948,975	$54,221,699	$119,667,000	$315,471,903
Total Output	$61,203,300	$4,348,280,029	$221,568,001	$655,169,674	$1,328,235,962	$129,048,496	$333,357,994	$1,010,980,494
Direct Income	$14,284,400	$863,895,020	$42,235,001	$78,841,698	$277,019,012	$30,862,499	$75,970,596	$197,586,889
Indirect Income	$10,094,300	$345,588,013	$40,545,601	$7,104,900	$230,992,996	$22,363,800	$42,543,499	$99,890,444
Total Income	$24,378,700	$1,209,483,032	$82,780,602	$85,946,598	$508,012,009	$53,226,299	$118,514,095	$297,477,334

Section 3: Economic Structure and Growth of the Gaston County: 1980-2010

Gaston County is one of six counties that make up the Charlotte Metropolitan Statistical Area (MSA). The Charlotte MSA is the 33rd largest in the United States, with a 2010 population of 1,758,038, and was the seventh fastest growing among the 100 largest MSAs between 2000 and 2010 growing by 2.1 percent. Over the past five decades, this pattern of robust population and economic growth has been a constant for the Charlotte MSA. However, while the overall growth of the MSA during the last half century has been spectacular, not all of the counties within the MSA have experienced the same level of economic growth.

Mecklenburg County is the largest and fastest growing county within the MSA. In 1980 Mecklenburg had a population of 404,270 and accounted for 47.3 percent of the total MSA population. Gaston County was the second largest county with 19.0 percent of the population. By 2010 Mecklenburg's population increased to 919,628 and the MSA's largest county had 52.3 percent of the population. Meanwhile, Gaston County's population decreased from 19.0 to 11.7

percent of the MSA ranking third behind York County, South Carolina in a tie with Union County. Tables 3.1 and 3.2 present the population levels and percent of total MSA over the past 30 years.

Table 3.1

County Population: 1980 to 2010					
County	**1980**	**1990**	**2000**	**2008***	**2010**
Cabarrus	85,895	98,935	131,063	170,395	178,011
Gaston	162,568	175,093	190,365	205,101	206,086
Anson	25,649	23,474	25,275	25,345	26,948
Mecklenburg	404,270	511,433	695,454	878,961	919,628
Union	70,380	84,211	123,677	191,514	201,292
York	106,720	131,497	164,614	220,219	226,073
MSA Total	**855,482**	**1,024,643**	**1,330,448**	**1,691,535**	**1,758,038**

* Office of State Budget and management Population Estimates and Projections

In 2000 Mecklenburg County reached its peak percent of total population and has been constant over the past decade. Mecklenburg's share of total MSA population will likely decline as the overflow population growth spills over to the adjacent counties in the MSA. This pattern of population spillover is consistent with older MSAs that reached these population levels decades ago. Both Union and York Counties are already experiencing that spillover. Table 3.3 presents the population growth rates for the counties within the Charlotte MSA over the past four decades.

Table 3.2

County Population Percent of Total: 1980 to 2010					
County	**1980**	**1990**	**2000**	**2008***	**2010**
Cabarrus	10.04%	9.66%	9.85%	10.07%	10.13%
Gaston	19.00%	17.09%	14.31%	12.13%	11.72%
Anson	3.00%	2.29%	1.90%	1.50%	1.53%
Mecklenburg	47.26%	49.91%	52.27%	51.96%	52.31%
Union	8.23%	8.22%	9.30%	11.32%	11.45%
York	12.47%	12.83%	12.37%	13.02%	12.86%
MSA Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

* Office of State Budget and management Population Estimates and Projections

Between 2000 and 2010 Union County had the largest population growth rate followed by York County and then Cabarrus County. All three exceeded the Mecklenburg County population growth rate during that decade. Over the four decade period, only Union County had a faster population growth rate than Mecklenburg County. The second slowest growing county over the

Table 3.3

County Population Changes					
County	**1980-90**	**1990-00**	**2000-08**	**2000-10**	**1980-2010**
Cabarrus	15.18%	32.47%	30.01%	35.82%	107.24%
Gaston	7.70%	8.72%	7.74%	8.26%	26.77%
Anson	-8.48%	7.67%	0.28%	6.62%	5.06%
Mecklenburg	26.51%	35.98%	26.39%	32.23%	127.48%
Union	19.65%	46.87%	54.85%	62.76%	186.01%
York	23.22%	25.18%	33.78%	37.34%	111.84%
MSA Total	**19.77%**	**29.85%**	**27.14%**	**32.14%**	**105.50%**

30 year period and for each 10 year interval was Gaston County. Its population increased by only 26.8 percent over the 30 year period compared to the overall MSA grow rate of 105.5 percent. In fact, only Gaston and Anson County's population growth was less than the MSA average.

The MSA employment picture looks similar. Table 3.4 presents employment levels for the MSA and all six counties from 1980 to 2008. The information in Table 3.4 is based on U.S. Census Bureau County Business Patterns data. Over the 30 year period, Mecklenburg County has the largest level of employment. In 1980 Gaston County had the second largest level of employment and ranked well ahead of the other four MSA counties. By 2008 the employment level in Gaston County was actually lower than in 1980. In addition, Gaston County slipped to number three in total employment behind York County and barely ahead of Cabarrus County.

