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16. Abstract <p>The upgrading and widening of highways across the state, especially in urban areas, is causing the directly affected businesses and property owners to inquire about the possible negative economic impacts of such construction. This report documents the during- and after-construction effects of the widening of a 3.75 kilometer (2.33 mile) section of State Highway (S.H.) 21, in Caldwell, Texas. A continuous two-way left-turn lane with curbs and gutters was added between 1991 and 1993.</p> <p>Collected data includes information on abutting business managers' estimation of the construction impact on their businesses and property values, and on the traffic volumes, travel times, and accident rates of the highway. Most businesses' number of usable parking spaces, of customers per day, and of full-time and part-time employees were unaffected during construction. Most business managers thought that sales decreased. Reported sales figures showed a 4% decrease in sales, which was less severe than the business managers estimated. Appraised abutting property values fell between 1990 and 1992, while land values increased during that time. Property values increased after construction.</p> <p>Direct construction expenditures on this project totaled \$6.095 million. The Texas input-output model estimates these expenditures' impacts to be \$22.5 million in additional output and 364 jobs for the statewide economy, including \$7.5 million in additional output and 121 jobs for the Caldwell economy. The benefit-cost ratio was 1.54, which means that the motorists are receiving \$1.54 in benefits for every dollar spent on the project.</p>					
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**ESTIMATED ECONOMIC IMPACT OF WIDENING
STATE HIGHWAY 21 IN CALDWELL, TEXAS**

by

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Research Report 1260-1
Research Study Number 0-1260
Study Title: Economic Impact of Highway Widening Projects

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College Station, Texas 77843-3135

IMPLEMENTATION RECOMMENDATION

The following recommendation seems to be in order at this time:

1. The economic impact findings of this study should be used by TxDOT planning officials to write and support environmental impact statements.

DISCLAIMER

The contents of this report reflect the views of the authors who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official view or policies of the Texas Department of Transportation (TxDOT) or the Federal Highway Administration (FHWA). This report does not constitute a standard, specification, or regulation. The report was prepared by Jesse L. Buffington and Marie T. Wildenthal.

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SUMMARY

Between 1991 and 1993, a rural, 3.75 kilometer (2.33 mile) section of State Highway (S.H.) 21, in Caldwell, Texas, was widened to include a continuous two-way left-turn lane with curbs and gutters. This report documents the during and after construction effects of the widening. No right-of-way was taken for the project.

The 4% decrease in sales figures reported by abutting business managers during construction was less severe than the managers estimated. After construction, sales increased 8%. The number of parking spaces decreased 7% during construction, but the number of occupied parking spaces decreased 60%. Managers thought their number of customers per day and percentage of out-of-town customers decreased during construction, but increased afterward. Eighty percent of the businesses' number of full-time and part-time employees were unaffected during construction.

Abutting property (land plus improvement) values have steadily declined since 1985. The Deputy Chief Appraiser says that the oil boom was the most significant factor in property values, but the age of the improvements is also a factor. Land values also declined until 1992 but increased after construction.

After construction, some managers said that the traffic volume increased but it flows more smoothly. The measured traffic volume decreased 5% in the first year of construction but rose 3% to 6% each year during construction after that.

Most responding managers thought that the travel time increased during construction and decreased afterward, while most responding residents thought it did not change due to construction. The instrumented vehicle runs indicated that travel time increased 8.4% during construction and decreased 12% after construction.

There was no consensus among responding managers either during or after construction about the change in the number of accidents. Almost half of the responding residents thought that the number of accidents did not change and the data supports this.

The benefit-cost ratio for the project was estimated at 1.54, indicating that motorists are receiving \$1.54 worth of benefits for every \$1 spent on construction.

Sales tax revenue from 23 survey respondents reporting their sales decreased 4.5% during construction. Sales tax revenue from the 13 firms responding with sales figures to the after-construction survey increased 2% after construction. Real abutting property tax receipts decreased 9% during construction and 15% after construction.

Direct construction expenditures on this project totaled \$6.095 million. The Texas input-output model estimates these expenditures' impacts to be \$22.5 million in additional output and 364 jobs for the statewide economy, including \$7.5 million in additional output and 121 jobs for the Caldwell economy.

Most of the responding business managers thought that the noise level, air pollution level, and number of accidents at their business or along S.H. 21 increased during construction and did not change after construction. More than half of the responding residents thought that the general appearance and desirability of living abutting construction increased due to the construction.

Opinions of the contractor were distributed between very good and very poor, while almost half of the business owners thought TxDOT did a good or better job.

INTRODUCTION

PURPOSE OF STUDY

The upgrading and widening of highways over the state, especially in urban areas, is causing the directly affected businesses and property owners to ask questions about the possible negative economic impacts of such construction. Businesses along U.S. Highway 80 in Longview, Texas, were concerned that widening the highway through their city would result in the loss of shoulder and private parking spaces for their customers. They were also concerned about the ability of their customers to safely turn into their parking lots because the new curbing restricted continuous access to them. Several years ago, an out-of-state organization trying to study the effects of widening a rural highway from two to four lanes contacted a research economist at the Texas Transportation Institute (TTI) for information on the economic impact (specifically land value, land use, and business impacts) of such an improvement. Later, a real estate appraiser from Austin, Texas, called the same TTI researcher asking for information about the possible economic impact on a client's business property abutting U.S. Highway 183 which was being widened from a four-lane direct access facility to a four-lane limited access freeway with service roads. Due to lack of prior research, this research economist was not able to provide any assistance to these people.

To help fill this data gap, the TTI researcher proposed the Longview highway widening study and later the current study of three widening projects located on State Highway (S.H.) 21 in Caldwell, Texas; S.H. 199 west of Fort Worth, Texas; and U.S. Highway 59 in Houston, Texas. The Longview study has been completed and the findings are presented in a research report released in 1993 [1]. Some of the first findings from the current widening study are presented in this report, which describes the S.H. 21 widening in Caldwell, Texas.

HIGHWAY IMPROVEMENT

Location

The construction site of interest is a 3.75 kilometer (2.33 mile) segment of S.H. 21 between Davidson Creek and 1.61 kilometers (1 mile) west of F.M. 975 in Caldwell, Texas. Caldwell is a rural town of approximately 3,000 people. Bryan/College Station, a community of approximately 100,000, is approximately 25 miles away. The next closest city with a population over 25,000 is Austin, approximately 80 miles away.

Description of Before and After Design

The construction transformed a two- to four-lane undivided highway with an open ditch to a four-lane divided highway with a two-way left-turn lane and curbs and

gutters. There were two lanes on the west side of the railroad tracks and four lanes on the east side. A new railroad overpass bridge was constructed to allow for four lanes of traffic.

Traffic Volumes, Accidents, and Travel Times

TxDOT estimated the Average Daily Traffic (ADT) at the beginning of the project as 7,000, and the 20-year projected ADT as 16,700. The average number of accidents for the construction period is slightly higher than the average number prior to construction. There were 51 accidents during the year prior to construction on S.H. 21, but only 38 during construction, a 25% decrease. The number of accidents two years after construction was 31% less than it was prior to construction. Instrumented vehicles traversed the study area in an average time of 4 minutes and 21 seconds at the beginning of the first year of construction, and an average time of 4 minutes and 43 seconds during the second year of construction, an 8.4% increase. After construction, the travel time was 3 minutes and 49 seconds, which was 12% less than in 1991 and 19% less than in 1992.

Construction Costs and Construction Dates

The construction cost \$6.095 million. Originally, the project was scheduled to occur between October 1990 and March 1993. However, construction was delayed and occurred between January 1991 and July 1993. Data for the construction period (1991-1993) are presented in the tables to follow.

STUDY CITY AND COUNTY

Historical data on the study city, Caldwell, and county, Burleson, are presented in this section and used in other sections to help interpret the findings of data relating to the S.H. 21 improvement in Caldwell before versus during and after construction.

Population

Population figures for Caldwell and Burleson County are shown in Table 1. Over the past 10 years or so, the population of Caldwell has varied between 2,900 and 3,600, while the population of Burleson County has varied between 13,600 and 15,000. The censuses were not taken in the same years, so the figures are not directly comparable. However, it appears Caldwell's population fell by a slightly larger percentage between 1985 and 1991, years before construction started on widening S.H. 21. This situation may be attributable to a decline in petroleum exploration in the area. After construction started, petroleum exploration increased. Burleson County population increased by 9.5% after construction, while Caldwell's increased 4.5%.

Table 1. Caldwell Population for Various Years

Year	Caldwell Population	Burleson County Population
1980	2,953	NA
1982	NA	14,700
1985	3,605	15,000
1990	3,181	NA
1991	3,250	13,625
1992	3,266	NA
1993	3,350	NA
1994	3,397	NA
1995	NA	14,960

Source: U.S. Census Bureau.

Employment

Employment figures for Burleson County for the last 10 years are graphed in Figure 1. Between 1985 and 1990, employment alternately increased and decreased, ranging from 3,200 to 2,600. Employment increased from 2,800 to 3,000 during construction, and to 3,340 the year after construction ended.

