

Assessing the Economic and Business Impact of the Proposed Gandy Connector



Tampa-Hillsborough County Expressway Authority | August 2009

Prepared by the Center for Urban Transportation Research at the University of South Florida

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Executive Summary

The Tampa-Hillsborough Expressway Authority (THEA) is conducting an evaluation of a proposed Gandy Boulevard improvement project directed at serving regional traffic coming to and from the Gandy Bridge. The proposed build alternative considers an elevated structure connecting the Gandy Bridge with the western termini of the Selmon Expressway. While this solution is primarily intended to target regional traffic and reduce the level of local congestion, concerns about potential impacts on local businesses have been raised during the project advisory group presentations.

To this purpose, the THEA contracted the Center for Urban Transportation Research (CUTR) at the University of South Florida to conduct a study on the business impacts of the proposed Gandy Boulevard improvement project.

Research Approach

Researchers identified the section of the Gandy Boulevard where impacts are most likely to occur. The study area covers those businesses located on the section corresponding to the start point of the build alternative, located west of Westshore Boulevard and ending at the Gandy Boulevard-Dale Mabry Highway intersection.

The analysis estimates current levels of business activity by major industry sectors as classified by the North American Industrial Classification Code (NAICS). This gives a base case upon which to analyze the potential impacts associated with construction and operation of the proposed Connector. This study provides a picture of local economic activity levels prior to the current recessionary state of the economy and prior to any changes in business activity levels that might be associated with the Florida Department of Transportation reconstruction work of 2008-2009.

CUTR researchers developed an economic model of business activity specific to the study area that is consistent with economic impact analysis methods used to evaluate transportation infrastructure investments of this type.

Findings

CUTR estimated two distinct impacts associated with the proposed Connector. The first impact is associated with the reduction of regional or pass-through traffic on the Gandy Boulevard. The second impact is related to accessibility improvements that the proposed connector will provide to the Gandy Boulevard.

Business Impact due Traffic Diversion

The study finds that businesses that depend mostly on regional or pass-through traffic will be negatively impacted by the Connector. These include gasoline stations, businesses providing food and accommodation services, and automotive repair and maintenance businesses. The combined reduction in gross sales for these sectors amounts to about \$1.9 million or about 1.4 percent of total gross sales within the study area.¹ Reduced economic activity in the above sectors will also translate into a transfer of about 13 jobs from the study area to other areas in Hillsborough County.

Business Impact due to Accessibility Improvements

This study finds that the diversion of regional traffic from the Boulevard at the surface level will improve average travel times and thus reduce the generalized cost of travel local customers will face when reaching businesses. Increased accessibility will positively impact businesses that depend on regular customers.

The study also finds that improved local accessibility will result in an annual increase of about \$800 thousand in gross sales and the generation of 5 additional jobs.² Estimated increases in gross sales vary from a minimum of \$500 thousand to a maximum of \$1.1 million.

Conclusions

In summary, the study predicts a net gross sales reduction of \$1.1 million or 0.8 percent of sales in the study area, a transfer of an estimated 13 jobs outside the area and a gain of 5 jobs. While the reduction of gross sales and jobs experienced by traffic-dependent businesses can be considered a transfer of resources within the area served by the Authority, the increase in gross sales and jobs can be considered as a net positive impact in business activity and employment for the whole Hillsborough County.

The estimates presented in the report represent average expected impacts and do not take into consideration the implications of specific actions directed at increasing the visibility of businesses to drivers as they approach the area. Studies have shown that actions such as placing appropriate signage at the point of entrance of the Connector from the Gandy Bridge and other initiatives directed at increasing the visibility of the study area can reduce the negative impacts on traffic dependent businesses.

It is important to understand that this analysis does not take into consideration the regional economic benefits associated with the construction of the preferred alternative, rather its focus

¹ All monetary amounts are reported in 2009 dollars unless otherwise indicated.

² A job here refers to one person-year employment.

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is on 1.45 miles of Gandy Boulevard and those businesses located there. These positive regional economic impacts include temporary construction employment and associated expenditures, permanent job creation (if any), direct user benefits including reduced travel time savings, and social benefits resulting from vehicle emission reductions. These estimates have been made outside of this study and will be presented at the public hearing on the preferred alternative.

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1. Introduction

1.1 Background Information

In January 2009, the Tampa Hillsborough Expressway Authority (THEA) presented a unique solution to address traffic congestion on a 1.25 mile segment of Gandy Boulevard (US 92 in Tampa, FL). The “Connector” would provide congestion relief by separating regional and local arterial traffic. Long-distance regional trips will be served on an elevated express lane in the median of US 92 from the south end of the Selmon Expressway to the Gandy Bridge, one of the three bridges over Tampa Bay to Pinellas County.

Although the proposed connector might increase mobility and reduce congestion, the local business community expressed concerns about the potential negative impacts on the local economy. To make more informed decisions and to address concerns of local business owners, an impact study of the proposed connector is warranted.

1.2 Objective

The objective of this work order is to have the University of South Florida’s Center for Urban Transportation Research (CUTR) estimate the business impacts associated with the construction of the Gandy connector. These estimates will help:

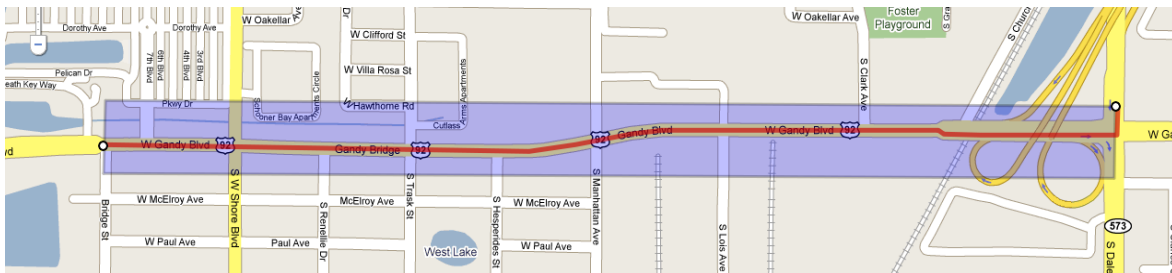
- Assess the impact that the connector will have on businesses located on Gandy Boulevard and those immediately adjacent.
- Determine the impact that not building the connector will have on the local business in the long-term.

2. Analysis of Impacts

2.1 Defining the Study Area

The study area is defined as the section of Gandy Boulevard starting one block west of the Westshore Boulevard intersection and ending at the Dale Mabry Highway intersection. The study area considers all businesses located along both sides of this 1.45 mile-long section of Gandy Boulevard, as highlighted by the red line of Figure 2.1. The definition of the study area is based on the selected Connector preferred built alternative, which includes an entry and exit ramp at the Dale Mabry intersection. The analysis considers the impact on business activity within this area and does not consider the impact on businesses located on ancillary roads around this section or the impact on businesses located north or south on Westshore Boulevard, Manhattan Avenue, Lois Avenue and south on Dale Mabry Highway. This is because it is assumed that the travelers directed to businesses located on Gandy Boulevard south of the Dale Mabry intersection will have the option of reaching those destinations by either traveling on the Gandy Boulevard or using the Connector.

Figure 2.1 Study Area



2.2 Estimating Current Business Activity

This section presents an overview of the current business environment in the study area. The analysis of current economic activity provides a base case upon which to examine the business impact analysis of Section 2.3.

This analysis is based on publicly available historical data, on information obtained by businesses and other information available by third party databases. To acquire a historical perspective of economic activity within the impact area, U.S. Census Bureau County Business Patterns (CBP) data were used. The CBP series consists of annual data on economic activity that at the most disaggregate level provides historical information on businesses operating within each postal zip code of the country. CUTR obtained historical data for zip code 33611,

