

Economic Impacts of Raised Medians on Adjacent Businesses

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ABSTRACT

This paper is the result of almost three years of investigation into the economic impacts on businesses and properties when raised medians are installed on adjacent streets. The researchers have developed and tested a methodology that can be used to collect and analyze data with which to study potential economic impacts. The preliminary results of data collection and conclusions are presented in this paper.

INTRODUCTION

Background

In recent years, transportation agencies have increased construction of raised medians on urban and suburban arterials. In addition to their use for access control, raised medians provide improved traffic operations and safety for a facility by separating opposing traffic flows and removing left-turning vehicles from the through lanes. With respect to access control, raised medians restrict left turns to mid-block and intersection median openings. While improving the operations and arterial signal coordination, the economic impacts of restricting these left turns may be felt by owners of businesses and properties adjacent to the arterial.

Many state and local transportation agencies, including the Texas Department of Transportation (TxDOT), have recognized the need to provide answers to the public regarding the pre-, during-, and post-construction impacts of installing raised medians. This paper describes the research to date in the third year of a four-year study sponsored by TxDOT to evaluate the economic impact of raised medians. Since the use of raised medians is increasing on urban streets, transportation agencies and the public are interested in learning more about the economic impacts. TxDOT desires a methodology with which to determine if such concerns are warranted. With such a methodology, TxDOT will be better informed of the overall economic impact that a raised median may have on adjacent businesses and properties. After estimating what, if any, impacts may be expected, TxDOT can provide this information to the public to keep them informed of anticipated changes. The research team anticipates that these research results and findings may be of use to other transportation engineers and planners interested in the impacts of raised medians.

Study Objective

The objective of the study is to develop and test a methodology to estimate the economic impact of median design. This is being carried out by:

1. Identifying prior evaluations and practices in the literature related to the effects of median design, as well as identifying other relevant issues and concerns.
2. Developing a methodology for evaluating the economic impacts of median design.
3. Evaluating economic impacts at several locations throughout Texas.

In the first year of this study, a methodology was developed and tested on one case study in College Station, Texas. Data were collected before and during construction along this corridor where a raised median was being installed. In the second year of this study, the research team sought additional case study locations on which to test the methodology for estimating the economic impacts of median design. After investigating several potential case study locations, the research team selected sites in the following cities: McKinney, Longview, Wichita Falls, Odessa, Houston, and Port Arthur. The research team identified and collected data on 10 corridors in these cities. These case studies are discussed in detail later in this paper. The current year of the study is being used to analyze the data collected during the second year. The final year of the research effort will be used to collect post-construction data along two corridors and complete all analysis.

Methodology

The primary purpose of this research project is the development of a methodology to determine if there are any economic impacts on adjacent businesses when a raised median is installed. The research team developed a methodology and tested it on a case study in the first year of the project. After analyzing the procedures and results of that test, the research team revised the methodology and tested it on 10 case studies in the second year of the project. The current methodology, consisting of eight main steps, provides a logical structure by which the user can identify case studies, collect data and analyze data. The eight elements of the methodology are to

1. Identify sites (cities) with potential corridors,
2. Identify corridor characteristics,
3. Contact sources of information,
4. Inventory businesses and establishments along the subject corridor,
5. Obtain information about businesses,
6. Prioritize businesses to be surveyed,
7. Collect data by personal interviews, and
8. Analyze and summarize data.

Details of each step are presented in previous publications (1, 2). Collecting data by personal interviews is quite labor-intensive, but it provides a much greater participation rate

than mail-out surveys, as well as higher quality data. The most complex of these steps is the final one, which contains several substeps involved in various aspects of data analysis.

SURVEY TECHNIQUES

The business impact survey contained two main types of questions: 1) those seeking hard data and 2) those asking for business owner/manager perceptions. The questions dealing with hard data asked for data such as numbers of employees and gross sales changes per year. The research team used these data to build trend lines for periods of time before and after median construction.

The questions regarding business owner/manager perceptions investigated issues such as anticipated changes in gross sales, property values, employees and traffic for years after the median installation. Researchers used the results of these questions to compare the owner/manager perceptions with the actual pre- and post-construction trends of these issues. The research team also developed and distributed an undeveloped land impact survey for owners of vacant property.