Wages

Real wages for Burleson County for the last 10 years are graphed in Figure 2. The changes in real wages are similar to those of employment. They decreased from \$66 million in 1985 to \$51 million in 1990, the year before construction. By the end of construction, they rose to \$60 million and further increased to \$69 million the year after construction ended.

Number of Businesses

The number of businesses in Burleson County decreased 20%, from 366 to 291, between 1984 and 1989 (see Figure 3). However, the number began to increase the year before construction started. During the construction, the number of

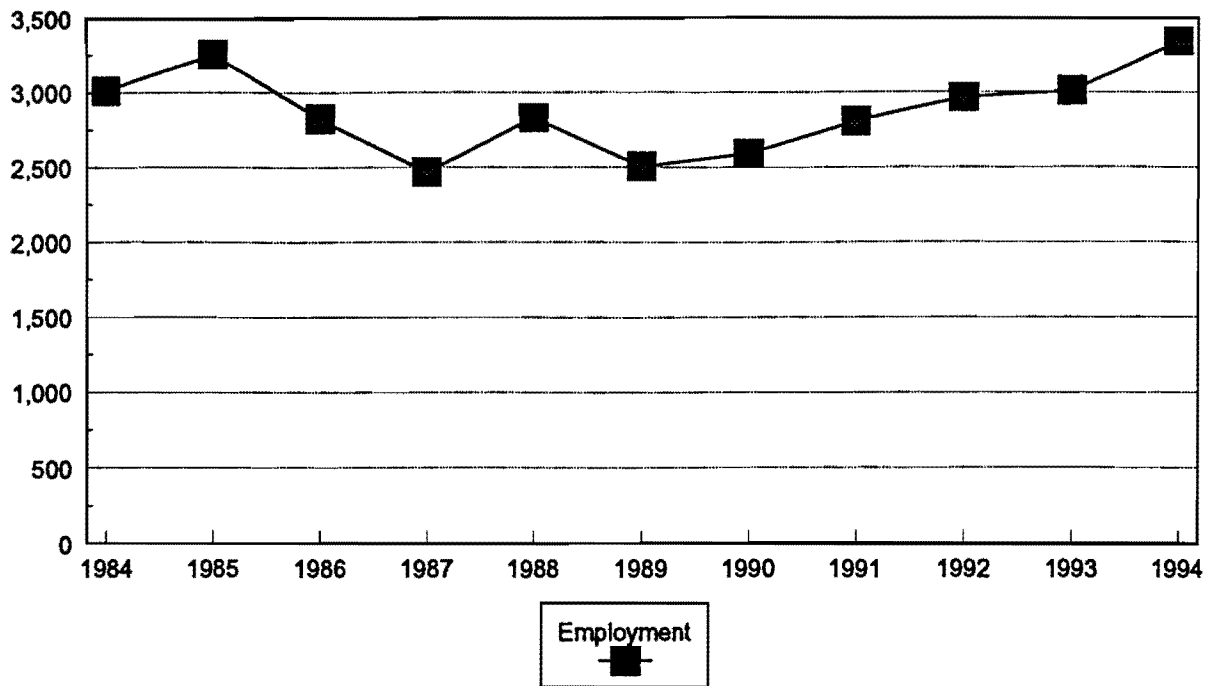


Figure 1. Burleson County Employment, 1984 - 1994

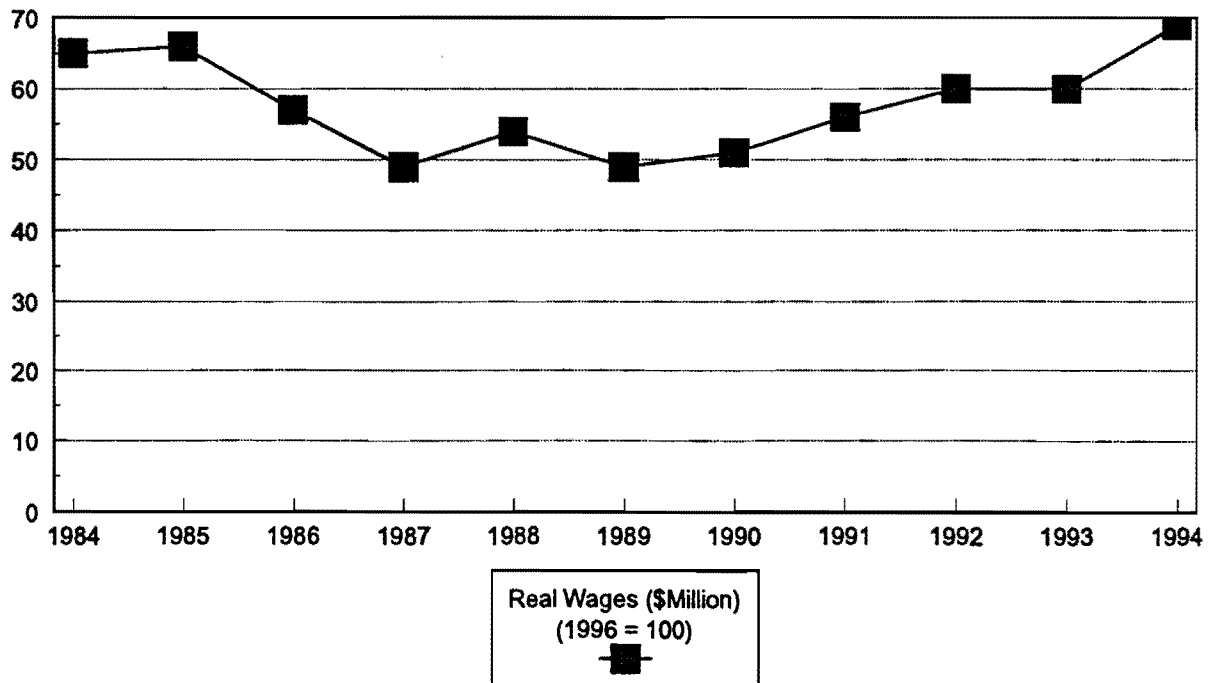


Figure 2. Burleson County Real Wages, 1984 - 1994

businesses increased 10%, from 308 to 340. After construction, the number further increased from 340 to 370, an 8% gain.

The number of Caldwell businesses decreased from 147 in 1984 to 110 in 1990, a 25% change (see Figure 3). This decrease was 5% greater than the corresponding decrease for Burleson County. During construction, the number of businesses increased by a slightly greater percentage (15%) than those in Burleson County. After construction, the number of Burleson County businesses increased by a greater percentage than the Caldwell businesses (3%).

Gross Sales

Real Burleson County business gross sales alternately increased and decreased between 1984 and 1994 (see Figure 3). The values ranged from \$150 million to \$189 million.

Real Caldwell business gross sales increased or decreased for a year or two between 1986 and 1994, and did not strictly follow the pattern of Burleson County businesses' sales. The values ranged from \$96 million and \$127 million, as can be seen in Figure 3. Real gross sales decreased the first year of construction, and then increased after that.

Property Values

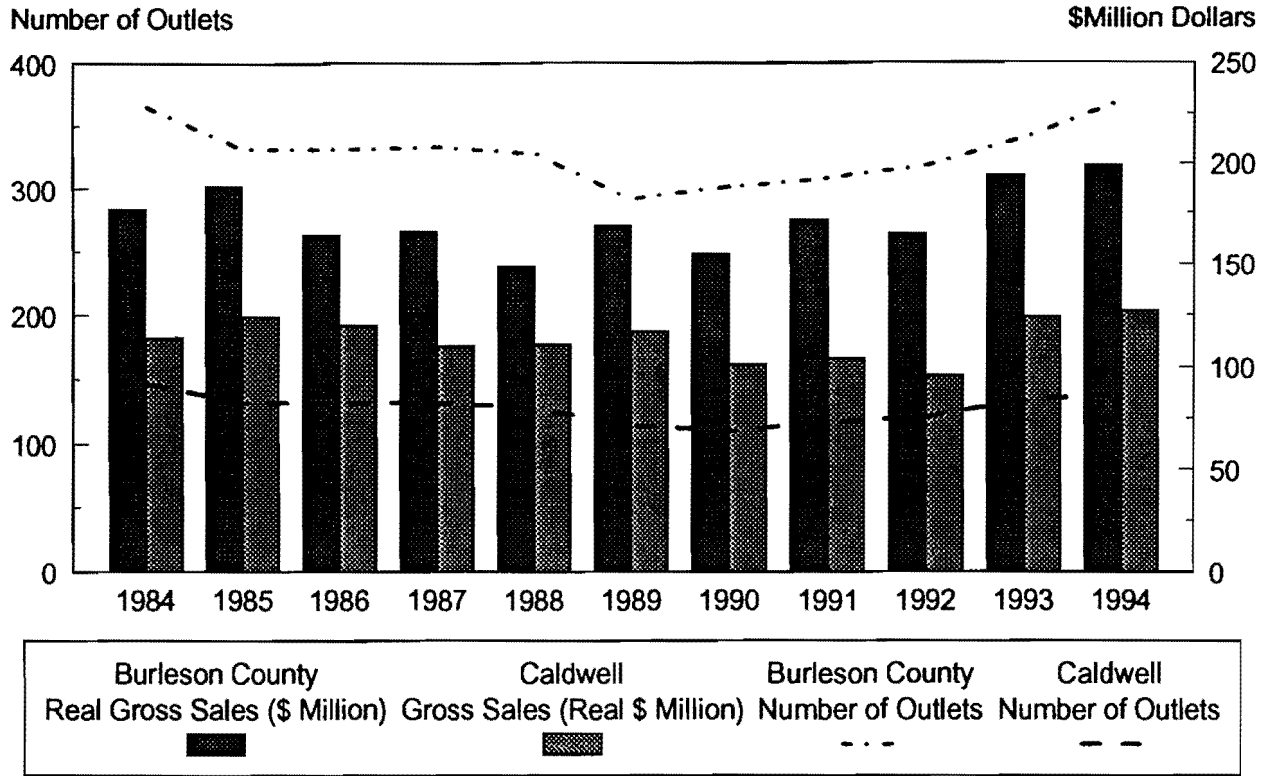
Burleson County real net appraisal values for residential, commercial, ranch, and miscellaneous property decreased from 1983 until 1989, when they increased until 1992 (Figure 4). The combined values have ranged from \$1,900 million to \$566 million.