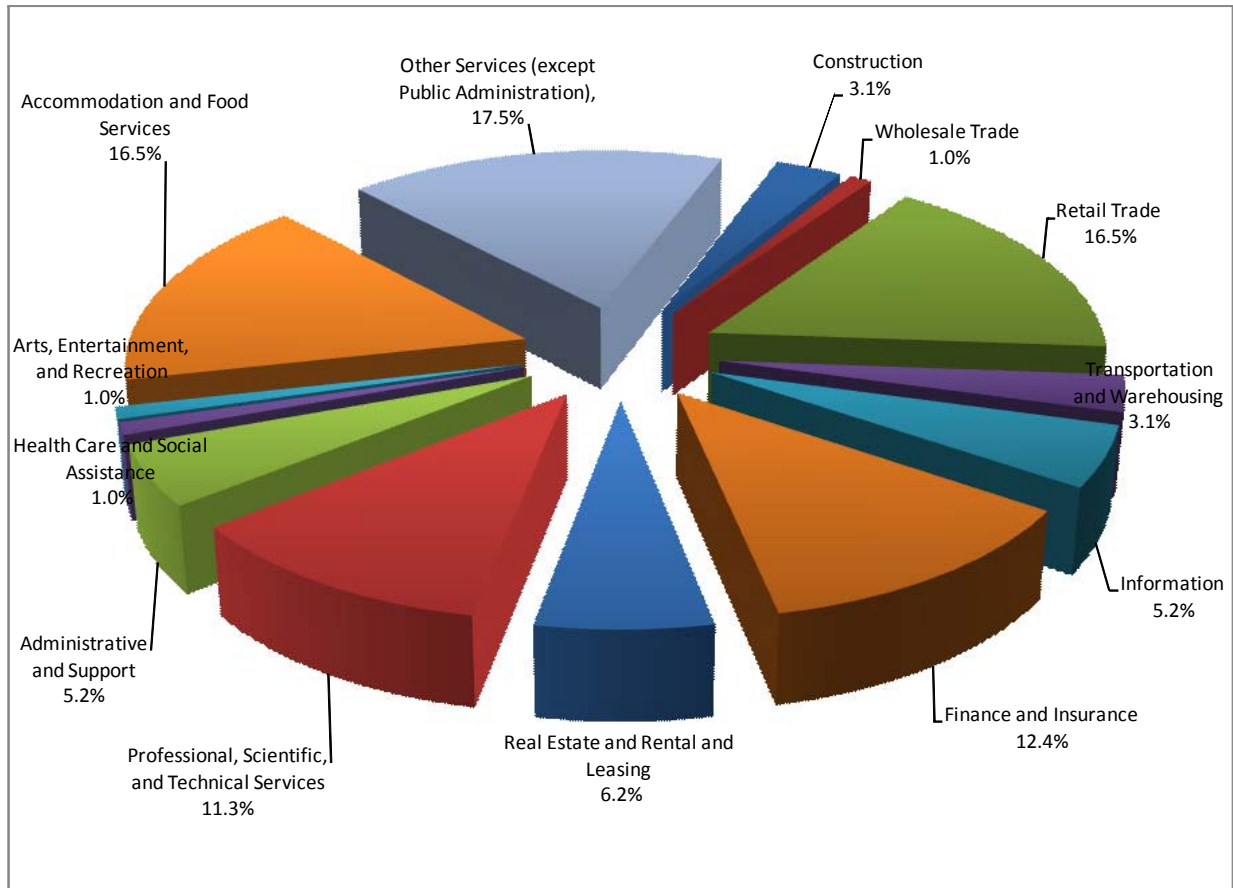
where the study area is located. Based on the Gandy business representation and its share of economic activity with respect to the overall zip code, researchers conducted a trend analysis on historical economic activity that relates to the Gandy businesses. This analysis covers the period 1998-2006 due to data availability and to avoid explicitly any temporary disruption in economic activity that might have been caused by construction activities that occurred on the boulevard as part of the Florida Department of Transportation (FDOT) re-construction work of 2008-2009.

2.2.1 Businesses in Operation

A total of 97 businesses operating in several industry sectors located within the study area were identified. Figure 2.2 displays a breakdown by industry type following the North American Industrial Classification System (NAICS) at the two-digit level of aggregation.

Most of the Gandy businesses operate in retail trade (16.5%), finance and insurance (12.4%), professional and technical services (11.3%), food and accommodation (16.5%) and other services (17.5%). The NAICS definition of other professional services includes businesses that offer legal services, specialized architectural and engineering services, management and technical consulting services, veterinary services and personal care services. The NAICS definition of retail includes grocery stores, health and personal care stores, gasoline stations, and general merchandise stores, among others. A full list of NAICS industries classified at the 3-digit level is included in Appendix A.

Figure 2.2 Study Area - Current Business Composition



As of 2006 Gandy businesses represent 13.5 percent of total businesses operating in zip code 36611, which has a similar split by industry type as the study area as displayed in Figure 2.3.

Gandy businesses represent a relevant share of operation within each industry sector. Figure 2.4 shows, for example, that businesses operating in accommodation and food services account for 29.1 percent of businesses operating in the zip code, followed by other professional services (23.3 percent), finance and insurance (21.8 percent), and real estate and rental/leasing (20.8 percent).

Figure 2.3 Zip Code 33611 - Industry Composition

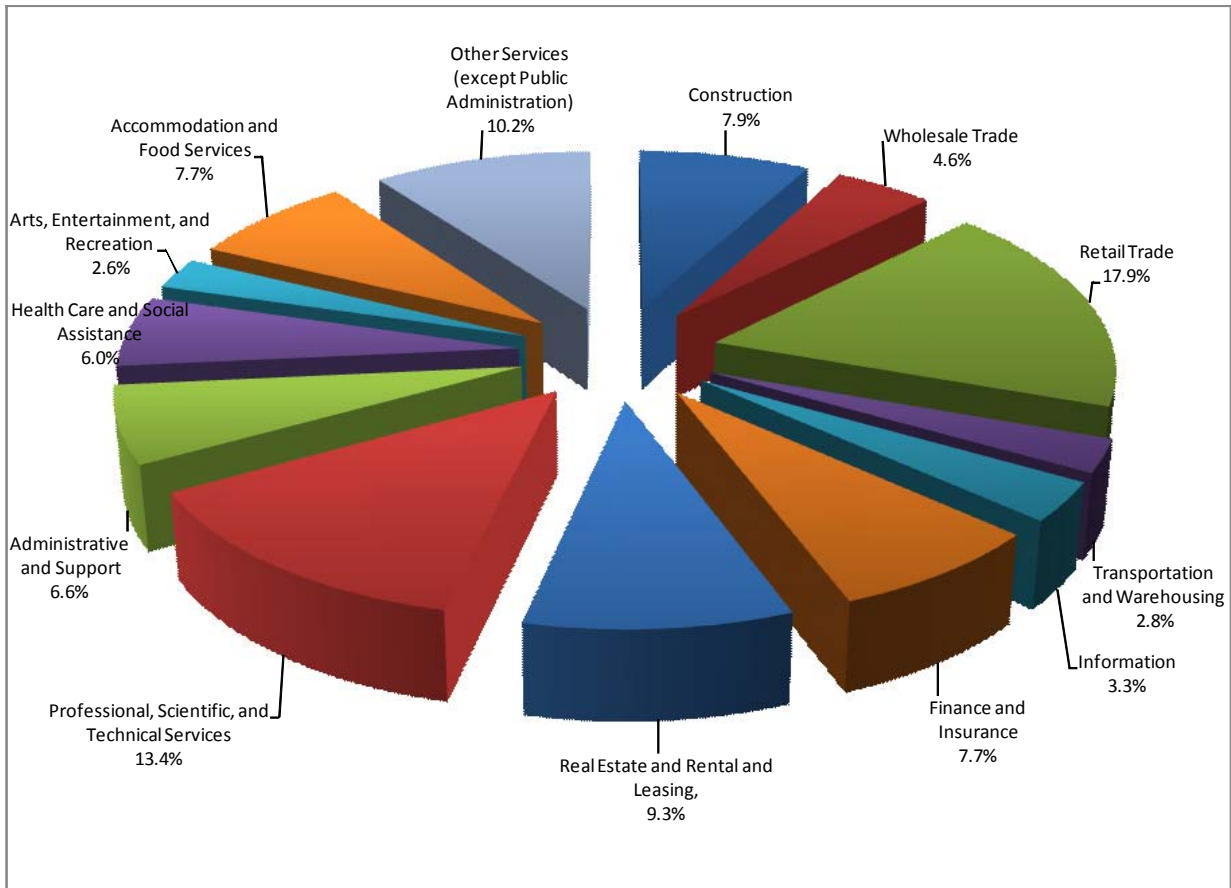
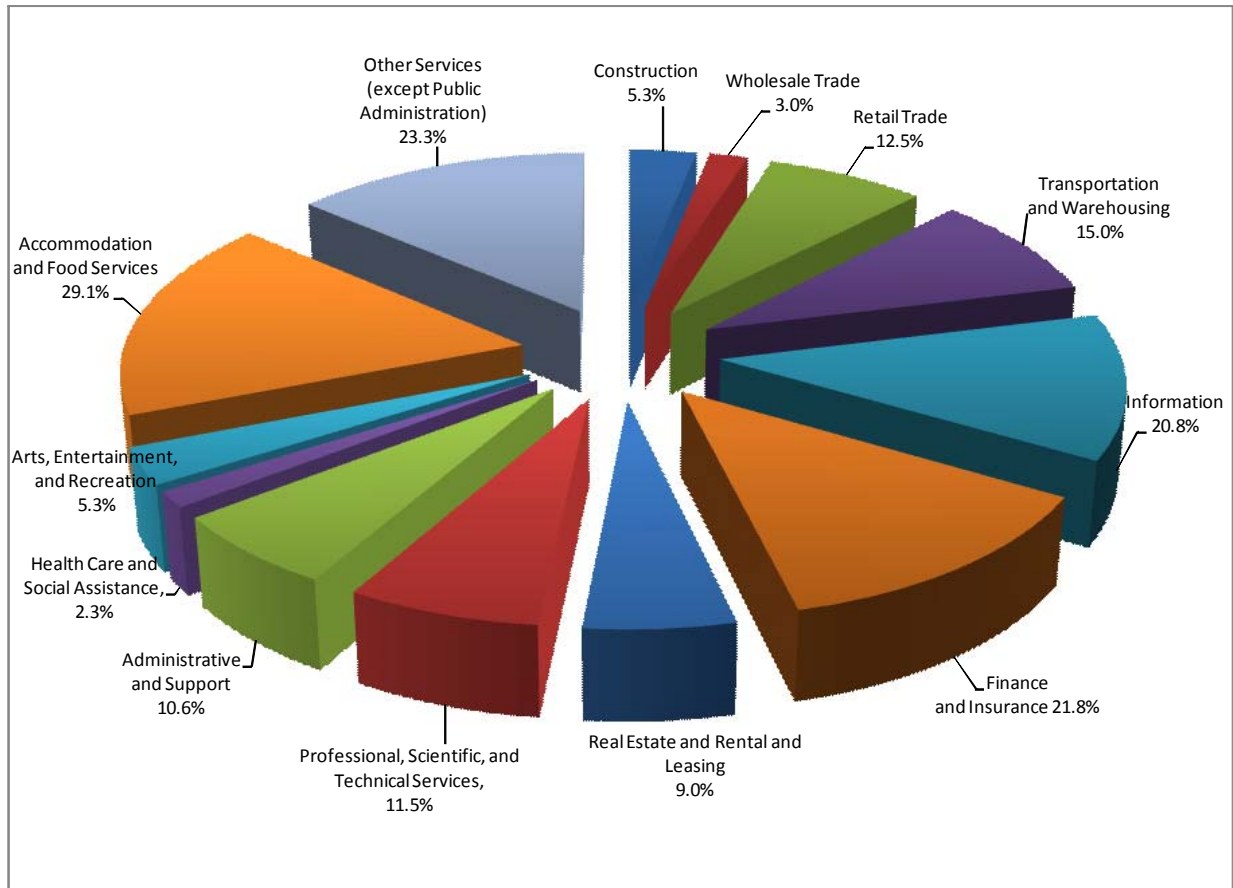
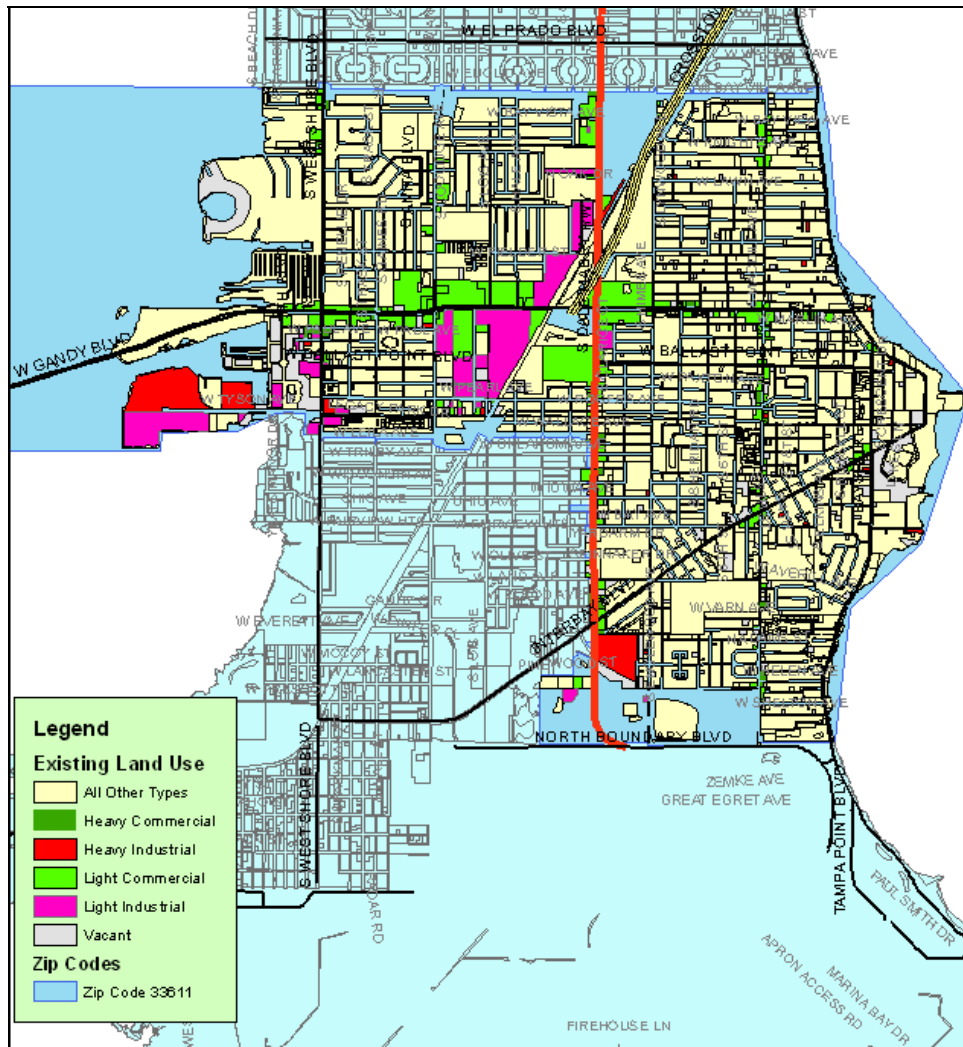