Table 3.4

Total County Employment 1980-2008				
County	**1980**	**1990**	**2000**	**2008**
Cabarrus	35,324	35,191	52,821	63,125
Gaston	67,413	72,861	70,768	65,344
Anson	6,542	7,404	6,219	5,344
Mecklenburg	238,593	366,224	498,694	560,059
Union	20,323	30,003	39,205	51,805
York	30,322	40,703	55,687	69,614
MSA	398,517	552,386	723,394	815,291

Table 3.5 presents the percent of total MSA employment for each of the six counties within the Charlotte MSA. Mecklenburg County is the clear leader in percent of total MSA employment.

In 1980 Mecklenburg accounted for 59.9 percent of total MSA employment, and by 2008 it accounted for 68.7 percent. The obvious outlier is Gaston County. In 1980 Gaston County provided 16.9 percent of total MSA employment and was behind Mecklenburg. By 2008 Gaston County accounted for only 8.0 percent of total MSA employment and had dropped to third in total MSA employment in a virtual tie with Cabarrus County.

Table 3.5

County Percent of MSA Total Employment 1980-2008				
County	**1980**	**1990**	**2000**	**2008**
Cabarrus	8.86%	6.37%	7.30%	7.74%
Gaston	16.92%	13.19%	9.78%	8.01%
Anson	1.64%	1.34%	0.86%	0.66%
Mecklenburg	59.87%	66.30%	68.94%	68.69%
Union	5.10%	5.43%	5.42%	6.35%
York	7.61%	7.37%	7.70%	8.54%
MSA	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Table 3.6 presents the total employment growth within the MSA over the past four decades. Overall, the MSA has increased its total employment level by 104.6 percent in 38 years. Three of the six counties have exceeded the overall MSA average. Union County has seen its total employment level increase by 154.9 percent, followed by Mecklenburg with a 134.7 percent increase. Gaston and Anson Counties are the only counties in the MSA where the employment level has declined during the past 38 years. Only one other county has experienced a decline in employment during any one period and that was Cabarrus County during the 1980-1990 time period.

Table 3.6

Total Employment Growth 1980-2008				
County	**1980-90**	**1990-00**	**2000-08**	**1980-2008**
Cabarrus	-0.38%	50.10%	19.51%	78.70%
Gaston	8.08%	-2.87%	-7.66%	-3.07%
Anson	13.18%	-16.00%	-14.07%	-18.31%
Mecklenburg	53.49%	36.17%	12.31%	134.73%
Union	47.63%	30.67%	32.14%	154.91%
York	34.24%	36.81%	25.01%	129.58%
MSA	**38.61%**	**30.96%**	**12.70%**	**104.58%**

Part A: Gaston County economic history

There are two primary and related causes for Gaston County's meager population growth and negative employment growth during the past four decades. The first is the historic economic structure of the county that resulted from the rapid and relocation of the U.S. textile industry from New England to the Carolina Piedmont during the later part of the 19th century. The second, which is related because it led to the relocation of the textile industry, is the presence of water power and later hydroelectric power in the western Piedmont region of the Carolinas. The Catawba River basin provided this resource but also has been a geographic barrier to both Gaston and Lincoln Counties during the second half of the 20th century and has blocked Gaston County's ability to take advantage of its proximity to one of the fastest growing counties in the U.S.

Gaston County is located just west of Mecklenburg County in the southern Piedmont of North Carolina. It is the 74th largest in land area of the 100 North Carolina counties. It contains 364.5 square miles and ranks 8th (2010) in county population. Gaston County became a county in 1846 and during most of its growth and development remained independent from Charlotte and the concept of an MSA.

The county's economic development history begins in the latter part of the 19th century as the textile industry began to move south from New England to the Carolina Piedmont. Manufacturers originally moved to the Carolinas due to the proximity of raw materials, abundant water power of the Piedmont's rivers, and inexpensive labor. By the early 20th century, the Piedmont of North Carolina was the textile capital of the U.S. Hydroelectric mills began replacing water powered mills during this time, but the Piedmont's river structure still remained the important resource for the expanding textile cluster. Over the next 60 years, Gaston County, along with a number of other Piedmont counties, benefited from the economic opportunities that the textile industry provided.

Part B: The decline of manufacturing and the textile industry

In the 1980s the counties that benefited from the growth of the textile industry experienced a negative economic structural change. North Carolina had 835,585 workers employed by manufacturing firms in 1980 which accounted for 42.4 percent of total North Carolina employment. Of that, 244,535 jobs were in textile mills. North Carolina accounted for 28.7 percent of total U.S. employment in the textile industry. By 1990 manufacturing employment in North Carolina was still growing but accounted for only 32.3 percent of total state employment. Textile employment had declined to 206,324 by 1990, a loss of over 38,000 jobs. In 2000 manufacturing employment in North Carolina fell to 731,399, a loss of 135,000 jobs in ten years, and accounted for 21.6 percent of total state employment. Textile employment fell to 116,262, a loss of over 80,000 jobs in ten years.