Real net appraised values of Caldwell residential, commercial, ranch, and miscellaneous property between 1987 and 1996 are graphed in Figure 5. Generally, net appraisal values have been declining since 1986, when they were \$130 million. They continued to decline until 1992. They rose in 1993 and 1994, then fell slightly.

Oil and Gas Production

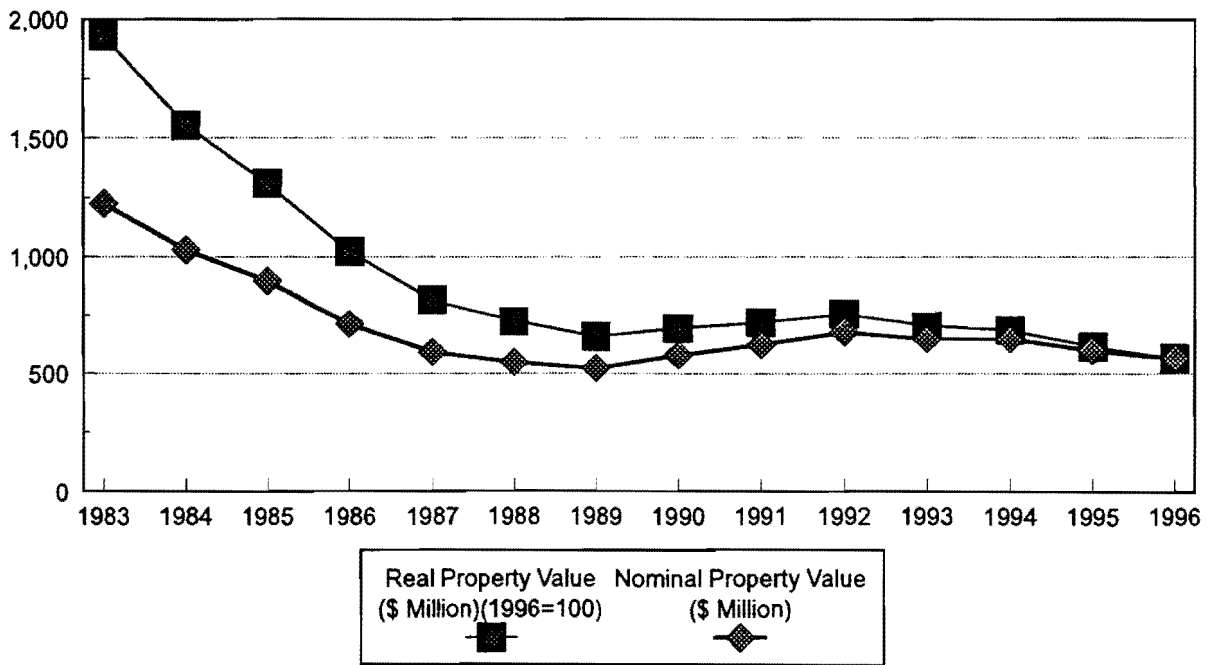
Trends in crude oil and condensate production for Burleson County are graphed in Figure 6. Oil production increased significantly from 7.5 million barrels to 12 million barrels between 1990 and 1991, but has since declined. The real crude oil and condensate production value was affected by both production level and price (see Figure 7). The average price per barrel of crude oil and condensate declined between 1990 and 1994, then rose in 1995 (Figure 8).

Between 1984 and 1989, natural gas production decreased by 50%, as can be seen in Figure 9. In 1991 and 1992, gas production increased significantly, but has decreased since then. The trend in production is similar to the trend in value since 1987 (Figure 10).



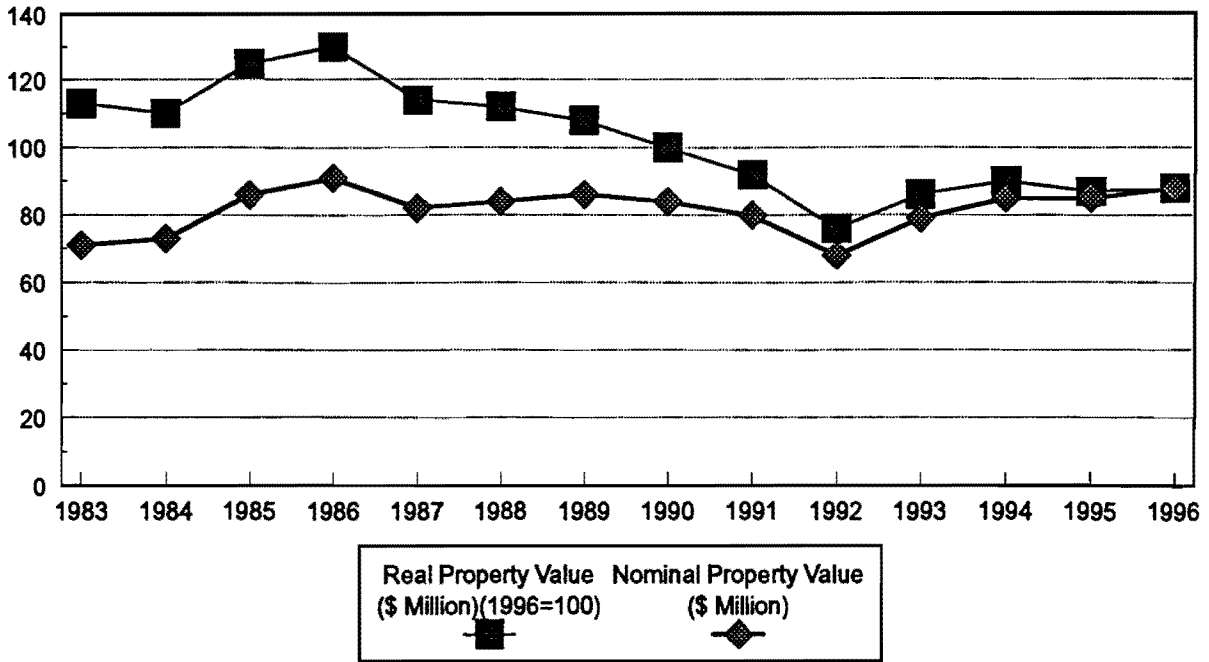
1996 = 100

Figure 3. Real Reported Gross Sales for All Burleson County Businesses, 1984 - 1994