Figure 2.4 Study Area: Gandy Businesses as a Share of zip code 33611 businesses



Gandy businesses occupy 221.4 square acres of commercial land or 37.7 percent of the total commercial land acreage currently allocated to zip code 33611. Most of the remaining commercial land is located on the other section of the Gandy Boulevard (east of Dale Mabry), MacDill Avenue, and Dale Mabry Highway.

Figure 2.5 Commercial Acreage: Zip Code 33611



2.2.2 Current Business Economic Activity

CUTR measured economic activity in terms of total gross sales, total employee compensation and total employment by industry sector at the NAICS 2-digit level. This level of aggregation, while producing a picture of the economic vitality of the study area, avoids identifying firm-specific information. Gross sales include the value of merchandise sold by businesses net of deductions, refunds, and allowances for merchandise returned by customers. Employee compensation includes wage and salary payments, including benefits, and provides a measure of income to workers.

Since estimates of these measures of economic activity for each of the 97 businesses are not publicly disclosed, CUTR relied on several sources and a specific estimation approach. A business survey was designed, requesting business-specific information in an attempt to obtain direct data on these measures. The survey questionnaire is reported in Appendix C. The survey

was conducted between June 25 and 26, 2009. A pre-stamped envelope was included for participants to mail responses to CUTR in full anonymity. Surveys were requested to be returned within two weeks of the time they were delivered. In an effort to collect more surveys after the initial two week period, follow-up calls were made to approximately forty businesses who had not returned the information. The overall effort produced a response rate of about 14 percent.

Data gaps due to lack of response were filled by employing an estimation methodology that relates measures of economic activity for the businesses operating within the zip code to those operating in the study area. The methodology to estimate gross sales, total payroll expenses and total employment is reported in Appendix A.

Table 2.1 reports estimates of gross sales, employment, payroll expenses and indirect business taxes for the businesses operating within the study area. All dollar figures are reported in 2009 dollars. Information services operating in the study area represent most of the business activity in zip code 33611. This is because of the location of major local broadcasting service operators along the Gandy Boulevard. Professional services, along with food and accommodation services also represent a good share of the business (12.0% and 16.0%, respectively).

Table 2.1 Gandy Study Area: Measures of Economic Activity

Industry	Gross Sales		Employment		Employee Compensation	
	Total	% of zip code	Total	% of zip code	Total	% of zip code
Construction	3,273,397	2.4%	18	2.6%	1,213,505	3.3%
Wholesale Trade	3,860,021	0.7%	4	0.7%	272,824	0.7%
Retail Trade	21,962,977	3.6%	75	3.0%	2,621,228	3.6%
Transportation and Warehousing	3,120,787	7.7%	26	9.6%	1,089,651	8.6%
Information	63,983,921	78.5%	282	92.2%	21,132,631	98.1%
Finance and Insurance	11,731,686	2.8%	54	3.3%	3,487,981	3.4%
Real Estate and Rental and Leasing	2,711,128	0.9%	23	3.3%	790,033	4.6%
Professional, Scientific, and Technical Services	8,201,175	12.0%	58	12.2%	3,244,394	10.8%
Administrative and Support	2,886,251	5.2%	47	5.8%	1,388,952	5.5%
Health Care and Social Assistance	476,887	0.6%	4	0.4%	246,022	0.6%
Arts, Entertainment, and Recreation	143,899	0.3%	4	0.6%	64,109	0.6%
Accommodation and Food Services	10,712,792	16.0%	148	14.9%	2,780,967	15.8%
Other Services (except Public Administration)	5,661,398	9.8%	74	7.4%	1,689,264	8.8%
Total	138,726,320	5.5%	816	7.0%	40,021,561	9.0%