By 2008 the picture was even worse. Manufacturing employment in North Carolina was 502,878, a loss of 228,612 jobs in just eight years. This was just 14.0 percent of total employment, and textile employment fell to only 44,288, a loss of another 71,974 jobs in just eight years.

Tables 3.7 through 3.9 provide insight into the structural shift in manufacturing and textile employment within Gaston County over the past 38 years. Manufacturing employment declined from 42,302 in 1980 to 14,813 in 2008. This is a reduction in manufacturing employment as a percent of total employment from 62.8 percent in 1980 to 22.7 percent in 2008. In 1980 Gaston County had one of the highest percentages of manufacturing employment among North Carolina counties, and over half of Gaston's manufacturing employment was in textile mills and apparel industries. Over 100 textile mills called Gaston County home in 1980. By 1990 textile employment fell by over 7,000 jobs, about the same level of decline experienced by total manufacturing employment.

The decline became apparent by 2000. The textile industry lost another 8,000 jobs in Gaston County and mills began closing during that decade. Between 1980 and 2000 improved technology and the substitution of capital for labor caused the change in the textile industry and

in textile employment in Gaston County. However, in the years between 2000 and 2008, the real structural change occurred. The number of textile mills in Gaston County dropped from 83 in 2000 to just 38 by 2008. This is a decline of 54.2 percent in textile establishments in just eight years.

Table 3.7

Gaston County Manufacturing and Textile Employment: 1980-2008				
Item	**1980**	**1990**	**2000**	**2008**
Manufacturing Employment	42,302	36,244	24,677	14,813
Textile Employment	24,735	17,139	9,118	3,951
Apparel Employment	1,714	2,460	630	15
Manufacturing Establishments	420	480	436	331
Textile Establishments	101	99	83	38
Apparel Establishments	21	26	15	3

Table 3.8

Manufacturing Employment as a Percent of Total Employment 1980-2008				
County	**1980**	**1990**	**2000**	**2008**
Cabarrus	65.92%	40.78%	24.71%	12.29%
Gaston	62.75%	49.74%	34.87%	22.67%
Lincoln	57.57%	53.37%	39.11%	26.28%
Mecklenburg	9.07%	6.97%	7.50%	5.20%
Union	47.62%	45.06%	33.67%	21.74%
York	51.72%	34.75%	7.13%	14.45%
MSA	29.51%	19.96%	13.60%	9.42%

Table 3.9

Gaston County Manufacturing and Textile Employment: 1980-2008				
Item	**1980-90**	**1990-2000**	**2000-2008**	**1980-2000**
Manufacturing Employment	-14.32%	-31.91%	-39.97%	-64.98%
Textile Employment	-30.71%	-46.80%	-56.67%	-84.03%
Apparel Employment	43.52%	-74.39%	-97.62%	-99.12%
Manufacturing Establishments	14.29%	-9.17%	-24.08%	-21.19%
Textile Establishments	-1.98%	-16.16%	-54.22%	-62.38%
Apparel Establishments	23.81%	-42.31%	-80.00%	-85.71%

Part C: Regional employment growth and structural change

Prior to 1980 the counties surrounding Mecklenburg County had a degree of economic structural independence. That is, the Gaston, Cabarrus, and Lincoln County economies were primarily based on manufacturing with a concentration of textile firms. Union County and York County

also relied on manufacturing employment as their economic base but had lesser reliance on textiles. Union County, specifically, had a large agricultural component to its economy. Beginning in 1990 the counties surrounding Mecklenburg that started losing manufacturing employment began building their new economic base off the non-manufacturing economy of Mecklenburg County. The counties of Cabarrus, Union, and York initially became bedroom communities of Mecklenburg as population spilled over county lines.

This spillover was supported by both strong transportation channels into these three counties and by the low density settlement patterns just over the county line. A phase of local service based economic growth associated with the new households followed the initial phase of suburbanization. Gaston, and to a lesser extent Lincoln, did not benefit from their proximity to Mecklenburg County during this transition period. The main reason for this difference is the lack of transportation channels from Mecklenburg County into Gaston County.

The Catawba River, which was instrumental in the early economic development of the Gaston economy, presented a geographical barrier to the county's ability to tap into the rapid growth of Mecklenburg County. The only river crossings into Gaston County from Mecklenburg County are along the I-85/US 29-74 corridor and NC 27 further north into Mt Holly. The central third of Gaston County along the I-85 corridor is the traditional center of the region's textile industry. As a result, the area offered little opportunity for subdivision development and did not experience the service industry employment growth experienced by the counties located east and south of Mecklenburg. In fact, the least densely populated region of Gaston County has virtually no reasonable access to Mecklenburg County. In the entire southern third of Gaston County there is no road access crossing into Mecklenburg County. This lack of access makes the southern third of Gaston County effectively further away from Charlotte and the central concentration of the regional economy.