CASE STUDIES

Background and Selection Criteria

The research team decided it was necessary to investigate all potential case study corridors to determine their applicability to this project. The process of investigating potential case study corridors included several steps. The first step of the site investigation process was to talk to local officials (TxDOT, MPO, city, etc.) in order to obtain as much preliminary information as possible about each corridor. This information included the type of construction project, the construction time period, the types of abutting development, and the amount of abutting, undeveloped land. The research team used this information to rule out corridors that did not fit the parameters established in the methodology. Preferable corridors included those with medians constructed in the last six years and that were primarily abutted by commercial property. The vast majority of the corridors involved the installation of raised medians; however, the team also looked into median removals.

Site Investigations

Site Visits

At least one researcher visited each corridor to visualize the type of adjacent development. All of the corridors visited, with the exception of one series of corridors, are located in cities within Texas. The research team also investigated a series of corridors along 71st Street and adjacent intersecting streets in Tulsa, Oklahoma. The site visits also included performing windshield surveys and photographing the corridors.

Windshield Surveys

The researchers performed windshield surveys along each corridor. This process included recording the names, addresses, and telephone numbers (when available) from storefronts.

This information was recorded by sketching maps of the corridors and noting specific details such as parcel location, site circulation, driveway locations, and median opening locations.

Photographing the Corridors

The business inventory process also included photographing the corridors. Researchers took slides of the roadway cross sections, as well as examples of adjacent businesses and associated driveways. The researchers used the slides as a record of specific attributes of the corridors. The slides also provided an opportunity for other members of the research team to view the corridors.

Corridor Descriptions

These case studies include corridors with a variety of business mixes. Most of the corridors are in suburban type areas with shopping centers and strip retail development. One of the corridors, Grant Avenue in Odessa, is located in a central business district. The specific types of development on the individual corridors ranged from completely retail to a mix of office, institutional, and retail. These development mixes determined the number of potential survey participants in each corridor. In addition, the cities included in the study reflect a variety of population sizes. The populations range from approximately 35,000 in McKinney to approximately 1.8 million in the City of Houston. Table 1 summarizes several different characteristics of interest for each of the eleven case studies.

TABLE 1 Case Study Locations

Street Name	City and Pop.	Before Const.	After Const.	Study Limits	Length (km)	Age	Survey Type	Land Use	No. of Establishments
Texas Avenue	College Sta. 64,119	TWLTL	Raised Median	University Dr. to FM 2818	2.4	Under Const	Interview	Retail, University	130
South Post Oak Road	Houston 1,841,064	Undiv	Raised Median	I-610 to South Main Street	2.4	8	Interview	Retail, Industrial	155
Clay Road	Houston 1,841,064	Undiv	Raised Median	Hollister Rd to Gessner Rd	3.6	2	Mail-out	Retail, Industrial, Undeveloped	63
West Fuqua Road	Houston 1,841,064	Undiv	Raised Median	Hiram Clarke to Alameda Rd	2.4	9	Mail-out	Retail, Undeveloped	68
Long Point Road	Houston 1,841,064	Undiv	Raised Median	Campbell Rd to Hollister Rd	1.1	Pre-const	Mail-out	Retail	41
Twin Cities Highway	Port Arthur 58,582	Raised Median	TWLTL	53 rd Street to Griffing Park	3.2	13	Mail-out	Retail, Office	90
9 th Avenue	Port Arthur 58,582	Undiv	Raised Median	Texas 365 to Lake Arthur Dr	2.4	18	Mail-out	Retail, Residential, Undeveloped	66
University Drive	McKinney 34,979	Undiv	Raised Median	U.S. 75 to Texas 5	2.2	6	Interview	Retail, Residential	132
Loop 281	Longview 75,973	Flush Median	Raised Median	Spur 63 to Spur 502	1.0	2	Interview	Retail	65
Call Field Road	Wichita Falls 98,161	Undiv	Raised Median	Kemp Blvd to Lawrence St	0.5	Pre-const	Interview	Retail	55
Grant Avenue	Odessa 95,384	Undiv	Raised Median	2 nd Street to 8 th Street	1.0	6	Interview	Retail, Office	42

RESEARCH STUDY SUPPORT

Background

In the first year of this study, the research team discovered that the survey administration was facilitated by gaining support from the local chamber of commerce in the case study city. Gaining this support from chambers of commerce or appropriate neighborhood/business groups was also desired for the 10 additional case studies obtained in the second year of the research effort. This chapter will describe the agencies and groups involved in supporting the research effort.