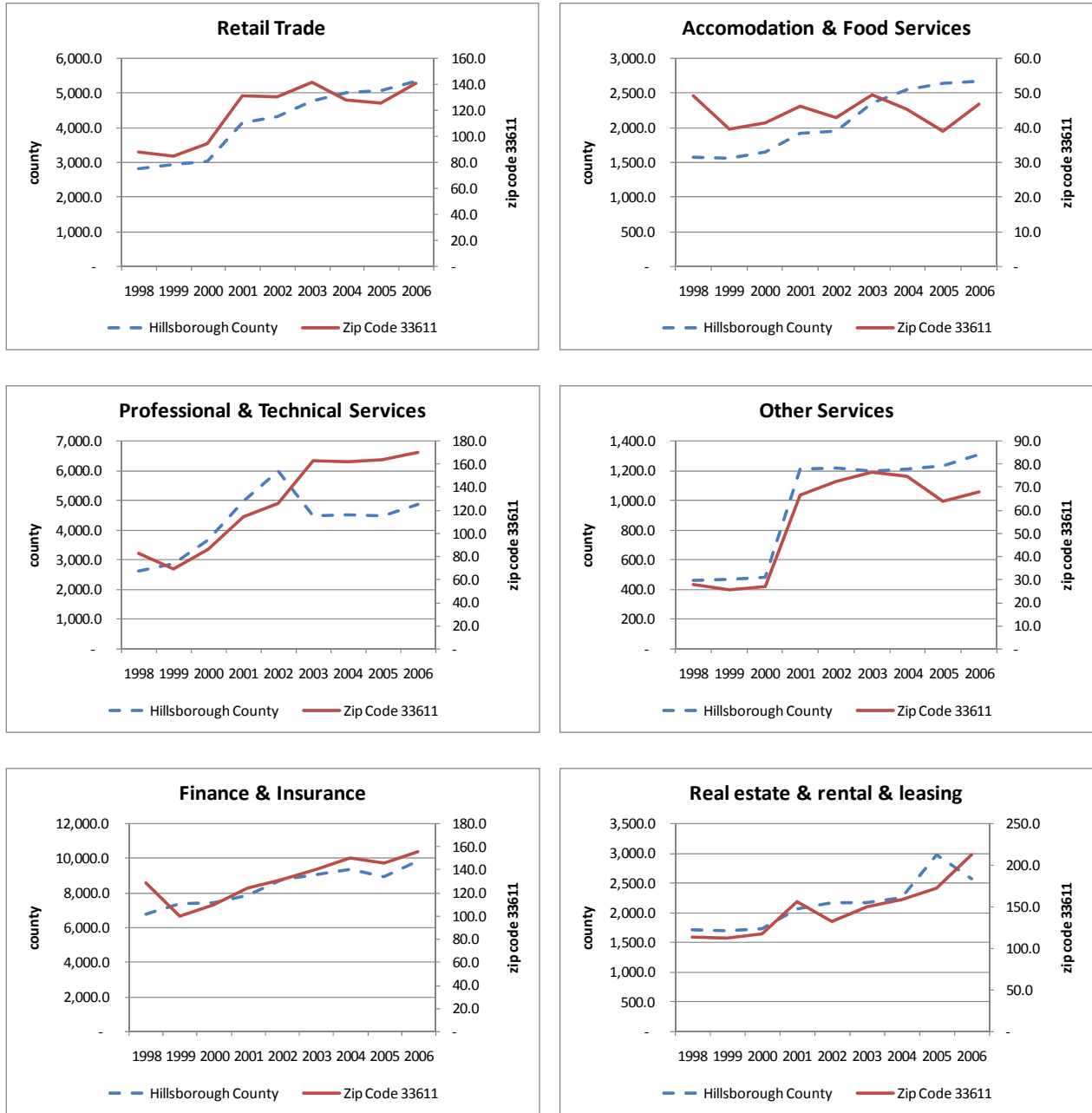
2.2.3 Historical Trends

To analyze past and current economic vitality of the study area, researchers relied on the U.S. Census Bureau CBP annual series which reports data on the number of establishments and employment levels. At this level of disaggregation, the CBP series does not report sales and payroll information due to disclosure issues that might identify specific businesses. Given that the study area business composition closely matches the composition of the overall zip code, and given its sizeable contribution to economic activity within the zip code area, a trend analysis was conducted at the zip code level. Figure 2.6 displays historical data on gross annual

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sales for the period 1998-2006 for the most representative industry sectors. Overall, these trends indicate that economic activity at the zip code level follows a similar trend to the whole county.

Figure 2.6 Zip Code 33611: Gross Sales by Industry (\$, million)



2.3 Business Impacts

The study area description and characteristics are used as an input to the estimation of the business impacts that the construction of the Connector might generate.

CUTR reviewed future traffic forecasts that compare travel conditions along Gandy Boulevard without the Connector (no-build scenario) and with the proposed Connector, specifically the build alternative that include ramps at the Dale Mabry Highway intersection (build scenario). Next, researchers analyzed the relationship between the measures of economic activity summarized in Section 2.2 and travel conditions to make inferences about changes in economic activity brought about by changes in traffic conditions.

Also considered are the long-term business impacts of not building the Connector. Traffic conditions within the study area are expected to worsen as average travel speeds along the Gandy Boulevard will be lower in the absence of the Connector. This will have an impact on businesses that depend mostly on local or regular customers.

2.3.1 Empirical Research on Relief Routes Business Impacts

CUTR surveyed a vast array of studies that look explicitly at the impact of transportation relief routes on business and economic activity. A relief route is defined as a segment of a highway or limited access road that moves traffic around a location, usually a central business district (CBD) or a city. In the same fashion, the Connector can be considered a route that provides relief to local traffic by diverting regional traffic from the study area.

Researchers found that there is no general consensus on the impact of relief routes on business and economic activity, as well as on study procedures and analysis methods [1-6]. Some studies provide evidence of negative impacts, while other studies find that economic conditions not related to the relief route are more likely to explain changes in economic activity. Some studies rely on anecdotal evidence and informal surveys, while other studies are based on before and after comparison of growth trends. Other studies rely on more sophisticated analytical methods, such as statistical regression analysis of economic activity that control for factors not related to the bypass but that can mask the underlying effects due to the relief route.

Early studies find no conclusive evidence that bypasses have a negative effect on economic activities. In 1996, the National Cooperative Highway Research Program conducted a study on the impact of bypasses and relief-routes on rural communities and small urban areas [7]. The study was based on a literature review of more than 190 publications from the 1950s to the 1990s and a survey of agencies' practices. The study summarized statistics on changes in business sales for 83 locations in 19 states where bypasses were constructed. The sample

consisted for the most part of small towns with populations below 20,000, and the average bypass length was about six miles, with an average distance between the new and old routes of about 1.3 miles. Although the study found some evidence of traffic dependent business being affected by a bypass, it does not provide conclusive evidence of losses in sales due to bypassing alone.

Contrasting evidence is also reported in more advanced empirical work that relies on advanced statistical methods. For example, a study on the impact of highway bypasses on 23 Texas cities with populations ranging between 2,500 and 25,000 provides evidence of negative impacts on business activities [8]. The study's results showed a 15 percent decline in gas station retail sales, a 10 to 15 percent decline in restaurant sales and a 15 percent reduction in total retail sales for the bypassed locations in cities with less than 25,000 inhabitants. As in other studies, the models show that many other factors play a relevant role in affecting economic growth and that it is difficult to disentangle effects strictly related to bypass implementation.

One comprehensive evaluation of the impacts of highway bypasses in Kansas towns attempted to interpret causal relationships between bypasses and business activities [9]. By partitioning total traffic flowing on and off bypasses, the study found no evidence of long term negative impacts on local economies, but found evidence of short-term negative effects on selected firms, specifically those dependent on pass-through traffic, such as bars, motels, and service stations. Background effects related to pre-existing economic conditions affecting the local economy played a more relevant role than bypasses in affecting business growth.

More sophisticated studies use advanced statistical techniques to uncover the impacts of bypasses on business activities in terms of changes on per capita sales in industry sectors most likely to be affected [10, 11]. These studies find that bypasses negatively impact business activities with magnitudes related to the amount of traffic being bypassed and the business' relative dependence upon pass-through traffic. In particular, these studies found that when the traffic split (defined as the ratio of the volume on the bypass over the total volume of traffic flowing to a city) exceeds a threshold, the bypass will have negative effect. The threshold varies according to the industry with a critical value of 36 percent for retail sales, 26 percent for eating and drinking places and 43 percent for services.

In summary, all of the studies that find evidence of changes in economic activity report that the business sectors most likely to be affected are gasoline stations, fast food restaurants and other businesses that depend mostly on pass-through traffic. Table 2.2 reports those sectors that are most likely to be impacted by the construction and operation of a relief route. Visitor-serving businesses, such as motels, art galleries, antique shops are less likely to be affected as they rely on visitors attracted to the area as a destination. These businesses may find their business improves if the area is turned into a destination.

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Big retail stores may benefit from improved access as well as those businesses that cater to a local clientele, such as drug stores, banks, grocery stores, and personal care stores.

The magnitude of impacts depends on the study area characteristics, such as its size and its relative distance to the CBD.

Figure 2.7 Before and After



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Table 2.2 Expected Business Impact by NAICS Sector

<i>NAICS Code</i>	<i>Industry</i>	<i>Impact</i>	<i>Remarks</i>
23	Construction	unlikely	not traffic dependent
42	Wholesale Trade	unlikely	not traffic dependent
44-45	Retail Trade	+	depends on client base
445	Food and Beverage Stores	+	mostly local demand
446	Health and Personal Care Stores	+	mostly local demand
447	Gasoline Stations	-	traffic dependent depends on client
451	Sporting Goods, Hobby, Book, and Music Stores	+	base depends on client
452	General Merchandise Stores	+	base
48-49	Transportation and Warehousing	unlikely	not traffic dependent
51	Information	unlikely	not traffic dependent
52	Finance and Insurance	+	mostly local demand
53	Real Estate and Rental and Leasing	+	mostly local demand depends on client
54	Professional, Scientific, and Technical Services	+	base
56	Administrative and Support	unlikely	not traffic dependent
62	Health Care and Social Assistance	+	mostly local demand depends on client
71	Arts, Entertainment, and Recreation	+	base depends on client
72	Accommodation and Food Services	+/-	base negative on limited seating (i.e., fast food)
722	Food Services and Drinking Places	-	depends on client
81	Other Services (except Public Administration)	+	base negative on
811	Repair and Maintenance	-	automotive repair business depends on client
822	Personal and Laundry Services	+	base

Source: CUTR Review of Business Impact Literature

2.3.2 Relationship Between Traffic Volumes and Business Activity

The literature review provided some evidence about business sectors that are more likely to be affected with the impact depending on their sensitivity to traffic volume. Although some studies give estimates of percentage changes in business activity due to relief route construction and operation, their findings cannot be used in this study. This is because these estimates are fitted to specific samples of small urban and rural cities; a context different from the study area analyzed here.