Part D: The new Gaston economy

Despite the structural change that has taken place in the Gaston County economy over the past three decades, there is some positive news. Table 3.10 presents non-manufacturing employment

levels over the past 28 years for all six counties in the Charlotte MSA. During this time, overall Gaston County employment declined (see Table 4), losing 2,000 jobs between 1980 and 2008. However, the Gaston County economy actually added 25,000 non-manufacturing jobs during the same period. The simple analysis indicates that the massive job loss in the manufacturing sector (over 27,000 jobs) overwhelmed the rest of the economy. The structural change that took place simply outpaced the non-manufacturing job growth that spun off from the Charlotte economic engine.

Table 3.10

Non-Manufacturing Employment 1980-2008

County	**1980**	**1990**	**2000**	**2008**
Cabarrus	12,037	20,840	39,767	55,368
Gaston	25,111	36,617	46,091	50,531
Anson	4,308	4,462	2,886	1,462
Mecklenburg	216,946	340,692	461,288	530,944
Union	10,646	16,485	26,003	40,541
York	14,638	26,558	51,716	59,557
MSA	**116,905**	**108,252**	**95,196**	**74,468**

Table 3.11 presents the annualized percent changes in non-manufacturing employment for the six counties in the Charlotte MSA. While Gaston County's non-manufacturing job growth rate is the lowest among the six counties, it is not grossly out of line with the Mecklenburg rate and less than a percent lower than the overall MSA rate. This non-manufacturing job growth rate presents hope and opportunity for the future Gaston County economy. The critical issue for the present Gaston economy is the magnitude going forward of the structural change in the county's economy. The decline of the textile industry within the U.S. and the Piedmont is close to its end. As of 2008, Gaston County has fewer than 4,000 workers employed in the textile industry (down from over 26,000 in 1980). In addition, the county has a little over 10,000 workers employed by non-textile manufacturing firms. During the next several decades, Gaston County's textile and other manufacturing industries' job loss rate should diminish, and the current non-manufacturing job growth rate should continue, providing an overall positive employment growth rate going forward. The only question is how strong that overall rate will be? Within a decade the manufacturing job losses should end and the overall job growth rate will become driven by non-manufacturing job growth.

Table 3.11

Annualized Percent Changes in Non-Manufacturing Employment				
County	**1980-90**	**1990-00**	**2000-08**	**1980-2008**
Cabarrus	5.64%	6.67%	4.22%	4.36%
Gaston	3.84%	2.33%	1.16%	2.19%
Anson	2.79%	1.26%	1.92%	1.44%
Mecklenburg	4.62%	3.08%	1.77%	2.73%
Union	4.47%	4.66%	5.71%	3.24%
York	6.14%	6.89%	1.78%	4.61%
MSA	**4.66%**	**3.53%**	**2.08%**	**2.91%**

Using the most recent eight year non-manufacturing job annualized growth rate, by 2020 Gaston County would add around 10,000 jobs (all non-manufacturing) and reach an employment level of 75,000 jobs. This would only be a little over 2,000 jobs higher than the peak employment level in 1990, but it would reverse the 18 year trend of declining job growth and opportunities for Gaston County.

Based on the shift in structural change outlined in this section, the next section of this study will look at the long run forecast from employment and population levels and growth under a range of alternative scenarios.

Section 4: Economic Impact of the Garden Parkway: 2008-2035

Part A: Construction impact: 2012-2015

The proposed Garden Parkway is a 21.8 mile limited access highway which begins in Mecklenburg County at I-485 near Douglas International Airport, heads west across the Catawba River through southern Gaston County, and turns north to intersect with I-85 west of US 321. The proposed construction plan is estimated to take four years, beginning in 2012, with the road open to traffic in late 2015. The estimated construction cost is $870 million, with roughly 85.9 percent of the construction costs occurring within Gaston County.

The following section details the economic impact on the Gaston County economy of the proposed Garden Parkway construction over the 2012 through 2015 period. The $870 million total cost is divided evenly into the four years of construction, and 85.85 percent of the annual construction budget of $217.5 million is allocated for spending within Gaston County each year.

To assess the total economic impact accurately, the direct output of the proposed activity must be estimated. In this case, the direct output on Gaston County for the four years of construction is $186,723,750 per year. The term direct refers to the dollar output associated with the economic activity under consideration.

The multiplier concept then captures the total effect of the economic activity on output and employment in the overall economy. For instance, an output multiplier value of 2.1 means that for each dollar of direct spending in an industry, 1.1 additional dollars are generated in other parts of the economy, with the total benefit to the economy being 2.1 dollars. Therefore, an event that creates $100 million in new expenditures in an industry would, using the multiplier, translate into a subsequent output gain of $110 million in other sectors, for a total output impact of $210 million.

The Minnesota IMPLAN Group provides the basic multiplier methodology used in this study. IMPLAN is a multiplier methodology originally developed by the United States Government and currently maintained by the Minnesota IMPLAN Group. For this study, output, employment, and income multipliers for the construction of other new nonresidential structures, IMPLAN sector code 36, was used.