Source: Burleson County Appraisal District

Figure 4. Burleson County Real Property Value, 1983 - 1996



Source: Burleson County Appraisal District

Figure 5. Caldwell Real Property Values, 1983 - 1996

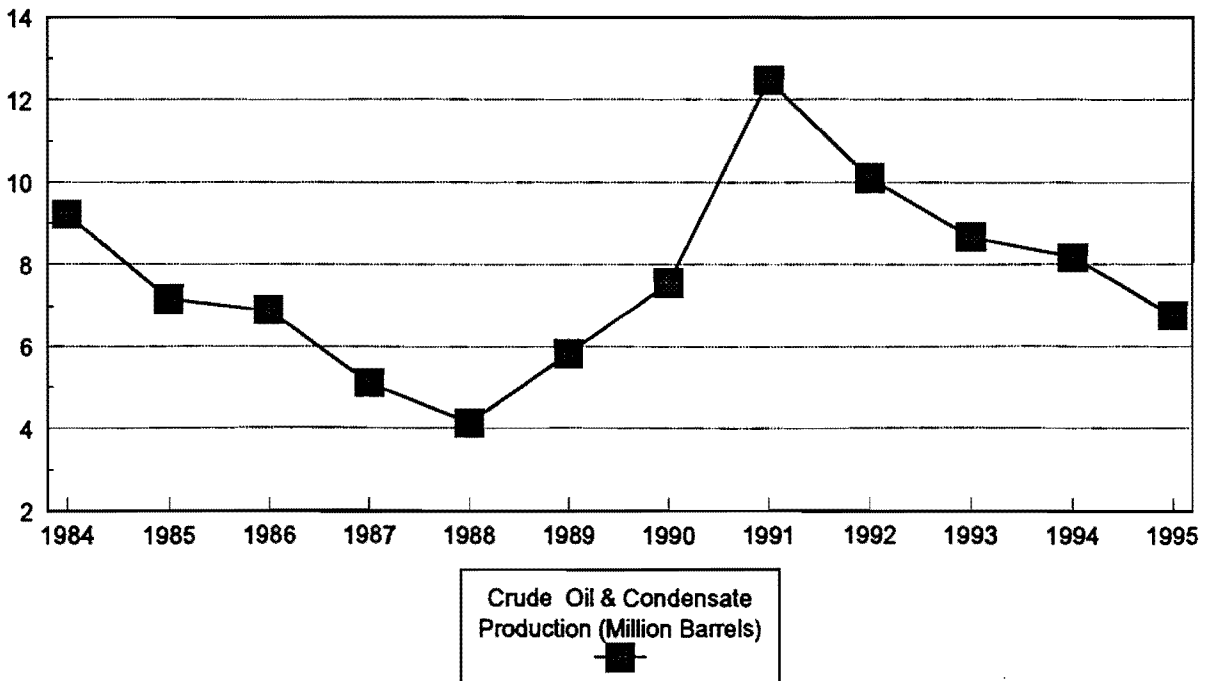


Figure 6. Burleson County Crude Oil and Condensate Production, 1984 - 1996

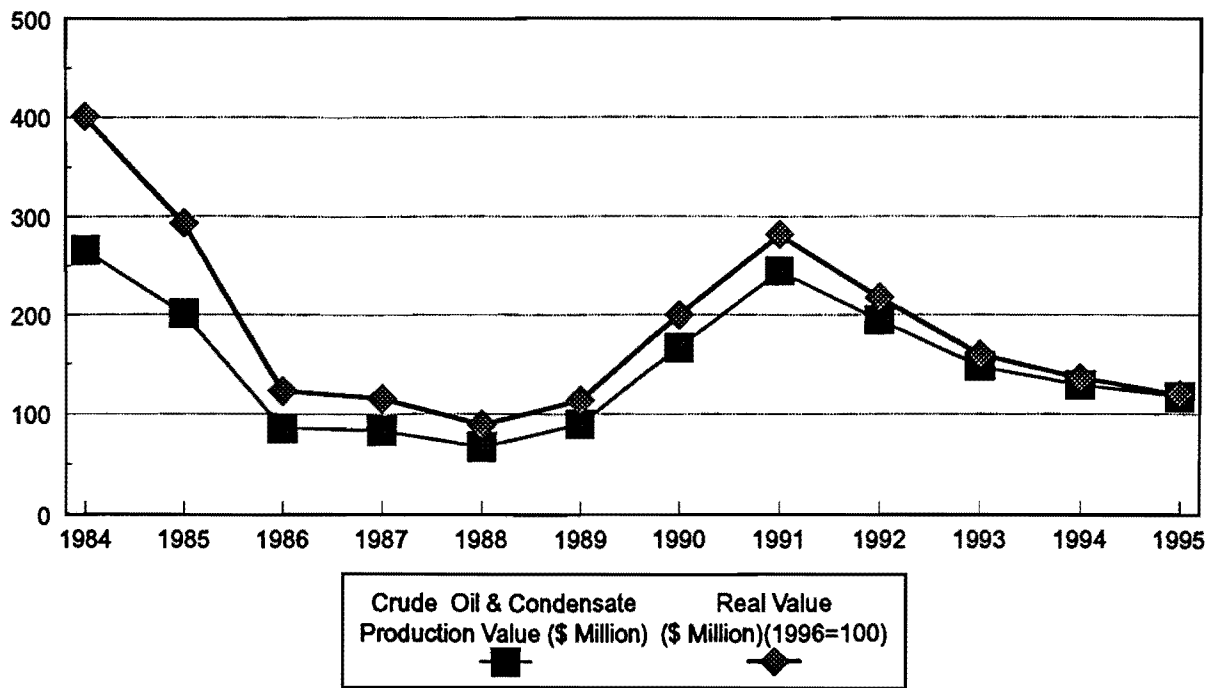


Figure 7. Burleson County Real Crude Oil and Condensate Production Value, 1984 - 1995

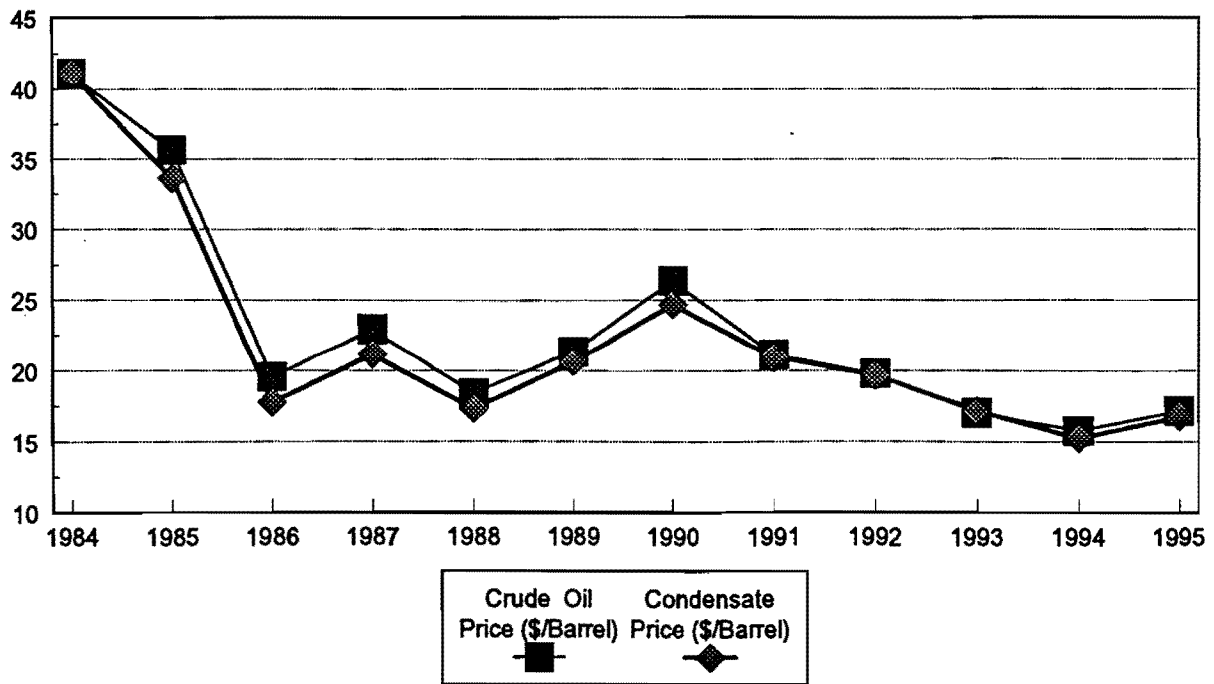


Figure 8. Burleson County Real Crude Oil and Condensate Average Price per Barrel, 1984 - 1995