To better link changes in business activity to changes in traffic volumes, the team conducted an empirical analysis that uses sophisticated statistical methods similar to those found in the empirical literature, but using a dataset tailored to the study area. The analysis uncovers industry sectors that are sensitive to changes in traffic volumes and those that are not. It also provides estimates of the sensitivity of specific industry sectors' gross sales levels to changes in traffic volumes, as measured by annual average daily traffic (AADT). The sensitivity measure is based on the elasticity of total gross sales with respect to AADT and quantifies a percent change in total industry gross sales for each one percent change in AADT.

Table 2.3 provides gross sales elasticities with respect to AADT for all those sectors identified as affected by changes in AADT. These estimates are based on a series of regression equations that estimate changes in gross sales caused by changes in traffic volumes measured in AADT. Appendix B provides a technical description of the estimation method.

Table 2.3 Selected Industry Output Elasticities with Respect to AADT

<i>NAICS Code</i>	<i>Industry</i>	<i>Elasticity</i>	<i>Std. Error (+/-)</i>
447	Gasoline Stations	0.69	0.17
72	Accommodation	0.18	0.08
722	Food Services and Drinking Places	0.20	0.06
811	Repair and Maintenance	0.33	0.11

Source: CUTR Econometric Analysis (See Appendix B)

For example, Table 2.3 shows that the elasticity of gasoline stations is equal to 0.69, which means that for every one percent change in AADT, gross sales change by 0.69 percent. In line with what was found by the empirical literature, gasoline station businesses (NAICS sector 447) are relatively more sensitive to changes in traffic volumes, followed by accommodation and food services (NAICS sector 722, which includes both limited and full service restaurants). These ranges represent estimates and, therefore, have ranges represented by the standard error figures reported on the last column of Table 2.3. Researchers used the elasticities of

Table 2.3 to evaluate how business activity in the study area is likely to be affected by traffic volume changes due to the proposed Connector.

Figure 2.8 Driver's View

2.3.3 Future Traffic Conditions

Next, an understanding of how traffic conditions in the study area will change due to the Connector was needed.

To estimate how the Connector will impact traffic levels in the study area, team members analyzed current and forecasted traffic data from the Draft Design Traffic Technical Memorandum prepared by HNTB Corporation on behalf of the Authority [12]. This technical memorandum documents existing and future



traffic conditions for different build alternatives along Gandy Boulevard. Scenarios dealing with a no-build and a build scenario that includes ramps to and from the Connector nearby the Dale Mabry Highway were considered. This is defined as Alternative 2 in the HNTB technical memorandum. We also examine traffic forecasts of a no-toll and a \$.25 toll scenario to understand the effect of toll pricing on travel behavior along the corridor.

The HNTB study provides detailed traffic information in terms of annual average daily traffic estimates. AADT measures the number of vehicles flowing within a given segment of a roadway and represents a daily average taken using traffic counts over a given year. Table 2.4 summarizes future AADT data forecasted for the design year of the facility passing through the Westshore Boulevard segment east of the Gandy Bridge for the following scenarios:

- No-build scenario
- Build no-toll with entry/exit Dale Mabry ramp
- Build \$.25 cents toll with entry/exit Dale Mabry ramp

AADT passing through this segment are representative of traffic flowing on and off the Gandy Bridge and passing through the Gandy study area. AADT in this segment allows differentiating between local traffic and regional or pass-through traffic.

Regional and Local Traffic

To estimate the percent of traffic that is regional or pass-through traffic, researchers looked at the change in traffic passing through the Westshore Boulevard segment east of the Gandy Bridge with and without the Connector under the no-toll scenario. The no-toll scenario allows

splitting traffic between those vehicles using the Connector and those passing through the study area. By looking at the AADT estimates of Table 2.4, the percent of total traffic that can be defined as diverted traffic or regional traffic is equal to:

$$\%AADT_{REGIONAL,NOTOLL} = 1 - \frac{AADT_{BUILD}}{AADT_{NOBUILD}} = \left(1 - \frac{36,500}{60,700}\right) * 100 = 39.9 \quad (1)$$

That is, 39.9 percent of future traffic diverting to the Connector represents regional or pass-through traffic. This number measures the percentage of traffic passing through the Connector and not directed to any particular place in the study area. Local traffic is equal to 60.1 percent of total AADT. Note that under the build no-toll scenario, total AADT is equal to 68,500. We do not put this into the denominator because the additional 7,800 vehicles (68,700-60,700) are vehicles attracted to the new facility by other regional roads (presumably I-275 AADT). Under the build no-toll scenario, this AADT flows directly into the Connector.

Table 2.4 AADT: Design Year Estimates

Segment	No Build	Build	
		No Toll	\$.25 Toll
Gandy Bridge to Westshore Blvd	60,700	36,500	43,300
Connector			
Diverted from study area	-	24,200	17,400
Diverted from other roadways	-	7,800	6,100
Total	60,700	68,500	66,800

Source: Authors calculations based on HNTB Draft Design Technical Memorandum: Table 5

Under the \$.25 toll scenario, the percentage of local traffic will increase to include a share of pass-through traffic that will flow into the Gandy Boulevard, since some individuals will prefer not to pay the toll to avoid congestion. Under the \$.25 toll scenario, the percent of pass-through traffic will be:

$$\%AADT_{REGIONAL,TOLL} = 1 - \frac{AADT_{BUILD}}{AADT_{NOBUILD}} = \left(1 - \frac{43,300}{60,700}\right) * 100 = 28.7 \quad (2)$$

The difference in AADT between equations (1) and (2) is equal to 11.2 percent. This means that out of the total AADT flowing into Gandy Boulevard, 11.2 percent will be pass-through traffic.

There is some additional traffic to consider. It is the increased traffic passing through that is generated by diversion from other regional highways generated by the Connector. To estimate this traffic component, we need to look at the difference of total AADT traffic flowing through the connector under the \$.25 toll build and the no-build scenarios.

This is estimated as:

$$AADT_{DIVERTED} = AADT_{BUILD_TOLL} - AADT_{NOBUILD} = 66,800 - 60,700 = 6,100 \quad (3)$$

This is equal to an increase of 10.2 percent in total traffic with respect to the no-build case. Although this represents additional regional traffic attracted to the Connector, it represents a potential traffic flow to the Gandy Boulevard (assuming some of this traffic will pass through the boulevard to reach some destinations).

In summary, under the \$.25 toll build scenario there will be 60.1 percent local traffic and 11.2 percent pass-through traffic flowing through the study area. Without the Connector, all traffic would be on the boulevard. With the \$.25 build alternative, there will be a diversion of $100 - (60.1 + 11.2) = 28.7$ percent.

2.3.4 Changes in Business Activity due to Connector

The 28.7 percent reduction in AADT in the study area will translate to a reduction in economic activities for those businesses most likely to rely on a relatively high share of pass-through or regional traffic and a low share of local or regular customers. The literature review of Section 2.3.1 identified these sectors as the gasoline stations (NAICS 447), accommodation and food services in general (NAICS 72), and food and drinking places (NAICS 722). Additional businesses that might be affected by a reduction in pass-through traffic are those related to automobile service and maintenance (NAICS 811).

Table 2.5 applies the 28.7 reduction in regional or pass-through traffic to the elasticities of Table 2.3 to estimate changes in gross sales by sector. The reduction in traffic experienced by the study area will translate into a decline in business activity for the businesses operating within the above industry sectors. In particular gasoline stations are expected to see a decline in sales of about 19.7 percent, with a minimum and maximum range varying from 14.9 to 24.5 percent. Businesses operating in food services and drinking places will experience a decline of about 5.6 percent, ranging from a minimum of 4.0 percent to a maximum of 7.3 percent. Businesses operating in the repair and maintenance of vehicles will experience a decline of about 9.4 percent, ranging from a minimum of 6.3 to a maximum of 12.5 percent.

Table 2.5 Predicted Changes in Business Sales

NAICS Code	Industry	Elasticity	Std. Error (+/-)	Change in AADT (%)	Change in Sales (%)		
					Average	Min	Max
447	Gasoline Stations	0.69	0.17	-28.7	-19.7	-14.9	-24.5
72	Accommodation	0.18	0.08	-28.7	-5.2	-3.0	-7.3
722	Food Services and Drinking Places	0.20	0.06	-28.7	-5.6	-4.0	-7.3
811	Repair and Maintenance	0.33	0.11	-28.7	-9.4	-6.3	-12.5
Average					-10.0	-7.0	-12.9

Source: CUTR Econometric Analysis (See Appendix B)

The above estimates represent average expected impacts and do not take into consideration how specific future actions directed at making the study area a visitor destination might reverse some of these reductions.

The literature review highlights the relevance of implementing specific actions directed at increasing the visibility of businesses operating in the above sectors, such as placing appropriate signage at the point of entrance of the Connector from the Gandy Bridge or any other initiative directed at increasing the visibility of the study area.

2.3.5 Business Impacts

Next, we estimate how the reduction in business activity affects businesses in the study area in terms of gross sales and employment and also consider if these changes might spread beyond the study area businesses.