This study used the IMPLAN 152 by 152 multiplier matrix for Gaston County to obtain multipliers for dollar output, employment, and income. This matrix provides multipliers for 152 detailed three and four-digit North American Industrial Classification System (NAICS) industries. In addition, each of the 152 industries has an industry-specific *indirect* multiplier for each of the other 151 industries and for its own industry. Table 4.1 presents the IMPLAN output multipliers used in this study for the 2012 impacts on Gaston County. The multipliers are based on 2009 data (the latest available) and are used to estimate the economic impact of the Garden

Parkway construction for the years 2012 through 2015. The multipliers used for the 2012 through 2015 impacts have all been adjusted to account for inflation over the period since 2009. The adjustment process applies only to the employment multipliers which are based on jobs created per $1,000,000 of direct construction expenditure. The adjustment process used the Bureau of Labor Statistics CPI to account for the effects of inflation on the number of jobs created per $1,000,000 in construction expenditures.

Table 4.1

Gaston County IMPLAN Adjusted Multipliers for 2012 (IMPLAN Code 36)

Multiplier Type	Direct Effects	Indirect Effects	Induced Effects	Total Effects
Employment*	9.730904	1.967891	2.583911	14.282705
Output	1.000000	0.172849	0.256599	1.429448
Income	0.350955	0.072012	0.088688	0.511656

* Jobs per $1,000,000 of expenditures

The IMPLAN multipliers also provide a comprehensive set of disaggregated multipliers that can estimate the indirect and induced impacts separately from the total impact at the regional level. The indirect effect is the additional economic activity of the supply chain within the region caused by the economic activity of the direct industry. The induced effect is the additional economic activity of all other unrelated firms and households within the region caused by the economic activity of the industry and the indirect effect.

Table 4.2 presents the 2012 impact on output, jobs, and income of the proposed construction of the Garden Parkway and the Gaston County economy. The $186,723,750 in direct construction expenditures will generate 1,817 direct jobs, 367 indirect (supplier chain) jobs, and 482 induced jobs, for a total 2,667 jobs in 2012. This would represent an increase in Gaston County jobs of 3.9 percent during 2012. Total economic impact of the road construction during 2012 would be $266,911,891. In addition, the 2,667 total jobs supported by the construction of the road would increase Gaston County income by $95,538,140 during the year.

Table 4.2

Gaston County Garden Parkway Construction Economic Impact for 2012

Multiplier Type	Direct Effects	Indirect Effects	Induced Effects	Total Effects
Employment	1,817	367	482	2,667
Output	$186,723,750	$32,275,013	$47,913,128	$266,911,891
Income	$65,531,634	$13,446,351	$16,560,156	$95,538,140

Table 4.3 presents similar information as Table 4.2. The economic output and income impacts are the same as Table 4.2 for 2012. However, the jobs impact during 2013 is slightly lower because of the effects of inflation on job creation. Direct jobs generated by the road construction in 2013 are expected to reach 1,788. Indirect (supplier chain) job are estimated to be 362, and induced jobs should reach 475. Total employment impact of the road construction on Gaston County during 2013 should reach 2,624 jobs.

Table 4.3

Gaston County Garden Parkway Construction Economic Impact for 2013

Multiplier Type	Direct Effects	Indirect Effects	Induced Effects	Total Effects
Employment	1,788	362	475	2,624
Output	$186,723,750	$32,275,013	$47,913,128	$266,911,891
Income	$65,531,634	$13,446,351	$16,560,156	$95,538,140

Table 4.4 and Table 4.5 present the output, employment, and income impacts for 2014 and 2015. As in Table 4.3, the output and income impacts are the same, and the employment impacts are adjusted for inflation in the same manner.

Table 4.4

Gaston County Garden Parkway Construction Economic Impact for 2014

Multiplier Type	Direct Effects	Indirect Effects	Induced Effects	Total Effects
Employment	1,759	356	467	2,582
Output	$186,723,750	$32,275,013	$47,913,128	$266,911,891
Income	$65,531,634	$13,446,351	$16,560,156	$95,538,140

Table 4.5

Gaston County Garden Parkway Construction Economic Impact for 2015

Multiplier Type	Direct Effects	Indirect Effects	Induced Effects	Total Effects
Employment	1,730	350	459	2,540
Output	$186,723,750	$32,275,013	$47,913,128	$266,911,891
Income	$65,531,634	$13,446,351	$16,560,156	$95,538,140

Table 4.6 presents information on the top 12 spin-off industries. The industries are ranked by the total number of indirect and induced jobs that the construction phase of the Garden Parkway will support during the first year of construction (2012). The Architectural and engineering services sector will benefit the most with 92 indirect (supplier chain) jobs, and one induced job for a total 93 jobs supported during 2012. The top three supplier chain industries are Architectural,

engineering, and related services (92 jobs); Employment services (28 jobs); and Automotive repair and maintenance, except car washes (25 jobs).