Agencies and Groups Involved

Chambers of Commerce

Several agencies and groups provided vital support in testing the methodology on the case study corridors. The research team sought and obtained endorsement of the survey instrument and process from chambers of commerce in most of the case study cities. In Houston, chamber of commerce personnel recommended the research team contact neighborhood/business groups for research support and provided contacts. In larger cities such as Houston, neighborhood/business groups provide more support to the research since business owners are tied closer to these associations than to a chamber of commerce. In one of the cities, the chamber of commerce required a presentation to be made to the board of directors, but time constraints prevented such a presentation and no endorsement was obtained.

Process to Obtain Support

Generally, a researcher would contact the chamber of commerce and identify the appropriate person to write a letter (or sign a letter prepared by the research team) addressed to business owners and/or managers or undeveloped land owners along the corridor. The research team viewed this step as crucial since it was hypothesized that the businesses would be more willing to participate in a survey if the local chamber of commerce endorsed it. In all cases, the chambers of commerce were cooperative and all but one of them was able to provide the desired letters. None of the chambers of commerce refused to provide assistance.

Appraisal Districts

Appraisal districts in some of the cities provided significant support in the data collection efforts. They allowed the researchers to use public computer terminals to obtain property value information. The amount and specific types of data available, such as historical years, varied among districts. In at least one case, such minimal data were available on the appraisal district's computer that the research team needed to send a letter requesting additional historical information. The research team obtained compact discs from a private company to obtain information for some corridors. Data were primarily available in this medium for larger metropolitan areas.

DATA COLLECTION SUCCESS

One of the initial considerations of the research team was the ability to obtain accurate, valuable data from as businesses as possible. The team developed two survey instruments, one for interviews and one to be mailed. Administering two types of survey instruments provided useful information with which to compare their effectiveness. Tables 2 and 3 present participation rates for the mail-out surveys and personal interviews, respectively.

Mail-Out Surveys

The participation rates for the five mail-out surveys performed in the second year of the research effort are illustrated in Table 2. This table breaks down the participation rate by corridor and parcel type (e.g., business or undeveloped land). The participation rates ranged from 6 to 17 percent. Overall, the total participation rate for both businesses and undeveloped, land was nine percent. Surveys were sent to all businesses and undeveloped-landowners identified along the corridor during the windshield survey and through the appraisal district data. Therefore, businesses that moved, did not want to participate, or were not likely to be affected by the median were not removed from the mailing list prior to sending the surveys. Since the mail-out surveys were relatively low cost, the time was not taken to remove these individuals from the list. Further, it was possible that some of these establishments may provide additional information of interest. The result is that the participation rates are lower than they would have been had these businesses been removed from the original sample.

It should also be noted that the Spring Branch area is in the process of revitalizing the areas near the Clay Road and Long Point Road corridors in Houston. The Spring Branch Revitalization Association was conducting public hearings discussing the plans for the Long Point Road corridor and also discussing the economic developments and revitalization along Clay Road. The research team was able to attend one such meeting. It is likely that these ongoing and current efforts in this area supported the relatively higher participation rates of these corridors.

TABLE 2 Participation Rates for Mail-Out Surveys

Street Name	City	Number of Parcels		Total No. Sent	Returned Surveys		Participation Rates (Percent)		
		Businesses	Undevel. Land		Businesses	Undevel. Land	Businesses	Undevel. Land	Total
Clay Road	Houston	61	11	72	8	1	13%	9%	13%
Fuqua Road	Houston	62	28	90	2	4	3%	14%	7%
Long Point Road	Houston	35	0	35	6	0	17%	N/A	17%
Twin Cities Highway	Port Arthur	90	0	90	5	0	6%	N/A	6%
9 th Avenue	Port Arthur	68	23	91	5	3	7%	13%	9%
Totals =		316	62	378	26	8	8%	13%	9%

TABLE 3 Participation Rates for Personal Interviews

Street Name	City and State	Total Number of Establishments Contacted ¹	Number of Business Participants	Participation Rates (Percent)
Texas Avenue	College Station, Texas	130	95	73%
South Post Oak Road	Houston, Texas	50	19 ²	36%
University Drive	McKinney, Texas	47	29	62%
Loop 281	Longview, Texas	40	22	55%
Call Field Road	Wichita Falls, Texas	27	17	63%
Grant Avenue	Odessa, Texas	21	15	71%
Totals =		315	197	62%

¹There were no undeveloped land parcels along any of the corridors except South Post Oak Road. This corridor had three such parcels, but two of them requested a mail-out survey and one was not able to be contacted.