To obtain these estimates, we apply the predicted percent changes to each sector total gross sales amount. Table 2.6 reports the predicted changes in total gross sales. We estimated changes in employment by applying the changes in gross sales into an input-output (I/O) model for the study area zip code 33611. The I/O model estimates how reduction in economic gross sales affects the employment levels necessary to produce each industry services within the area.

Table 2.6 Sales and Employment Impacts

NAICS Code	Industry	Change in Sales (\$, million)			Change in Employment		
		Average	Min	Max	Average	Min	Max
447	Gasoline Stations	-1.1	-0.8	-1.4	-3	-2	-3
72	Accommodation	-0.2	-0.1	-0.3	-2	-2	-5
722	Food Services and Drinking Places	-0.4	-0.3	-0.5	-6	-4	-8
811	Repair and Maintenance	-0.2	-0.1	-0.2	-2	-1	-3
Total		-1.9	-1.3	-2.4	-13	-9	-19

Source: CUTR Analysis

The predicted average loss in gross sales is about \$1.9 million, ranging from a minimum of \$1.3 to a maximum of \$2.4 million. The food services and drinking places industry sector together with gasoline stations will absorb most of the losses in gross sales due to traffic diversion. This is due to a combination of each industry sector's relative size in terms of current gross sales and their relative dependence upon non-local or pass-through traffic.

Food services and drinking places absorb most of the reduction in employment due to being more labor intensive than the other sectors. This reduction in employment pertains to the study area only and not to zip code 33611 or the rest of Hillsborough County. The loss of jobs in the study area is equally balanced by an increase in employment in the same amount in other areas of the county. That is to say that this loss of jobs does not translate into a permanent loss of employment.

2.3.6 Business Impacts of due to Improved Local Traffic Conditions

One of the most relevant benefits of relief routes, besides accommodating increased regional traffic levels, is to provide congestion relief to local area residents.

The literature review of Section 2.3.1 found that, in general, businesses that rely on local traffic (i.e., local or regular customers) benefit the most from traffic improvements generated by a relief route. Table 2.2 reports such businesses as those operating within the general merchandise retail sector, grocery stores, local drug stores, banks and personal care services stores.

2.3.6.1 Induced Local Travel

One of the potential benefits associated with the build case scenario is an improvement of average travel times along the Gandy Boulevard. It is expected that diversion of regional or pass-through traffic will affect average weekday speeds along the boulevard. This is shown in Table 2.7, which reports the assumed average weekday speed used to develop the traffic forecasts for the build and no-build scenarios.

Table 2.7 suggests that the Gandy Boulevard section within the study area will see significant travel time improvements due to higher average travel speeds. The shifting of regional traffic from the boulevard to the Connector will result in an average weekday speed increase of about 7.5 miles per hour.

Table 2.7 Average Weekday Congested Speeds (miles/hour)

Street	Segment	No Build	Build	
			\$.25 Toll	Difference
Gandy Blvd	Bridge to Westshore Blvd	11	22	11
Gandy Blvd	Westshore Blvd to Manhattan Ave	24	31	7
Gandy Blvd	Manhattan Ave to Lois Ave	26	32	6
Gandy Blvd	Lois Ave to Dale Mabry Ave	22	28	6
<i>Average</i>		<i>20.8</i>	<i>28.3</i>	<i>7.5</i>

Source: Data provided by HNTB Traffic Engineers

These estimated gains in average travel speed will potentially create an increase in the local demand for traffic. The travel literature defines this as the portion of induced demand or increase in travel demand from additional trips that are attracted due to accessibility improvements [13, 14]. Generally, traffic assignment models capture the portion of induced traffic that relates to re-routed traffic but do not consider the portion of additional trips that is attracted by accessibility improvements. To account for this portion of additional travel, studies estimate an induced travel demand elasticity with respect to travel time that varies between -0.28 to -0.57 for the short-term and the long-term, respectively.

As a conservative estimate, we use the short-term elasticity of induced demand to estimate the additional demand ($\Delta AADT$) on the Gandy Boulevard due to accessibility improvements with the following equation:

$$\Delta AADT = AADT_{BUILD} \left[\left(\frac{T_{BUILD}}{T_{NOBUILD}} \right)^{\epsilon_I} - 1 \right] \quad (4)$$

Where

- $AADT_{BUILD}$ is the average AADT within the Gandy Boulevard section located within the study area, corresponding to the average AADT of the segments from the Gandy Bridge to Dale Mabry Highway
- T_{BUILD} is the build case average weekday speed of the segments from the Gandy Bridge to Dale Mabry Highway
- $T_{NOBUILD}$ is the no-build case average weekday speed of the segments from the Gandy Bridge to Dale Mabry Highway
- ϵ_I is the short-term induced travel demand elasticity with respect to travel time

Then, the resulting predicted increase in local travel is equal to:

$$\Delta AADT = 41,910 \left[\left(\frac{28.8}{20.8} \right)^{0.29} - 1 \right] = 3,782 \quad (5)$$

This is equal to an increase in local traffic demand of about 9.0 percent. We relate this percent change in AADT to the gross sales elasticities with respect to AADT to estimate changes in business activity, as shown in Table 2.8. Similar to Table 2.3, the elasticities measure the responsiveness of businesses relying on local traffic to changes in AADT levels.

Table 2.9 reports the estimated changes in total sales for each of the sectors, as well as changes in total employment. The increase in local demand due to travel time improvement generated by the build case will produce an average of \$0.8 million increase in sales and the generation of 5 additional jobs. Estimated increases in gross sales vary from a minimum of \$0.5 to a maximum of \$1.1 million.

Note that contrary to the reduction of gross sales and jobs of Section 2.3.5, these changes in gross sales and jobs can be considered as a net increase in business activity and employment for the whole Hillsborough County.

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Table 2.8 Predicted Changes in Sales: Non-traffic Dependent Businesses

NAICS Code	Industry	Elasticity	Std. Error (+/-)	Change in AADT (%)	Change in Sales (%)		
					Average	Min	Max
44-45	Retail Trade	0.11	0.06	+9.0	1.0	0.4	1.5
445	Food and Beverage Stores	0.30	0.09	+9.0	2.7	1.8	3.5
446	Health and Personal Care Stores	0.26	0.09	+9.0	2.4	1.6	3.2
451	Sporting Goods, Hobby, Book, and Music Stores	0.25	0.14	+9.0	2.3	1.0	3.5
452	General Merchandise Stores	0.16	0.07	+9.0	1.5	0.8	2.1
52	Finance and Insurance	0.26	0.06	+9.0	2.4	1.8	3.0
53	Real Estate and Rental and Leasing	0.19	0.07	+9.0	1.7	1.1	2.3
54	Professional, Scientific, and Technical Services	0.20	0.11	+9.0	1.8	0.8	2.8
62	Health Care and Social Assistance	0.14	0.08	+9.0	1.3	0.6	2.0
71	Arts, Entertainment, and Recreation	0.24	0.13	+9.0	2.2	1.0	3.3
81	Other Services (except Public Administration)	0.15	0.06	+9.0	1.3	0.8	1.8
812	Personal and Laundry Services	0.31	0.10	+9.0	2.8	1.9	3.6
Average					1.9	1.1	2.7

Source: CUTR Econometric Analysis (See Appendix B)

Table 2.9 Sales and Employment Impacts: Non-traffic Dependent Businesses

NAICS Code	Industry	Change in Sales (\$, million)			Change in Employment		
		Average	Min	Max	Average	Min	Max
44-45	Retail Trade	0.1	0.0	0.1	0	0	0
445	Food and Beverage Stores	0.0	0.0	0.0	0	0	0
446	Health and Personal Care Stores	0.1	0.0	0.1	0	0	0
451	Sporting Goods, Hobby, Book, and Music Stores	0.0	0.0	0.0	0	0	0
452	General Merchandise Stores	0.0	0.0	0.0	0	0	0
52	Finance and Insurance	0.3	0.2	0.4	2	1	2
53	Real Estate and Rental and Leasing	0.0	0.0	0.1	0	0	1
54	Professional, Scientific, and Technical Services	0.1	0.1	0.2	1	0	2
62	Health Care and Social Assistance	0.0	0.0	0.0	0	0	0
71	Arts, Entertainment, and Recreation	0.0	0.0	0.0	0	0	0
81	Other Services (except Public Administration)	0.0	0.0	0.0	0	0	0
812	Personal and Laundry Services	0.1	0.0	0.1	1	1	2
Total		0.8	0.5	1.1	5	3	7

Source: CUTR Analysis

3. Conclusions

3.1 Summary of Impacts

This study looked at the business impact generated by the proposed improvements to the Gandy Boulevard (SR 600, US 92) corridor from the Gandy Bridge to the western termini of the Selmon Expressway in Hillsborough County. Under the proposed build alternative (\$.25 toll and Dale Mabry ramps), the project will generate both positive and negative impacts to businesses currently operating in a 1.45 mile stretch of the Gandy Boulevard, which defines the study impact area.

We looked at two major indicators of business activity, gross business sales and total employment by industry type as categorized by the North American Industrial Classification Code. Historical trend analysis of business activity within the study area shows that business activity is, in general, similar to the zip code and county overall economic activity in terms of business mix and vitality. This analysis permits building a business base case scenario upon which we estimated changes due to the proposed investment.

The overall net business impacts are the sum of the positive and negative changes in business activity occurring within the study area as a result of implementing the proposed selected build alternative. Table 3.1 reports an average net negative change in gross sales equal to \$1.1 million, ranging from a minimum of \$0.8 to a maximum of \$1.3 million. This reduction in sales is less than 1 percent in total sales for all 97 businesses considered in this study.