Table 4.6

Garden Parkway Construction Impact Spin-off Impact 2012

IMPLAN Sector	Description	Direct	Indirect	Induced	Total
369	Architectural, engineering, and related services	0	92	1	93
413	Food services and drinking places	0	11	65	77
382	Employment services	0	28	9	38
360	Real estate establishments	0	11	23	33
397	Private hospitals	0	0	33	33
414	Automotive repair and maintenance, except car washes	0	25	7	32
329	Retail Stores - General merchandise	0	12	20	31
394	Offices of physicians, dentists, and other health pract.	0	0	30	30
324	Retail Stores - Food and beverage	0	7	18	25
388	Services to buildings and dwellings	0	15	9	24
425	Civic, social, professional, and similar organizations	0	9	14	22
398	Nursing and residential care facilities	0	0	22	22
	All Other Industries	1,817	158	233	2,208
	Total	1,817	367	482	2,667

Overall, the Garden Parkway will provide an economic stimulus to the Gaston County economy during the four years of construction. In fact, had the construction taken place as part of the American Recovery and Reinvestment Act it would have made a significant dent in the county's unemployment rate during 2009 and 2010. Gaston County's unemployment rate, which peaked at 14.5 in March of 2010, would have fallen to as low as 11.8 percent during that month. The rate in February, 2011 of 11.4 percent would instead have been 8.6 percent. These reductions in the county's unemployment rate during these difficult times would have changed substantially the economic outlook for an economy that has been through three decades of economic decline.

Part B: Ongoing economic impact of the Garden Parkway: 2015-2035

This part of the report provides population, household, and employment projections for Gaston County through 2035 based on a No-Build Scenario of the Garden Parkway and two different Build Scenarios of the Garden Parkway. The North Carolina Office of State Budget and Management and the South Carolina Budget and Control Board both produce population estimates for counties within their states through 2030. These projections are part of a Federal State Cooperative Population Estimates program begun in 1975. Each state has appointed a

single agency within the state with this responsibility. For North Carolina, the agency released these estimates in September of 2010.

Table 4.7 below is based on the North Carolina and South Carolina population projections through 2030. Both state population projections currently provide certified population estimates for each year since the 2000 Census through 2009. The estimates in the column labeled 2009 are each state's certified estimates for 2009. The 2009 certified estimates are based on the 2000 U.S. Census count and take into consideration annual births, deaths, and net migration.

Since these certified estimates, the U.S. Census released the 2010 population counts for all counties in both states. As a result, two adjustments have been made. First, the annualized rate of growth for the six counties in the Charlotte MSA for 2009 through 2020 and 2020 through 2030 that was calculated by both state agencies was applied to the actual 2010 census data just released. Second, the 2035 population projection was based on the annualized rate of growth for each county between 2020 and 2030. Both the 2009 certified estimates and the 2010 actual U.S. Census count are contained in Table 4.7 to provide an assessment of the accuracy of the state population projection program. The certified 2009 projections are all based on the historic demographic factors in each county between 2000 and 2009. These annual growth rate projections do not take into account any changes in infrastructure taking place over the next two decades. As a result, the county population projections presented in Table 4.7 provide an ideal baseline (No-Build) estimate for this study.

Table 4.7 provides the population projections through 2035 in each county in the Charlotte MSA for the No-Build Scenario. Gaston County population under the No-Build Scenario will reach 259,245 persons by 2035. This is an increase in population over the next 25 years of 53,159 persons, an increase of 25.8 percent over the 2010 actual count. Of the other five counties within the Charlotte MSA, only Anson County is projected to have both a smaller absolute population increase and a smaller percent increase.

Table 4.7

Charlotte MSA Population Projections: No-Build Scenario

County	2000	2009*	2010 Actual**	2020	2030	2035
Cabarrus	130,778	174,255	178,011	227,705	276,818	305,215
Gaston	190,365	207,234	206,086	227,124	248,063	259,245
Anson	25,275	25,193	26,948	26,593	26,534	26,505
Mecklenburg	695,454	894,290	919,628	1,071,543	1,222,331	1,305,504
Union	123,677	196,322	201,292	250,450	299,087	326,840
York	164,614	215,610	226,073	261,317	297,601	317,591
MSA	1,330,163	1,712,904	1,758,038	2,064,732	2,370,434	2,540,900

* Certified estimates

** 2010 U.S. Census (actual count)

Table 4.8 presents the population No-Build/Build Scenarios for Gaston County for the years 2010, 2020, 2030, and 2035. The Build Scenario Base projections for 2010 through 2015 (before the road is completed) are based on the annualized population growth rate of Gaston County between 2009 and 2020 from the North Carolina projections. The Build Scenario Base projection for 2016 through 2020 is based on the annualized population growth rate for North Carolina between 2009 and 2020 from the North Carolina projections. The Build Scenario Base projection for 2020 through 2035 is based on the annualized population growth rate for North Carolina between 2020 and 2035 from the North Carolina projections.

Table 4.8

Gaston County Population Projections: (No-Build/Build Scenarios)

Scenario	2010	2020	2030	2035
No-Build	206,086	227,124	248,063	259,245
Build Base	206,086	231,356	259,407	274,683
Build Alternative	206,086	234,471	269,217	288,475

The Build Scenario Alternative projections for 2010 through 2015 (before the road is completed) are based on the annualized population growth rate of Gaston County between 2009 and 2020 from the North Carolina projections. The Build Scenario Alternative projection for 2016 through 2020 is based on the annualized population growth rate for the MSA between 2009 and 2020 from the North Carolina projections. The Build Scenario Alternative projection for 2020 through 2035 is based on the annualized population growth rate for the MSA between 2020 and 2035 from the North Carolina projections.