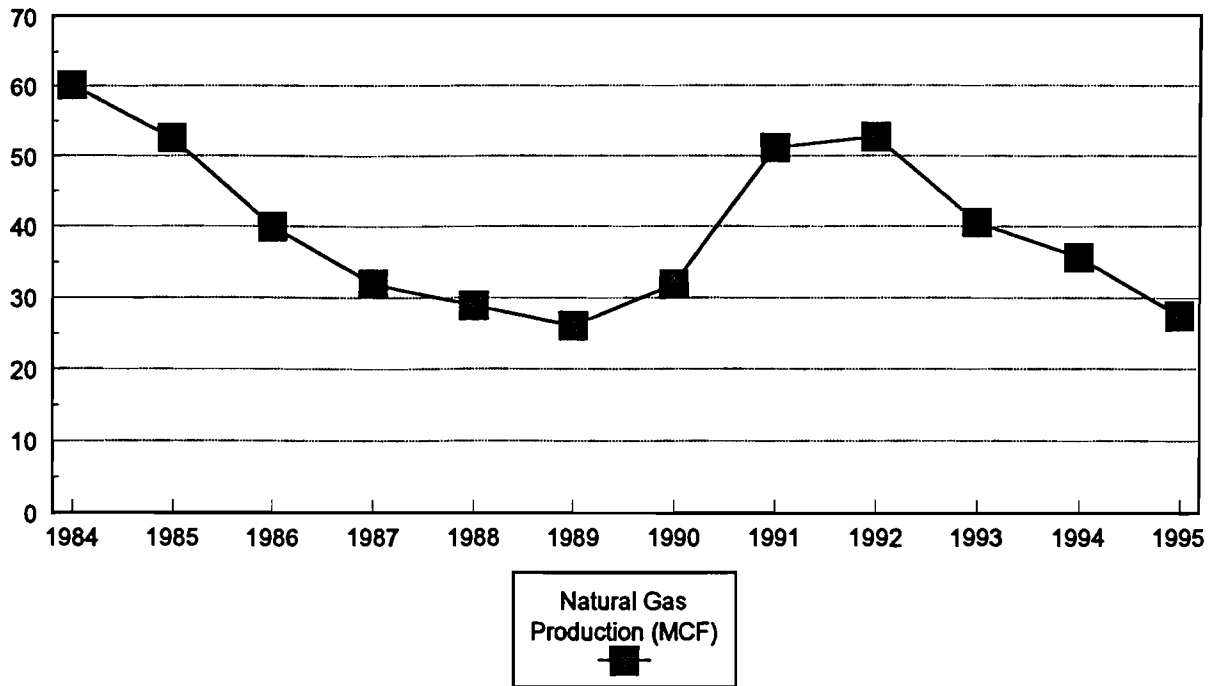


Figure 9. Burleson County Natural Gas Production, 1984 - 1995

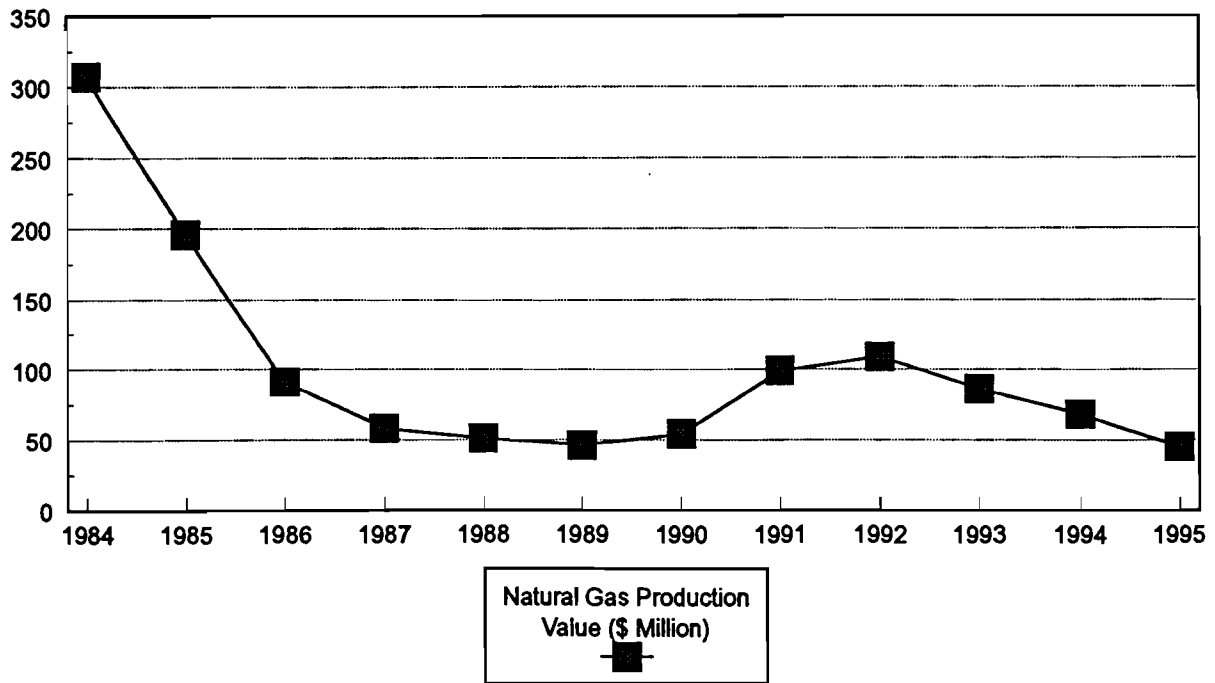


Figure 10. Burleson County Real Natural Gas Value, 1984 - 1995

Drilling Activity

Average annual rotary rig counts for Texas region 3 are graphed in Figure 11. Texas region 3 is comprised of 12 counties, including Burleson. Between 1984 and 1988, rig counts slowly declined and then increased between 1989 and 1991. During the construction period, rig counts hovered around 55 rigs. They increased to 59 rigs during the last year of construction and the following year, but decreased two years after construction ended.

STUDY METHODS AND DATA SOURCES

The study method is to evaluate data collected to represent the situation before, during, and after construction of the S.H. 21 widening project. The construction period data are highlighted in the tables. Below is a brief summary of the method used in establishing each type of impact. The city of Caldwell data and, to a lesser extent, Burleson County data, are compared with the state highway-specific data to interpret the latter data in estimating construction-period impacts and finally after-period impacts.

Business Impacts

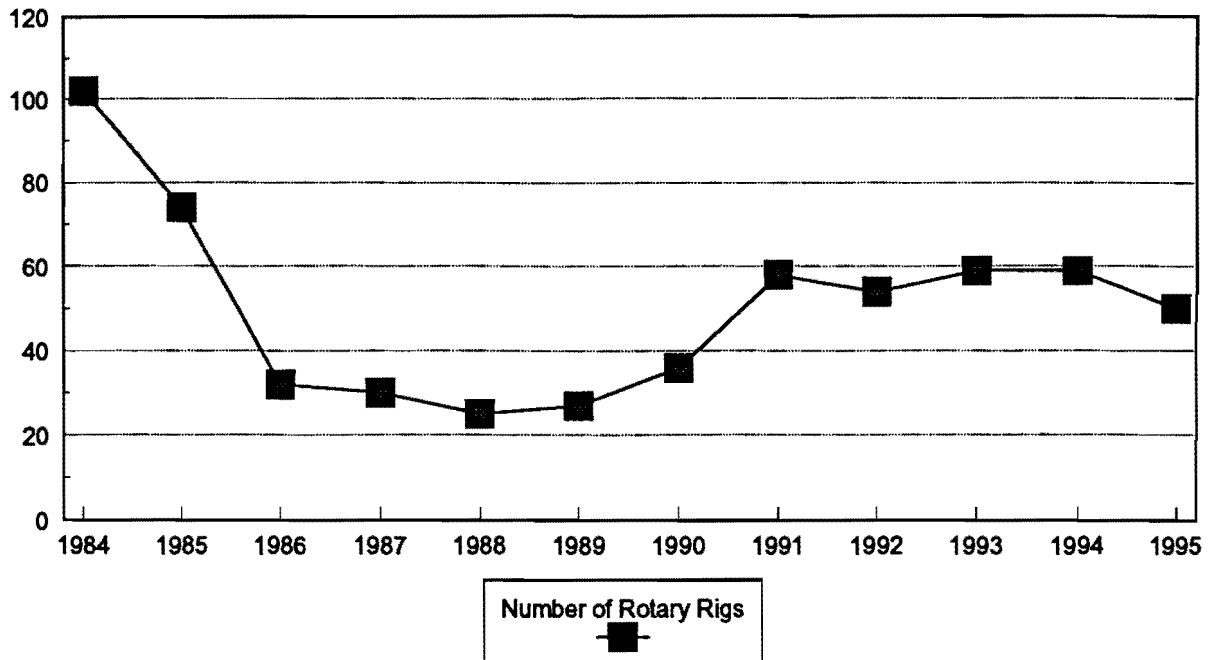
Business impacts were evaluated by studying trends in the State Comptroller's record of number and types of businesses since 1984. Business impacts were also evaluated through a survey of the business owners and managers along the widened sections of S.H. 21 and S.H. 36. Managers and owners were asked about changes in their number of parking spaces, employees, and customers, as well as sales and profit levels.

Property Value Impact

Property value trends were evaluated using Burleson County Appraisal District values for Burleson County, Caldwell, S.H. 21, and S.H. 36 properties. Business managers' and residents' opinions about the changes in property values were also incorporated in the analysis.

User Cost Impacts

The researchers estimated user cost impacts by investigating instrumented vehicle, accident, and ADT data as well as business managers' and residents' opinions on the changes in traffic volumes, travel time, and accidents on S.H. 21. They were also analyzed using the MicroBencost benefit-cost model.



Source: Baker-Hughes Incorporated

Figure 11. Average Annual Rotary Rig Count for Texas Region 3, 1984 - 1995

City and County Tax Revenue Impacts

State Comptroller's data were used to calculate Caldwell average percent taxable sales per business by SIC code and the percentage was applied to the annual sales provided by business owners and managers in the study area. City and county tax rates, obtained from the Burleson County Tax Assessor-Collector and the city of Caldwell, were applied to these sales volumes, as well as to the property values obtained from the Burleson County Appraisal District.