Table 3.1 Net Business Impacts within Study Area

<i>Business Impact Type</i>	<i>Total Gross Sales</i>			<i>Employment</i>		
	<i>Average</i>	<i>Min</i>	<i>Max</i>	<i>Average</i>	<i>Min</i>	<i>Max</i>
Regional Traffic Diversion	-1.9	-1.3	-2.4	-13	-9	-19
Local Travel Time Improvements	0.8	0.5	1.1	5	3	7
Difference	-1.1	-0.8	-1.3	-8	-6	-12

Source: CUTR Analysis

Table 3.2 relates these estimates with respect to the study area and the whole region within which the Authority operates. While the reduction in gross sales represents a negative impact affecting those businesses operating within the impact area, it is equally matched by an increase in gross sales outside the study area (i.e., the sum of gain and losses is equal to zero).

On the other hand, the \$0.8 million increase in sales and the additional 5 jobs due to increased business demand generated by the predicted travel time improvements represent a net gain that goes beyond the study area.

Table 3.2 Overall Net Impacts

	<i>Gross Sales (\$,million)</i>	<i>Employment (number)</i>
Net changes within Impact area	-1.1	-8
Net changes rest of the county	0.8	5

Source: CUTR Analysis

3.2 Other Impacts

We did not consider changes in productivity levels that businesses might experience as a result of changes in traffic levels. This is because at this microscopic level business confidentiality issues prevent obtaining the relevant data.

The analysis also does not take into consideration any historical trend affecting a specific business within the study area whose causes are not explicitly related to the objectives of this study.

Finally, we only considered the impacts on business activity in the immediate surroundings of the proposed facility. As with any transportation improvement project, impacts extend beyond this focus of analysis to encompass a wider range of benefits and impacts, such as direct user travel time savings, pollution emission changes, changes in business productivity, business relocation, construction expenditure impacts; all of which must be considered within a wider impact area where the Authority operates and its users are located.

Appendix A. Methodology to Estimate Business Activity Measures

This appendix outlines the method to estimate total employment, total gross sales, and total employee compensation of businesses located in the study area.

Total Gross Sales

Gross sales include the value of merchandise sold by businesses net of deductions, refunds and allowances for merchandise returned by customers. For each industry i , total gross sales GS_i

are equal to the sum of gross sales per employee, $\frac{GS_i}{E_i}$, multiplied by the total employment, $\sum_k E_{i,k}$.

$$GS_i = \frac{GS_i}{E_i} * \sum_k E_{i,k} \quad i = 1, \dots, N \quad k = 1, \dots, N \quad (A.1)$$

Sales per Employee, $\frac{GS_i}{E_i}$

To obtain estimates of sales per employee, we built an economic input-output (I/O) model of zip code 33611. I/O models describe how economic activity is organized among firms operating in a given area (in this case zip code 33611) in terms of production functions that detail the inputs necessary to produce one unit of output for each industry. We utilize the IMPLAN I/O model. IMPLAN and the associated datasets are supported by the IMPLAN Group, based in Minnesota. IMPLAN is a widely used, nationally recognized input-output economic impact model.

The resulting zip code model reproduces a model of economic activity within the zip code. We assume homogeneity of businesses in terms of production functions along the Gandy Boulevard and businesses modeled at the zip code level.

Since by default IMPLAN only provides estimates of total output, there are additional steps which are required to obtain total gross sales estimates. These are also explained in the IMPLAN website support page at:

http://implan.com/index.php?option=com_fireboard&Itemid=76&func=view&id=59&catid=80#59

Sales by Retail Sector

IMPLAN defines retail as a set of margined sectors (gross margin represents total sales less cost of goods sold). To estimate gross sales researchers must follow these steps:

- 1- Take the total value of output of each industry of interest. The value of output represents gross margin.
- 2- Obtain the average margin for that sector using the Annual Benchmark Report for Retail trade available at the US Census website:
http://www.census.gov/prod/www/abs/br_month.html
- 3- Divide total output by average margin to obtain estimates of gross sales by retail sector

Sales by Services

In IMPLAN, services are not margined, so the value of production or total output is a direct estimate of consumer sales. To get sales by households versus industry, we need to look at the personal consumption expenditures (PCE). We obtain the household total personal consumption expenditures (PCE) by commodity from IMPLAN. These expenditures consist of payments by households to industries for goods and services used for personal consumption. Since we are operating under an input-output framework, these purchases are shown as payments made directly to the industry producing the goods. PCE are the largest component of final demand. For example, PCE in zip code 33611 for Food Services and Drinking Places is \$50.15 million or $50.15/17,215$ households = \$2,913. Note that total output is equal to \$58.34 million. There are some sales of this sector to industries, final demands, and maybe some exports of these services to other zip codes.

Total employment, $\sum_k E_{t,k}$

To obtain estimates of employment level at businesses operating within the study area, we relied on following sources of data.

Survey of businesses

We conducted a survey of businesses along the Gandy Boulevard during June-July, 2007 (See Appendix C for details on the survey instrument). To compensate for those businesses not filling the survey, we used the following assumptions. We treated each business within an

industry as having similar characteristics. For example, if the study area has three gasoline stations and we obtained employment information from only one station, we assumed the two remaining stations have the same employee size. To further corroborate our estimates we also checked each business reported employment levels as available from the Hillsborough County Tax Collector business tax file and each company reported staff levels on the company's website. Some businesses provided information on gross sales and employment figures that allowed honing and corroboration of our gross sales estimates.

Hillsborough County Tax Collector Business Tax File

The Hillsborough County Tax Collector publishes a text file version of the tax receipts collected from all businesses currently operating within the county. This file contains the name and location of each businesses and the number of employees currently employed. The file is available at: http://www.hillstax.org/occweb/occupational_file_download.asp

Other Sources

These include third party and company information gathered from internet websites. This consists of a search of current employment levels by consulting company websites and related information, third party information on business operation. The three sources together allowed estimating employment levels at each of the study area businesses.

Total Employee Compensation

We followed the same approach as described above to estimate total employee compensation, EC_t . We estimated total employee compensation per employee using the I/O model and applied the following formula:

$$EC_t = \frac{EC_t}{E_t} * \sum_k^n E_{t,k} \quad t = 1, \dots, n; k = 1, \dots, n \quad (A.2)$$

Data aggregation

We summarize gross sales and employment estimates at the North American Industrial Classification System (NAICS) two-digit level. Aggregation by major sector allows summarizing data in a meaningful fashion and allows succinct presentation of findings, while concealing information that might identify any specific business operation within the study area.

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Table 1 Business Type and NAICS 3-digit Classification

<i>Business Type</i>	<i>NAICS 3</i>	<i>NAICS 3 Definition</i>
Maintenance and repair construction of residential structures	238	Specialty Trade Contractors
Wholesale trade	424	Merchant Wholesalers, Nondurable Goods
Retail - Motor vehicle and parts	441	Motor Vehicle and Parts Dealers
Retail - Furniture and home furnishings	442	Furniture and Home Furnishings Stores
Retail Stores - Electronics and appliances	443	Electronics and Appliance Stores
Retail - Food and beverage	445	Food and Beverage Stores
Retail - Health and personal care	446	Health and Personal Care Stores
Retail - Gasoline stations	447	Gasoline Stations
Retail - Sporting goods, hobby, book and music	451	Sporting Goods, Hobby, Book, and Music Stores
Retail - General merchandise	452	General Merchandise Stores
Truck transportation	484	Truck Transportation
Scenic and sightseeing transportation and support activities for transportation	488	Support Activities for Transportation
Couriers and messengers	492	Couriers and Messengers
Motion picture and video industries	512	Motion Picture and Sound Recording Industries
Radio and television broadcasting	515	Broadcasting (except Internet)
Telecommunications	517	Telecommunications
Other information services	519	Other Information Services
Monetary authorities and depository credit intermediation	522	Credit Intermediation and Related Activities
Nondepository credit intermediation and related activities	522	Credit Intermediation and Related Activities
Securities, commodity contracts, investments, and related activities	523	Securities, Commodity Contracts, and Other Financial Investments and Related Activities
Insurance agencies, brokerages, and related activities	524	Insurance Carriers and Related Activities
Real estate	531	Real Estate
General and consumer goods rental except video tapes and d	532	Rental and Leasing Services
Video tape and disc rental	532	Rental and Leasing Services
Legal services	541	Professional, Scientific, and Technical Services
Accounting, tax preparation, bookkeeping, and payroll service	541	Professional, Scientific, and Technical Services
Architectural, engineering, and related services	541	Professional, Scientific, and Technical Services
Specialized design services	541	Professional, Scientific, and Technical Services
Other computer related services, including facilities manager	541	Professional, Scientific, and Technical Services
Management, scientific, and technical consulting services	541	Professional, Scientific, and Technical Services
Veterinary services	541	Professional, Scientific, and Technical Services
Employment services	561	Administrative and Support Services
Investigation and security services	561	Administrative and Support Services
Services to buildings and dwellings	561	Administrative and Support Services
Waste management and remediation services	562	Waste Management
Offices of physicians, dentists, and other health practitioners	621	Ambulatory Health Care Services
Fitness and recreational sports centers	713	Amusement, Gambling, and Recreation Industries
Hotels and motels, including casino hotels	721	Accommodation
Food services and drinking places	722	Food Services and Drinking Places
Automotive repair and maintenance, except car washes	811	Repair and Maintenance
Electronic and precision equipment repair and maintenance	811	Repair and Maintenance
Personal care services	812	Personal and Laundry Services
Dry-cleaning and laundry services	812	Personal and Laundry Services
Other personal services	812	Personal and Laundry Services

Appendix B. Methodology to Estimate Changes in Gross Sales due to Changes in AADT

This appendix explains the approach we developed to estimate gross sales elasticities with respect to annual average daily average travel.