Gaston County population is expected to increase to 274,683 by 2035 under the Build Base Scenario. This is an increase of 15,438 persons compared to the No-Build Scenario. Under the Build Alternative Scenario Gaston County population is expected to increase to 288,475, an increase of 29,230 persons compared to the No-Build Scenario.

Table 4.9 presents the household No-Build/Build Scenarios for Gaston County for the years 2010, 2020, 2030, and 2035. These estimates are based on the population projections presented in Table 4.8 and the average household size of 2.58 persons for Gaston County from the 2010 Census. Average household size has declined within the U.S. and Gaston County for the past several decades. In 1980 Gaston County average household size was 2.88 persons. Today it is 2.58 persons. The use of 2.58 persons for calculating the number of households through 2035 is based on the assumption that the average household size has been stable between 2000 and 2010. In addition, because of the difficult economic times, household size may increase in the short term before beginning to decline in the later years of the projection period.

Gaston County households are expected to increase to 106,468 by 2035 under the Build Base Scenario. This would be an increase of 5,983 households compared to the No-Build Scenario. Under the Build Alternative Scenario Gaston County households are expected to increase to 111,796, an increase of 11,328 households compared to the No-Build Scenario.

. **Table 4.9**

Gaston County Household Projections: (No-Build/Build Scenarios)

Scenario	2010	2020	2030	2035
No-Build	79,867	88,020	96,135	100,468
Build Base	79,867	89,660	100,531	106,451
Build Alternative	79,867	90,867	104,333	111,796

In 1980 Gaston County was the second largest county within the Charlotte MSA. In addition, it was the sixth largest county of the 100 counties in North Carolina. By 2010 Gaston County had fallen to the 10th largest county in the state and the third largest county in the MSA. Under all three scenarios presented in Table 4.8, by 2035 Gaston County will be the fifth largest county in the Charlotte MSA. Both Union and Cabarrus Counties will exceed Gaston County in population and households by 2035.

Table 4.10 presents the employment projections under the No-Build/Build Scenarios for Gaston County for the years 2010, 2020, 2030, and 2035. The No-Build projections are based on 2008 actual employment numbers for Gaston County. The 2020, 2030, and 2035 employment projections assume no additional manufacturing job losses and increase annually by the current rate of non-manufacturing job growth (2000-2008) applied to the overall job level. This growth assumption is based on two factors.

First, as detailed in Section 3 of this report, the massive structural change that took place in the Gaston County economy over the past three decades is likely over. In 2008 Gaston County had a little over 14,000 manufacturing jobs. Of those 14,000, less than 4,000 are in the textile sector. Going forward over the next 25 years it is unlikely that Gaston County will continue to suffer manufacturing job loss levels and rates anywhere near those experienced during the 1980to 2008 period.

Second, Gaston County is transitioning into a suburban county in the Charlotte MSA. In the past, Gaston County had its own economic base that drove the county economy. Today, Gaston's economic fortunes rely on the economic growth of Mecklenburg County and the population and employment spillover as Mecklenburg becomes denser.

Under the No-Build Scenario Gaston County employment will reach a level of 89,127 jobs by 2035. In 1980 Gaston County had the second largest employment level of the six counties in the Charlotte MSA. Under the No-Build Scenario Gaston County will drop to fifth in the total employment behind Cabarrus, Union, and York Counties.

Table 4.10

Gaston County Employment Projections: (No-Build/Build Scenarios)

Scenario	2008	2020	2030	2035
No-Build	65,344	75,010	84,148	89,127
Build Base	65,344	77,759	93,743	102,928
Build Alternative	65,344	78,508	96,480	106,955

Under the Build Base Scenario Gaston County's employment should reach 102,928 jobs by 2035. This employment growth scenario is based on the assumption that the Garden Parkway

will be built between 2012 and 2015. This also assumes no addition manufacturing job losses will occur, the employment growth rate between 2008 and 2015 will be the same as the No-Build Scenario, and that the job growth rate between 2015 and 2035 will be the North Carolina average non-manufacturing job growth rate. This rate is considerably less than the non-manufacturing growth rates for Cabarrus, Anson, Mecklenburg, Union, and York Counties.

Under the Build Alternative Scenario Gaston County's employment should reach 106,955 jobs by 2035. This employment growth scenario is based on the assumption that the Garden Parkway will be built between 2012 and 2015. This also assumes no addition manufacturing job losses will occur, the employment growth rate between 2008 and 2015 will be the same as the No-Build Scenario, and that the job growth rate between 2015 and 2035 will be the MSA average non-manufacturing job growth rate. This rate is considerably less than the non-manufacturing growth rates for Cabarrus, Union, and York Counties and about the same growth rate as Mecklenburg and Anson Counties.

The No-Build/Build Base Scenario job difference by 2035 is just under 14,000 jobs. Under the No-Build/Build Alternative Scenario, the 2035 job difference just under 18,000 jobs. Two important aspects lead to these significant job growth differences. First, the Garden Parkway will provide increased access to the state's largest and most vibrant private sector economy. Currently, both Gaston and Lincoln Counties have substantially restricted access to Mecklenburg County because of the Catawba River. This barrier makes it difficult for these two counties to tap into the natural spillover of Mecklenburg economic activity compared to Cabarrus, Union, and York counties. In fact, this barrier is the most important reason for the growth differences between Gaston County and the other three counties over the past decade.