²Nine additional surveys not reflected here were received from the South Post Oak Road businesses. These were from individuals who had requested that they be sent a survey instead of performing a personal interview, or responses to surveys sent to many of the businesses along South Post Oak Road if there was difficulty contacting them.

Finally, for a very small cost, the research team sent out reminder cards about three to four weeks after the mail-out surveys were originally sent. This reminder did seem to help in obtaining a response from some businesses and undeveloped-landowners as a few more surveys were received. It also prompted several individuals to call the research team and thank them for the reminder. Usually these individuals would simply respond that they regretted to inform the researchers that they did not believe their information would be of value since their business had arrived so far after the completion of the raised median. However, this was still useful to the research team because these individuals could sometimes supply anecdotal information of use about the corridor, and it helped in keeping track of what business or undeveloped-landowners had participated or not participated.

Interview Surveys

Table 3, previously presented, displays the participation rates for the personal interviews in the five other case study corridors from this year of the study as well as the original test of the methodology in the first year of the study along Texas Avenue. The participation rates are generally much higher when personal interviews are performed than when surveys are mailed out. The participation rates range from 36 percent (South Post Oak Road) to 73 percent (Texas Avenue). It is expected that the participation rates along South Post Oak Road could be relatively low because the raised median was installed at least eight years prior to the survey administration. In addition the site was located in a very large city rather than a smaller community where business and undeveloped landowners may be more likely to take the time to sit through a personal interview. Along Texas Avenue in College Station, the proximity to the Texas A&M University campus and the fact construction was under way during the research project are the likely reasons for that higher participation rate.

ANALYSIS RESULTS

This section will describe analyses of interest that were performed on the business surveys. There are many different types of analysis that the research team has performed, and will still perform in the future, and this paper will illustrate only some of these preliminary analyses. These preliminary analyses include determining sample sizes and responses from:

1. Business owners and managers from all sites when businesses were present before, during, and after construction of the raised median.
2. Business owners where raised median installations are being planned.

Survey Results from Businesses Present Before, During, and After Construction

It was important to first stratify all the responses to the business surveys into three groups, 1) those businesses that were there before, during, and after construction of the raised median, 2) businesses that arrived during or after the construction, and 3) businesses along the corridor in which the raised median was removed (Twin Cities Highway in Port Arthur, Texas). This section will describe analyses from the first group. Table 4 summarizes the number of businesses of each business type for this

TABLE 4 Summary of Percent Changes and Sample Sizes for Responses from Businesses Present Before, During, and After Raised Median Installation

Business Type	Total Sample Size	Percent Change in Responses of Interest					
		Customers Per Day		Gross Sales		Property Values	
		During	After	During	After	During	After
Durables Retail	2	15% 1	5% 2	15% 1	1% 2	0% 1	17.5% 2
Specialty Retail	20	-7% 17	8% 17	-4% 17	0.6% 18	-1% 10	3.7% 13
Gas Station	1	100% 1	1% 1	0% 1	0% 1	50% 1	50% 1
Convenience / Gas	1	-50% 1	-30% 1	-50% 1	-3% 1	0% 1	10% 1
Fast food Restaurant	8	-30% 5	150% 6	-22% 5	0.2% 5	-1.7% 3	16.7% 6
Sit-down Restaurant	4	-3% 4	1.3% 4	-1% 3	0.75% 4	0% 3	0% 2
Auto Repair	6	-30% 4	-6% 4	-24% 5	-0.6% 5	3.3% 3	3.3% 3
Other Services	1	-75% 1	-20% 1	-75% 1	-3% 1	N.A. 0	N.A. 0
Other	9	-8% 3	-7% 3	2.5% 4	0.25% 4	0% 3	-5% 3

Note: The top number in each cell indicates the percent change indicated and the bottom number in each cell indicates the number of observations.

group, as well as responses to impacts on the number of customers, gross sales, and property values. The results were obtained by asking the business owners or managers whether each of these items (customers per day, gross sales, or property values) increased, decreased, or remained the same. The total sample size was 53 businesses from all corridors studied. One medical-related business did not respond to the questions described in Table 4; therefore, they are not included.