Environmental and General Appearance Impact

Abutting business managers' and residents' opinions on the change in noise level, air pollution level, and general appearance of S.H. 21 were used to evaluate the impact of the widening construction on these aspects of S.H. 21.

Contractor and TxDOT Performance Evaluation

Abutting business owners' and managers' opinions on contractor and TxDOT performance were used to evaluate these aspects. The TxDOT area engineer's assessment of the contractor was also included in the contractor performance evaluation.

BUSINESS IMPACT

INTRODUCTION

In this section, business trends for all Caldwell businesses will be compared with those of businesses along the widened sections of S.H. 21 and S.H. 36 in Caldwell. The number and types of businesses, as well as their sales levels, are compared, and the opinions of abutting business managers regarding various aspects of the construction are presented.

The business managers located along S.H. 21 and S.H. 36 were surveyed about their opinion of the impacts of the construction on their businesses. They were asked by what percentage interval various business aspects were affected by the construction. Customer impacts included the change in available parking spaces and change in the number of customers during construction. The impacts on sales, net profits, and number of employees were also investigated. Land value impacts and impacts on the general quality of life during construction, as measured by travel time through the construction area, number of accidents, and traffic volumes, were also studied. Actual values were solicited for gross sales, number of employees and parking spaces/occupied parking spaces, and percentage of out-of-town customers. In addition, the managers were surveyed on their assessment of the contractor's and TxDOT supervisor's performance. This section focuses on the business aspects of the survey. A copy of the survey is included in Appendix A.

Most of the during-construction surveys were administered in person by three TTI researchers during the week of July 26, 1993. The few remaining surveys were administered over the following two weeks. One manager refused to answer the questionnaire, and two businesses went out of business during the interview period. Two owners of former businesses were interviewed. A total of 54 responses were obtained.

After-construction interviews were conducted from the middle of August 1996 until January 1997. Survey efforts concentrated on businesses that existed during construction, and 39 responses were obtained. A copy of the survey is included in Appendix B.

CHARACTERISTICS OF HIGHWAY BUSINESSES

The classification for highway businesses is not as detailed as that for the city of Caldwell as a whole. For highway businesses, the focus is on retail sales, retail service, retail sales and service, professional, and other types of business.

Number and Types

During Construction

During construction, most of the businesses (25, or 46%) were engaged in retail sales, while seven (13%) were engaged in retail service. Nine (17%) were engaged in

both retail sales and service. Ten businesses (19%) conducted professional services, while three (6%) businesses had other types of business. Responding businesses distributed by type of business are shown in Table 2.

After Construction

The distribution of businesses by type after construction was similar to that during construction. Respondents were not given the option of checking retail sales and service after construction. Businesses engaged in retail sales and services were classified according to their predominant type of business.

Business Age

During Construction

Fifteen businesses (28%) were up to five years old. Most businesses (31, or 57%) were 6 to 20 years old, while seven businesses (13%) were 21 to 50 years old. One business (2%) was between 51 and 60 years old. These results are shown in Table 3. Therefore, most businesses had existed before and during construction.

After Construction

After construction, there were fewer businesses less than five years old because businesses existing in 1993 were targeted for interviews. Most (62%) had been in business for 6 to 20 years.

Building Age

During Construction

The distribution of the building age of the responding abutting businesses is listed in Table 4. Four businesses' buildings (7%) were five years or less old, while nineteen businesses' buildings (35%) were six to twenty years old. Twenty-three businesses' buildings (43%) were 21 to 50 years old. Four businesses' buildings (7%) were 51 to 85 years old and four business owners (7%) did not reply to this question. Therefore, most buildings were older, emphasizing the importance of looking at land values instead of property values when evaluating the impacts of the construction on property values.

After Construction

After construction, no business' building was less than five years old. Otherwise, the age distribution was similar to that before construction.

Table 2. Types of Abutting Businesses in Caldwell Responding to the During and After Construction Surveys

Type of Business	During Construction		After Construction	
	Number of Businesses	Percent of All Responding Businesses	Number of Businesses	Percent of All Responding Businesses
Retail Sales	25	46	23	59
Retail Service	7	13	10	26
Retail Sales and Service	9	17	0	0
Professional Service	10	19	4	10
Other	3	6	2	5
Total	54	101*	39	100

* Percentages may not add to 100% due to rounding.

Table 3. Distribution of Abutting Responding Businesses in Caldwell by Business Age

Age of Businesses	During Construction		After Construction	
	Number of Businesses	Percentage of Businesses	Number of Businesses	Percentage of Businesses
0 to 5 Years	15	28	4	10
6 to 20 Years	31	57	24	62
21 to 50 Years	7	13	8	21
51 to 60 Years	1	2	1	3
No Answer	0	0	2	5
Total	54	100	39	101*

* Percentages may not add to 100% due to rounding.

Table 4. Age Distribution of Businesses' Buildings Abutting Construction in Caldwell

Building Age	During Construction		After Construction	
	Number of Businesses	Percent of Businesses	Number of Businesses	Percent of Businesses
0 to 5 Years	4	7	0	0
6 to 10 Years	4	7	3	8
11 to 20 Years	15	28	13	33
21 to 50 Years	23	43	14	36
51 to 85 Years	4	7	3	8
No Answer	4	7	6	15
Total	54	99*	39	100

* Percentages may not add to 100% due to rounding.

Building Ownership

During Construction

Thirty-eight businesses (70%) owned their buildings, while sixteen businesses (30%) leased their buildings. Assuming that owners have more interest in maintaining their buildings than renters, most of the buildings might be better maintained than the average building. This factor would temper the fact that many of the buildings are older.

After Construction

After construction, a slightly higher percentage of businesses owned their own buildings. Thirty businesses (77%) owned their building, while nine (23%) leased their building.

IMPACT ON INDIVIDUAL HIGHWAY BUSINESSES

The owners of individual highway businesses were interviewed to obtain hard data to measure the before period (1990), construction period (1991-1992), and after-construction (1996) changes in the performance of their businesses, as well as obtain their

"opinion" data to estimate the extent of changes due to highway construction activities. The findings are presented below.

Customer Parking Spaces Available

During Construction

Almost 60% of the business managers (32) thought their number of parking spaces did not change during construction. Only one of the rest of the managers thought available parking increased. Nine managers (17%) thought they lost over half of their parking spaces, while 12 managers (22%) thought they lost up to 50% of their parking spaces. These results are shown in Table 5.

Responding businesses had a total of 745 parking spaces before construction and 695 during construction (see Table 6). Note that no right-of-way was taken, so the (net) 50 lost parking spaces (7%) were either located on the right-of-way or were lost due to the creation of curbs and gutters.

Individual managers' opinions, presented collectively in Table 5, are compared to the actual number of parking spaces they reported, presented aggregately in Table 6. In Table 7, the opinions are classified in the left column as increase, no change, or decrease. The difference in the before and after number of parking spaces reported by each manager is similarly classified in the right three columns. Observations along the diagonal represent opinions corresponding to the reported number of parking spaces, i.e., they said the number of parking spaces changed a certain way and the difference between their reported number of parking places before construction and after construction reflected that change.

Most managers' (88%) opinions agreed with the numbers they gave. This was the situation for 22 managers whose number of parking spaces did not change, and for 16 who lost parking places. One thought he gained parking places while he reported no change in numbers, and four thought they had lost parking places while their numbers indicated there was no change in their number of parking places. Eleven managers estimated no change in number of parking places and either did not provide numbers, or were not in business before construction.

After Construction

After construction, 30 (77%) of the business managers thought that there was no change in their number of parking spaces, while nine (24%) thought there was a decrease (Table 5). Therefore, a higher percentage thought there was no change and a lower percentage thought there was a decrease.

The number of parking places after construction is found in Table 8. There were 434 before construction and 415 after. The 4% decrease is smaller than the 7% decrease found during construction.

As seen in Table 9, most managers' opinions of their change in number of parking spaces agreed with the number of parking spaces they reported before and after

Table 5. Managers' Opinions of the Change in Number of Parking Spaces of Businesses Abutting Construction in Caldwell

Change in Number of Parking Spaces	During Construction		After Construction	
	Number of Businesses	Percent of Businesses	Number of Businesses	Percent of Businesses
Up 50% - 100%	0	0	0	0
Up 25% - 50%	0	0	0	0
Up 10% - 25%	0	0	0	0
Up 5% - 10%	0	0	0	0
Up 0% - 5%	1	2	0	0
No Change	32	59	30	77
Down 0% - 5%	4	7	0	0
Down 5% - 10%	2	4	1	3
Down 10% - 25%	1	2	5	13
Down 25% - 50%	5	9	0	0
Down 50% - 100%	9	17	3	8
Don't Know	0	0	0	0
No Answer	0	0	0	0
Total	54	100	39	101*

* Percentages may not add to 100% due to rounding.