Second, in 2010 Mecklenburg County is the largest county in North Carolina with 919,628 persons. It is also the most densely populated county in the state with almost 1,750 persons per square mile. With 2035 population expected to reach 1,305,504 persons and population density to reach almost 2,500 persons per square mile in Mecklenburg County, the surrounding counties will have to take spillover population and employment growth. The Garden Parkway and its bridge over the Catawba River will afford Gaston County the opportunity to tap into the

Mecklenburg County expected growth over the next 25 years and compete effectively with the other contiguous counties within the Charlotte MSA.

Section 5: Conclusions

- The overwhelming conclusion of both the scholarly literature and the professional literature is that there is a significant relationship between building interstate highway s and local economic development.

- Gaston County has experienced a significant economic structural change in its economy over the past three decades. Resulting in a loss of 38,000 manufacturing jobs and 20,000 textile jobs.

- Gaston County has not participated in the strong economic growth of the Charlotte MSA over the past 30 years. It has lagged behind in both population and employment compared to Cabarrus, Union, and York.

- Much of this three decade long weak economic performance has been a result of geographic isolation compared to Cabarrus, Union, and York.

- The construction of the Garden Parkway will lesson considerably the geographic isolation of Gaston County and allow the county to participate in the overall economic growth of the Charlotte MSA.

- During the four years of highway construction, Gaston County employment should experience over 2,600 additional jobs.

- With the construction of the Garden Parkway, Gaston County population by 2035 should reach 274,683 under the Build base Scenario, or 288,475 under the Build alternative Scenario, compared to 259,245 under the No-Build Scenario.

- With the construction of the Garden Parkway, the number of Gaston County households by 2035 should reach 106,451 under the Build base Scenario, or 111,796 under the Build alternative Scenario, compared to 100,468 under the No-Build Scenario.

- With the construction of the Garden Parkway, Gaston County employment by 2035 should reach 102,928 under the Build base Scenario, or 106,955 under the Build alternative Scenario, compared to 89,127 under the No-Build Scenario.

- The construction of the Garden Parkway has the potential to change the future economic fortunes of Gaston County.

Bibliography

Addy, Samuel, Ahmad Ijaz, Carolyn Trent, Kathleen Gabler, and Jonathon Law, "Socioeconomic Indirect and Cumulative Impact Components for the Northern Beltline," Center for Business and Economic Research at the University of Alabama, June 2010.

Aschauer, David A., "Highway Capacity and Economic Growth," *Economic Perspectives*, Federal Reserve Bank of Chicago, September-October 1990.

Brown, Dannis M., "Highway Investment and Rural Economic Development," Food and Rural Economics Division, Economic Research Service, U.S. Department of Agriculture, April 1999.

Centralina Council of Governments, " Metrolina Transportation Framework Study," November 2010.

Chandra, Amitabh and Eric Thompson, "Does Public Infrastructure Affect Economic Activity? Evidence from the Rural Interstate Highway System", *Regional Science and Urban Economics*, Vol, 30, No. 4, 2000.

Delta Regional Authority, DRA (Delta Regional Authority) Delta Development Highway System Plan" December 2006.

Dev Bhatta, Saurav and Matthew P. Drennan, "The Economic Benefits of Public Investment in Transportation: A Review of Recent Literature," *Journal of Planning Education and Resea*rch, Vol. 22, No. 3, March 2003

Gaston Urban Area Metropolitan Planning Organization, "2035 Long Range Transportation Plan," March 2010.

Mecklenburg-Union Metropolitan Planning Organization, "2035 Long Range Transportation Plan," March 2010.

North Carolina Office of State Budget and Management, Population Estimates and Projections, http://www.osbm.state.nc.us/ncosbm/facts_and_figures/socioeconomic_data/population_estimates.shtm

Rephann, Terance J., "The Economic Impacts of LULUs," *Environment and Planning C: Government and Policy*, Volume 18, 2000.

Rock Hill-Fort Mill Area Transportation Study, "2035 Long Range Transportation Plan for Rock Hill-Fort Mill Area Transportation Study," April 2009.

The Federal Highway Administration, "Economic Development History of I-81 Corridor," January 2005.

The Federal Highway Administration, “Economic Development History of Interstate 43 Corridor,” January 2009.

University of Virginia Library, Geospatial and Statistical Data Center, http://fisher.lib.virginia.edu/collections/stats/cbp/

U.S Census Bureau, American Fact Finder 2010 Census, http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml

U.S. Census Bureau, County Business Patterns http://www.census.gov/econ/cbp/index.html

U.S. Census Bureau, Population Estimates, http://www.census.gov/popest/eval-estimates/eval-est2010.html

Wubneh, Mulatu, “US Highway 17 and its Impact on the Economy of Eastern North Carolina,” Urban and Regional Planning Program, Department of Geography East Carolina University, May 2008.