The objective is to produce a table of elasticities tailored to businesses operating in our study area. We assume that traffic flows have an impact on business activity and we wish to quantitatively assess this relationship. We looked at empirical studies on the economic and business impacts of relief-routes that employ advance statistical methods relating traffic flows to economic activity. Thus, the analysis that follows is in line the most cited econometric-based empirical studies on the subject [10, 11].

Econometric Approach

We specify a fixed effect (FE) model as

$$y_{it} = \alpha + \beta_1 AADT_{it} + \beta_2 X_{it} + u_{it} \quad i = 1, \dots, N; t = 1, \dots, T \quad (B.1)$$

where y_{it} denote total industry output for county i in year t , X a matrix of K explanatory variables, $AADT$ total annual average daily traffic for county i in year t , $\beta_{1,2}$, $K \times 1$ vectors of parameters to be estimated. We specify the error u_{it} term as a one-way error component with

$$u_{it} = \mu_i + v_{it} \quad (B.2)$$

Where μ_i indicates the unobservable individual specific effect and v_{it} denotes the remainder disturbance. The first component represents unobservable characteristics specific to each county that do not change through time, such as geographical position, size, not included directly in the regression. The second component represents the usual disturbance term of regression which varies across counties and time (empirically, we assume this component to have serial autocorrelation).

The choice of a FE instead of random effects (RE) regression is due to the structure of the dataset. We have a panel of 67 ($k=67$) counties with data collected over a period of ten years ($T=10$), which gives a total sample size of 670. We wish to control for unobserved effects that vary across counties, some fixed in time, some varying with time. The choice of FE over RE is

justified by the small number of time observations and the relatively higher number of observational units, and due to the fact that the counties were not randomly selected [15]. The latter would result in a violation of the assumptions underlying the RE model.

We assume that income and population levels are correlated with the time invariant unobserved characteristics μ_i . For example, population size is correlated with the geographical location and size of a given county, as well as its industry mix. In this case, the appropriate econometric modeling choice is to apply a FE model to account for this unobserved heterogeneity rather than a RE model.

In the empirical analysis, we specify (B.1) in logarithm form so that we can directly obtain the relevant elasticities.

Dataset

We created a panel dataset of all 67 Florida counties over the period 1998-2007. The total sample size is 670 ($T=10; i=67$). The dataset contains gross sales figures for those industry sectors where we intend to estimate changes in sales due to changes in AADT. It also includes a set of explanatory variables that serve to control for county-specific observable characteristics, such as personal income, population, and other demographic variables, and other explanatory variables that control for state specific characteristics, such as gross state product by major industry sector. Table B.1 reports a description the variables. Note that to estimate gross sales, we followed the same approach summarized in Appendix A, although applied at the county level and over the 1998-2007 period. All variables measured in dollars are deflated into constant 1982-84 dollars prior to the analysis.

Table B.1 Dependent and Explanatory Variables

<i>Variable</i>	<i>Label</i>	<i>Description</i>
lgs_i	log of gross sales	total cross sales by industry type, NAICS 2-, and 3- digit level
lgs_i_1	log of gross sales previous period	total cross sales by industry type, NAICS 2-, and 3- digit level of previous year
lincapta	log of per-capita income	total county personal income/ total population
laadt	log of AADT	total county average annual daily traffic
lgdp_i	log of gdp	total gross state domestic product by industry
lind_i	log of industry share	share of industry <i>i</i> as a share of total industry establishments
lclm	log of centerline mileage	total county centerline mileage
lpctelderly	log of percent population that is 65 and older	Total number of persons 65 and older/total population
lyr	log of year	year (0 if 1998, 1 if 1999 and so on). Used as a de-trending variable

We estimated the model using the statistical package Stata® which has a specific routine (*xtreg*) to run FE regression. As an example, Table B.2 provides the summary of results for the FE regression of the NAICS sector 44 Retail Trade. Since the model dependent and explanatory variables are in natural logarithm form, the parameter associated with AADT (*laadt*) can be interpreted as the elasticity of gross sales of retail sector with respect to annual average daily traffic. In this case, a 1 percent increase in AADT is associated with an estimated increase of about 0.11 percent in retail trade gross sales.

Table B.2 FE Regression Results Example

<i>Variable</i>	<i>Coefficient</i>	<i>Standard Error</i>
constant	0.869	1.340
laadt	0.107	0.057
lgs_44_1	0.660	0.034
lincapta	0.105	0.104
lind_44	0.273	0.081
lgdp_44	0.734	0.380
lyr	0.016	1.340

N = 594; R² (within) = 0.56; F = 109.42; Prob > F = 0.0000

Data Sources:

AADT. Historical AADT station counts by county. 2007 Florida Traffic Information DVD-Rom, Transportation Statistics Office. Florida Department of Transportation.

Total Industry Gross Sales = Total gross sales per employee of industry *i*, multiplied by total county industry employment.

Total gross sales per employee. Estimated using IMPLAN.

Total Industry Employment. Paid employees for pay period, including March 12. County Business Patterns, U.S. Census Bureau. <http://www.census.gov/econ/cbp/index.html>

Total Industry Annual Payroll. Annual payroll, thousand of current dollars. County Business Patterns, U.S. Census Bureau. <http://www.census.gov/econ/cbp/index.html>

Total Industry Establishments. Number of Establishments. County Business Patterns, U.S. Census Bureau. <http://www.census.gov/econ/cbp/index.html>

Personal Income. Total annual personal income, thousand of current dollars. Personal Income series CA1-3 Bureau of Economic Analysis, Regional Economic Accounts, U.S. Department of Commerce. <http://www.bea.gov/regional/index.htm>

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Population. Number of Persons, midyear estimates of July 1. Personal Income series CA1-3. Bureau of Economic Analysis, Regional Economic Accounts, U.S. Department of Commerce. <http://www.bea.gov/regional/index.htm>

Gross Domestic Product. Total gross domestic product and total by NAICS 2-digit industry, millions of current dollars. Bureau of Economic Analysis, Regional Economic Accounts, U.S. Department of Commerce. <http://www.bea.gov/regional/index.htm>

Consumer Price Index. All Urban Consumers (current series), South Urban, 1982-84 base period. Bureau of Labor Statistics, U.S. Department of Labor. <http://www.bls.gov/cpi/>

Population by Age Group. U.S. Census, Population Estimates

<http://www.census.gov/popest/estimates.html>

Centerline Miles. Total number of centerline miles. Florida Highway Mileage Reports, Public Roads. <http://www.dot.state.fl.us/planning/statistics/mileage-rpts/public.shtm>

Appendix C. Survey of Gandy Businesses

PROPOSED GANDY CONNECTOR Economic and Business Impact Study

Gandy Boulevard Business Survey

The Tampa-Hillsborough County Expressway Authority, in cooperation with the Center for Urban Transportation Research at the University of South Florida, is conducting a Business and Economic Impact Study of the proposed Gandy Connector and we need your help.

This business survey is intended to acquire information that will help us better understand the economic links between businesses and the proposed Gandy Connector.

Your responses will remain strictly confidential and only summary data will be included in the final report.

Thank you for taking the time to respond to our survey.

Joe Waggoner, Executive Director

Tampa-Hillsborough County Expressway Authority

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1. What is the name and street address of your business?

Name:.....

Address:.....

2. Please indicate the type or nature of your business

Check the appropriate box

Hotel/Model	<input type="checkbox"/>	Auto Parts	<input type="checkbox"/>
Fast Food	<input type="checkbox"/>	Auto Repair	<input type="checkbox"/>
Restaurant	<input type="checkbox"/>	Car Sales	<input type="checkbox"/>
Retail Store	<input type="checkbox"/>	Gas Station	<input type="checkbox"/>
Furniture/Antiques	<input type="checkbox"/>		<input type="checkbox"/>
Grocery Store	<input type="checkbox"/>		<input type="checkbox"/>

Other (please specify):.....

3. Approximately what percent of your customers are regular?

Percent Regular:.....

4. When did your business begin operation at this location?

Year:.....

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5. Please indicate the approximate number of employees (including family members) in your business in the last 5 years

Please fill in as far back as you can

Year	Number of Employees	
	Full-time	Part-time
2008/09	_____	_____
2007/08	_____	_____
2006/07	_____	_____
2005/06	_____	_____
2004/05	_____	_____

6. Please provide estimates of total payroll expenses in your business for the last 5 years

Please fill in as far back as you can

Year	Payroll Expenses
2008/09	_____
2007/08	_____
2006/07	_____
2005/06	_____
2004/05	_____

7. Please provide estimates of total annual gross sales in your business for the last 5 years

Please fill in as far back as you can

Year	Sales
2008/09	_____
2007/08	_____
2006/07	_____
2005/06	_____

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2004/05

8. Please provide estimates of total annual sales taxes paid by your business for the last 5 years

Please fill in as far back as you can

Year	Sales Taxes
2008/09	_____
2007/08	_____
2006/07	_____
2005/06	_____
2004/05	_____

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