Table 6. Number of Parking Spaces Available/Occupied, Percent of Out-of-Town Customers, and Employees Before and During Widening of S.H. 21

Impact Items	Before (1990)	During (1991-1992)	Change	
			Number	Percent
Parking Spaces Available	745	695	-50	-7
Parking Spaces Occupied	575	438	-137	-24
Out-of-Town Customers	27%	20%	NA	-7
Full-Time Employees	327	311	-16	-5
Part-Time Employees	121	115	-6	-5

Table 7. Estimated Versus Actual Change in Number of Parking Spaces During Construction

Managers' Opinions of Their Change in Available Customer Parking Spaces	Change in Available Customer Parking Based on the Number of Parking Spaces Managers Said They Had*		
	Increase	No Change	Decrease
Increase	0	1	0
No Change	0	22	0
Decrease	0	4	16

* Eleven managers did not provide enough information to be classified in this table.

construction, reported aggregately in Table 8. Sixteen businesses' number of parking places did not change, and four businesses' number decreased. Two managers' opinions did not correspond with the number of parking places they reported. Of the 17 who did not report their number of parking places, 14 said their number of parking places was the same before and after construction.

Parking Spaces Occupied

During Construction

Responding business managers reported a total of 575 occupied parking spaces during the busiest hour of an average day before construction, and 438 occupied parking spaces during construction (see Table 6). The 24% decrease may have occurred because businesses were less accessible to customers. Sometimes occupancy decreased because it looked hazardous to try to enter the business parking lot.

After Construction

After construction, total occupancy increased 10%, from 348 to 382 occupied parking spaces during the busiest hour of the average day (Table 8). Therefore, the businesses may have been more accessible after construction. Caldwell's increased population could account for more occupied parking spaces, as well.

Number of Customers per Day

During Construction

The impact on the number of customers per day was more apparent than that on parking spaces, as can be seen in Table 10. Only 13 managers (24%) thought that there was no change in their number of customers per day. Twenty-one managers (39%) thought they lost up to 50% of their customers during construction, while 15 (28%) thought they lost over 50% of their daily customers. Two managers (4%) thought they had more customers per day during construction. These were places where the construction workers would stop or places that were relatively more accessible during construction.

Business managers gave several reasons for the decline in customers. For example, the traffic was backed up during holidays and Texas A&M University football games, so people couldn't easily turn in and out of driveways. Another manager indicated that he lost half of all the through traffic, and 80% of the customers were local. People would not stop because they could not get back on the highway. Many people figured out how to route around Caldwell due to the traffic.

Others said customers would not come because they could not figure out how to access the business. Another business owner said customers were afraid to come to his place. One business lost customers to a more accessible competitor.

Table 8. Number of Parking Spaces Available/Occupied, Percent of Out-of-Town Customers, and Employees Before and After Widening

Impact Items	Before (1990)	After (1996)	Change	
			Number	Percent
Parking Spaces Available	434	415	-19	-4
Parking Spaces Occupied	348	382	34	10
Out-of-Town Customers	30%	34%	NA	4
Full-Time Employees	278	272	-6	-2
Part-Time Employees	97	98	1	1

Table 9. Estimated Versus Actual Change in Number of Parking Spaces After Construction

Managers' Opinions of Their Change in Available Customer Parking Spaces	Change in Available Customer Parking Based on the Number of Parking Spaces Managers Said They Had After Construction*		
	Increase	No Change	Decrease
Increase	0	0	0
No Change	0	16	0
Decrease	1	1	4

* Of the 17 managers who did not report their number of parking spaces, 14 said that their number of parking spaces was the same before and after construction, and responded similarly in the opinion section of the questionnaire.

Table 10. Abutting Business Managers' Opinions on the Change in Number of Customers per Day During and After Construction

Change in the Number of Customers per Day	During Construction		After Construction	
	Number of Businesses	Percent of Businesses	Number of Businesses	Percent of Businesses
Up 50% - 100%	0	0	1	3
Up 25% - 50%	1	2	1	3
Up 10% - 25%	1	2	6	15
Up 5% - 10%	0	0	5	13
Up 0% - 5%	0	0	3	8
No Change	13	24	19	49
Down 0% - 5%	4	7	0	0
Down 5% - 10%	2	4	1	3
Down 10% - 25%	6	11	1	3
Down 25% - 50%	9	17	0	0
Down 50% - 100%	15	28	0	0
Don't Know	3	6	2	5
No Answer	0	0	0	0
Total	54	101*	39	102*

* Percentages may not add to 100% due to rounding.

Some businesses were able to operate even though they were inaccessible to customers. One business owner took phone orders during construction but lost transit customers. Another business owner sent agents out to do business to compensate for his inaccessibility. Another said that customers found him when they needed his services, but he did not get walk-ins.

Other business owners felt that the construction helped their business. Construction people ate at one restaurant during construction, and construction workers often came to buy things from two other stores.

After Construction

Almost half said there was no change in their number of customers after construction. Two managers said that their number of customers decreased, and two said they did not know how they changed, but 16 (42%) said that the number increased (Table 10). One manager said that the road helps, but most of the increase is due to new business growth. The increase could also be due to better access or Caldwell's population growth. Another said that faster traffic doesn't stop.

Customers from Out-of-Town

During Construction

The average percentage of customers from out-of-town decreased from 27% to 20% during construction (see Table 6). The decrease could partially be explained by the fact that local residents could find a back way into a business whereas out-of-town customers would prefer to drive to a business with more obvious accessibility or seemingly less hazardous entry conditions, as discussed more fully above.

After Construction

The percent of out-of-town customers increased from 30% to 34% (Table 8). This increase could be due to the end of the construction-related access problems.

Full-Time Employees

During Construction

Forty-four of the responding business managers (81%) thought that their number of full-time employees did not change during the construction, while eight managers (16%) thought that their number of full-time employees decreased during construction. Only one manager (2%) thought that his number of full-time employees increased during construction. These results are shown in Table 11.

Responding business managers employed a total of 327 full-time workers before construction and 311 during construction, as noted in Table 6. While employment for

abutting businesses decreased 5%, Burleson County employment increased during the same time period.

As seen in Table 12, the change in most (77%) managers' reported number of full-time employees, presented aggregately in Table 6, agreed with their perceived change in number of full-time employees, presented collectively in Table 11. This was the situation for 30 managers whose number of full-time employees did not change, and for four who lost full-time employees. One thought he gained full-time employees, but reported the same number of full-time employees before and after construction. Four managers overestimated the negative impact on their number of full-time employees. Two thought they did not change, but their numbers indicated they gained. Another two managers thought they lost full-time employees while their number did not change. Five underestimated the negative impact as they thought their number did not change, but their reported number of employees decreased. For various reasons, 10 managers' opinions were not able to be classified in the table.

After Construction

More managers indicated their number of full-time employees increased after construction (16%) than during construction. Slightly fewer (77%) indicated there was no change, and fewer, that the number had decreased (6%) (Table 11).

The total number of reported full-time employees decreased 2%, from 278 to 272 (Table 8). Therefore, it rebounded slightly from the during-construction change.

After construction full-time employment versus opinion of the change in employment is found in Table 13. The estimated percent change in number of full-time employees, aggregated in Table 11, and change in reported number of full-time employees, aggregated in Table 8, agreed for five managers whose number of full-time employees had increased, 18 whose number of full-time employees did not change, and one whose number of full-time employees decreased. Five managers reported number of full-time employees did not agree with their estimate. Six managers did not provide their number of full-time employees.

Part-Time Employees

During Construction

The responses about part-time employees are similar to those for full-time employees, as can be seen in Table 14. Forty-three of the responding managers (80%) thought that their number of part-time employees did not change during the construction, while eight managers (16%) thought that their number of part-time employees decreased

Table 11. Abutting Business Managers' Change in Number of Full-Time Employees During and After Construction

Change in Number of Full-Time Employees	During Construction		After Construction	
	Number of Businesses	Percent of Businesses	Number of Businesses	Percent of Businesses
Up 50% - 100%	0	0	2	5
Up 25% - 50%	0	0	1	3
Up 10% - 25%	0	0	1	3
Up 5% - 10%	0	0	2	5
Up 0% - 5%	1	2	0	0
No Change	44	81	30	77
Down 0% - 5%	2	4	0	0
Down 5% - 10%	0	0	0	0
Down 10% - 25%	2	4	0	0
Down 25% - 50%	3	6	1	3
Down 50% - 100%	1	2	1	3
Don't Know	1	2	1	3
No Answer	0	0	0	0
Total	54	101*	39	102*

* Percentages may not add to 100% due to rounding.

Table 12. Estimated Versus Actual Change in Number of Full-Time Employees During Construction

Managers' Opinions of Their Change in Their Number of Full-Time Employees	Change in the Number of Full-Time Employees Managers Said They Had*		
	Increase	No Change	Decrease
Increase	0	1	0
No Change	2	30	5
Decrease	0	2	4

* Ten managers did not provide enough information to be classified in the table.