Table 4 presents responses about the effects on businesses during and after construction relative to conditions prior to the median installation. The results suggest that the construction phase can have impacts upon customers per day, gross sales, and property values for many of the business types interviewed. It is interesting to note that business types such as specialty retail (e.g., clothing stores, book stores, hobby-related stores, etc.), fast food restaurants, and sit-down restaurants had increasing customers per day, gross sales, and property values after the median installation. The auto repair businesses noted decreasing sales after the installation.

It is important to note that the changes are not necessarily directly attributable to the raised median installation. Several other questions on the survey addressed questions more directly related to the raised median installation itself to obtain a better understanding of these results. For example, Table 5 presents the results of a survey question that asked business owners and managers whether they felt their regular customers would be less likely, more likely, or remain about the same with respect to visiting their business due to the raised median installation. Only one out of the six auto repair survey respondents and two of the eight fast-food restaurant business owners indicated decreases. The other respondents indicated that they would be either more likely to visit or remain the same.

The research team also obtained further qualitative assessments of the impact of the raised median by asking business owners and managers to indicate whether the median installation has caused several elements to become better, worse, or remain the same. These elements are displayed in Table 6 along with the number of responses for specialty retail, fast-food restaurants, and automobile service business types. Overall, a majority of business owners indicated that raised medians have rated any given item either better or the same.

TABLE 5 Frequency of Responses by Business Type to Effects of Raised Median Installation on Regular Customers' Endorsement of Business

Business Type	Less Likely to Visit	More Likely to Visit	Stay About the Same
Durables Retail	0 (0%)	0 (0%)	2 (100%)
Specialty Retail	0 (0%)	4 (21%)	15 (79%)
Gas Station	0 (0%)	0 (0%)	1 (100%)
Convenience / Gas	0 (0%)	1 (100%)	0 (0%)
Fast-food Restaurant	2 (25%)	3 (38%)	3 (38%)
Sit-down Restaurant	0 (0%)	0 (0%)	4 (100%)
Medical	0 (0%)	0 (0%)	1 (100%)
Auto Repair	1 (6%)	11 (69%)	4 (25%)
Other Services	0 (0%)	0 (0%)	1 (100%)
Other	0 (0%)	0 (0%)	4 (100%)

TABLE 6 Frequency of Responses by Business Type to Raised Median Installation

Item of Interest	Specialty Retail			Fast-food Restaurants			Automobile Services		
	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same
Traffic Congestion	13 68%	3 16%	3 16%	6 75%	0 0%	2 25%	3 50%	2 33%	1 17%
Traffic Safety	16 84%	2 11%	1 5%	6 75%	1 13%	1 13%	3 50%	1 17%	2 33%
Property Access	8 42%	4 21%	7 37%	3 38%	2 25%	3 38%	3 50%	2 33%	1 17%
Business Opportunities	9 47%	2 11%	8 42%	3 38%	0 0%	5 63%	4 67%	0 0%	2 33%
Customer Satisfaction	9 47%	0 0%	10 53%	3 38%	1 13%	4 50%	2 33%	0 0%	4 67%
Delivery Convenience	5 26%	1 5%	13 68%	2 25%	1 13%	5 63%	2 33%	0 0%	4 67%

It is interesting to note that property access is rated worse for 21 percent (4 of 19) of specialty retail businesses, 25 percent of fast-food restaurants (2 of 8), and 33 percent of automobile service shops (2 of 6). Business opportunities, customer satisfaction, and delivery convenience had the least negative effect on these business types.

The research team also asked business owners to rank distance of travel, hours of operation, customer service, product quality, product price, and accessibility to store. Accessibility to the store was ranked fourth, fifth, or sixth for all business types except fast-food restaurants, where it was ranked third, behind service and quality. This result indicates that there are other factors such as product quality, product price, and customer service that highly influence customers endorsing a particular business and management of the business has influence over these factors. Further, the research team found that the percentage of passerby traffic did not change for durables retail (e.g., appliance stores), sit-down restaurants, or medical establishments. Passerby traffic decreased for specialty retail, the one convenience store/gas station in the sample, and automobile service, and it increased for fast-food restaurants and other services.

Business Survey Results for Locations Where Median Installations Are Planned

The results discussed in the previous section are for areas where businesses were present before, during, and after the raised median installation. This section presents the perceptions of business owners in case study locations (Call Field Road in Wichita Falls, Texas, and Long Point Road in Houston, Texas) where data were collected prior to the raised median installation. There were a total of 23 observations for this analysis.

The overall perception of the raised median installation was more significant in anticipated impact than the results obtained in the previous section. For example, when rating the elements of distance of travel, hours of operation, customer service, product quality, product price, and accessibility to store in the previous section, accessibility to the store was generally ranked at number four, except for fast-food restaurants, when it was ranked at number three. Prior to construction of the raised median, accessibility was ranked much higher. For example, it was ranked number one for one medical facility,

number two for hair salons, and number three for convenience/gas stations and sit-down restaurants. For all others, it was ranked at number four, five, or six. When questioned about the impact of the raised median installation on their regular customers, two business owners of specialty retail, one convenience store, and one sit-down restaurant noted that regular customers would be less likely to endorse their business. All other business owners interviewed noted that they thought their regular customers would be more likely to visit their business or that it would not impact them. Finally, the research team further studied the specialty retail business responses to those elements indicated previously in Table 6. Researchers found that five out of six specialty business owners anticipated that access would be worse.

Final Notes on Project Analysis

The analyses provided in this section are certainly not comprehensive. Full results will be available when this year's final report is published this fall from the case studies obtained in this fiscal year. The final project, and all analysis, will be available in the Fall of 2000 when the project is completed. It is also important to note that there is clearly response bias in the data obtained from surveys of this type, and whether the information obtained from those who chose to respond is representative of the whole population is open to speculation. Respondents themselves selected whether or not to respond to the survey and thus were not chosen at random. Even though the information may not fully represent the entire population, this was the most complete information that was available, and it provides valuable insight.

FUTURE RESEARCH AND CONCLUSIONS

Follow-ups to Before-Construction Data Collection

Medians in two of the corridors (Call Field Road in Wichita Falls and Texas Avenue in College Station) studied in this project were under construction during survey administration. The research team plans to survey businesses along these corridors again during the next year (FY 2000) of the project to obtain post-construction data.

Additional Median Removal Data Collection

In an attempt to more fully study the impact of raised medians on adjacent businesses, the research team anticipates collecting data from corridors where medians have been removed. Several examples of this activity exist in Amarillo, Texas. Most of these examples are short segments of medians that have been removed at street intersections.

Conclusions

Many conclusions and interesting points may be drawn from this research effort:

- The in-person surveys appear to provide more reliable data than the mail-out surveys, and these survey respondents appreciate the face-to-face opportunity to have their opinions heard.

- The construction phase appears to have the most detrimental impacts on businesses. Suggestions to alleviate these impacts include, 1) ensuring that adequate access is provided to businesses during construction, 2) reduced construction time, 3) performing construction in smaller roadway segments.
 - Changes in economic activity are a function of many factors, including location (mid-block or intersection), business type, and local economic activity, to name a few. The research team is continuing to evaluate these trends and the influences of these factors.
 - When presented for ranking, business owners and managers often list accessibility to store after product quality, customer service, and product price and before hours of operation and distance to travel. This indicates that accessibility is often ranked lower than several items upon which business owners and management may have a significant influence.
 - The research effort is discovering that the number of employees often does not fluctuate in accordance with economic impacts as business owners tend to be loyal to their employees.
 - Five of the six undeveloped-land owners indicated that they felt the raised median made their property more attractive. Also, many of these landowners were apparently not as involved and/or concerned with overseeing such developments as compared to developed businesses.
 - Overall, public involvement participation was indicated as “low” by 70 percent of the returned business surveys.

One of the greatest challenges to TxDOT staff has been providing information to business and property owners regarding potential economic impacts of raised medians on businesses and properties. TxDOT staff will be able to use the results of this research to explain experiences on these corridors. It will be important for the staff to note that the results of this research will not guarantee any specific economic impacts on particular business or property types, but may be used to anticipate general impacts. At a minimum, this information will allow TxDOT staff to discuss these issues with the public using appropriate research data, instead of having to say that they have no idea of what to expect. These results are also anticipated to be of help to other planners, engineers, and researchers investigating these issues or involved in similar median projects.

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