Table 13. Estimated Versus Actual Change in Number of Full-Time Employees After Construction

Managers' Opinions of Their Change in Their Number of Full-Time Employees	Change in the Number of Full-Time Employees Managers Said They Had*		
	Increase	No Change	Decrease
Increase	5	1	0
No Change	1	18	3
Decrease	0	0	1

* Two additional businesses were not located abutting construction before construction and six managers did not provide their number of full-time employees.

Table 14. Abutting Business Managers' Opinion of the Change in Their Number of Part-Time Employees

Change in Number of Part-Time Employees	During Construction		After Construction	
	Number of Businesses	Percent of Businesses	Number of Businesses	Percent of Businesses
Up 50% - 100%	0	0	0	0
Up 25% - 50%	0	0	2	5
Up 10% - 25%	0	0	0	0
Up 5% - 10%	0	0	1	3
Up 0% - 5%	1	2	0	0
No Change	43	80	33	85
Down 0% - 5%	2	4	0	0
Down 5% - 10%	0	0	0	0
Down 10% - 25%	1	2	1	3
Down 25% - 50%	2	4	0	0
Down 50% - 100%	3	6	2	5
Don't Know	2	4	0	0
No Answer	0	0	0	0
Total	54	102*	39	101*

* Percentages may not add to 100% due to rounding.

during construction. Only one manager (2%) thought that his number of part-time employees increased during construction.

The 5% change in number of part-time employees was similar to that of the full-time employees, as can be seen in Table 6. There were a total of 121 part-time employees for the responding businesses before construction, and 115 during construction.

As shown in Table 15, 75% of the managers who reported their number of part-time employees, reported in aggregate in Table 6, reported numbers that agreed with their perceived change in number of part-time employees, reported in aggregate in Table 14. The managers with consistent perceptions included 29 who said that their number of part-time employees did not change and four who thought they had lost part-time employees. Nine managers gave a more positive estimate when they did not provide numbers. Six said their number of part-time employees did not change when their numbers indicated they had gained employees, and two said they had lost employees when their number of part-time employees was the same before and during construction. Two managers gave a more negative estimate when they did not provide numbers. For various reasons, 10 managers' opinions were not able to be classified.

After Construction

More managers thought their number of part-time employees increased (8%) or did not change (85%) after construction than during construction (Table 14). Actual numbers indicate that there was one more part-time employee after construction than before (Table 8).

As shown in Table 16, 67% of the managers who reported their number of part-time employees, reported in aggregate in Table 8, reported numbers that agreed with their perceived change in number of part-time employees, reported in aggregate in Table 14. The managers with consistent perceptions included 19 who said that their number of part-time employees did not change, two who thought they had more part-time employees, and one who thought he had lost part-time employees. Six managers gave a more positive estimate when they did not provide numbers, and five gave a more pessimistic view when they did not provide numbers. For various reasons, six managers' opinions were not able to be classified.

Gross Sales Volumes

During Construction

Managers' Opinions. Abutting business managers' opinions about their change in gross sales during construction are listed in Table 17. Approximately one-fourth (14) of the business managers thought that their gross revenue did not change during the highway widening. Most (34 or 63%) managers thought that their sales declined. Twenty (37%) of those managers thought they lost 25 or more percent of their gross

Table 15. Managers' Estimated Versus Actual Number of Part-Time Employees Before and During Construction

Managers' Opinions of Their Change in Their Number of Part-Time Employees	Change in the Number of Part-Time Employees Managers Said They Had*		
	Increase	No Change	Decrease
Increase	0	1	0
No Change	6	29	1
Decrease	0	3	4

* Ten managers did not provide enough information to be classified in this table.

Table 16. Managers' Estimated Versus Actual Number of Part-Time Employees Before and After Construction

Managers' Opinions of Their Change in Their Number of Part-Time Employees	Change in the Number of Part-Time Employees Managers Said They Had		
	Increase	No Change	Decrease
Increase	2	1	0
No Change	5	19	5
Decrease	0	0	1

Table 17. Abutting Business Managers' Opinions of Their Change in Gross Sales During Construction

Change in Gross Sales	During Construction		After Construction	
	Number of Businesses	Percent of Businesses	Number of Businesses	Percent of Businesses
Up 50% - 100%	0	0	1	3
Up 25% - 50%	1	2	4	10
Up 10% - 25%	1	2	8	21
Up 5% - 10%	0	0	2	5
Up 0% - 5%	1	2	3	8
No Change	14	26	15	38
Down 0% - 5%	3	6	2	5
Down 5% - 10%	5	9	1	3
Down 10% - 25%	6	11	0	0
Down 25% - 50%	12	22	1	3
Down 50% - 100%	8	15	0	0
Don't Know	2	4	2	5
No Answer	1	2	0	0
Total	54	101*	39	101*

* Percentages may not add to 100% due to rounding.

sales. Three managers thought their gross sales increased for many of the same reasons that they had more customers.

Most business managers commenting on their gross sales had a decline in sales. One business owner thought about closing during construction, and another actually closed for three months. One business owner noted that businesses relying on drop-in traffic were considerably hurt. Also, the decrease in sales by stores in Caldwell had an adverse affect on the suppliers of these stores as well. Another business owner noted that suppliers of unique products generally were not affected as drastically as others. The sales of one business actually increased, but at the percentage rate of only half of the rate of the national company as a whole.

Another type of sales is rent from rental property. One man usually rents a building to the IRS each year, but they rented a different building during construction. Another man had a building for lease that he was not able to lease until the construction ended.

Annual Sales. Twenty-three business managers reported their sales volumes for 1990 and 1991. As seen in Table 18, the net change in actual reported sales by 23 managers during construction was -\$855,520, which is a 5% decrease. This compares to the 5% reduction in employees as lower sales reduce the ability to pay employees. Real gross sales, presented in Table 19, declined \$2,002,707, which is a 10.6% decrease in 1996 dollars. The overall real average change was -\$73,841.

Managers' Opinions Versus Reported Sales. As seen in Table 20, the perception of 35% (8) of the managers of their change in gross sales was the same when they provided sales figures before and during construction, presented aggregately in Table 18, and when they gave their opinion of the change, presented collectively in Table 17. Two managers' estimates were more negative when they did not provide the figures, and 13 managers' estimates were more positive when they did provide the figures.

Sales Level. More managers were willing to provide their sales volume level than their actual sales volume (see Table 21). These figures suggest that a slightly higher percentage of businesses was in lower sales categories during construction than was the case before construction. In terms of individual businesses, no business moved to a higher sales category during construction than they were in before construction.

Businesses can gain or lose sales and remain in the same sales category. Therefore, comparing changes in sales categories during construction with the managers' opinion of the change is not as informative as it is for reported sales figures. However, one-third of the managers reported the same sales category before and during construction and also reported no change in sales during that time period (Table 22). Twenty-one managers said that their sales decreased and two said they increased, yet all remained in the same sales category. One said their business sales increased and four said they decreased, yet all reported a lower sales category during construction.

Table 18. Nominal Sales for Businesses Abutting Construction Reporting Their Sales Before and During Construction of S.H. 21

Business Type	Gross Sales (\$)			Number of Businesses
	1990	1991 - 1992	Change	
Retail	15,285,036	14,404,663	-880,373	17
Service	226,222	269,575	43,353	2
Other	227,000	208,500	-18,500	4
Total	15,738,258	14,882,738	-855,520	23

Table 19. Real Gross Sales for Businesses Abutting Construction Reporting Their Sales Before and During Construction of S.H. 21

Business Type	Real Gross Sales (\$) (1996 = 100)			Number of Businesses
	1990	1991 - 1992	Change	
Retail	18,349,060	16,347,860	-2,001,200	17
Service	271,570	305,941	34,371	2
Other	272,504	236,627	-35,877	4
Total	18,893,135	16,890,427	-2,002,707	23

**Table 20. Managers' Perceptions of Gross Sales Changes
When Providing Sales Figures and Not Providing Sales
Figures During Construction**

Managers' Opinions of Their Change in Sales	Change in Sales Volume the Managers Reported Before and During Construction		
	Increase	No Change	Decrease
Increase	1	2	2
No Change	2	3	9
Decrease	0	0	4

**Table 21. Nominal Gross Sales Levels of Responding Businesses Abutting
Construction in Caldwell, Texas, Before and During Construction**

Gross Sales Volume	1990		1991-1992	
	Number of Businesses	Percent of Businesses	Number of Businesses	Percent of Businesses
Less Than \$100,000	15	28	17	31
\$100,000 - \$500,000	7	13	11	20
\$500,000 - \$1,000,000	8	15	6	11
More Than \$1,000,000	8	15	7	13
No Response	16	30	13	24
Total	54	101*	54	99*

* Percentages may not add to 100% due to rounding.

Table 22. Managers' Perceptions of Their Change in Sales Intervals When They Provided Sales Intervals and When They Didn't

Managers' Opinions of Their Change in Sales	Change in Sales Interval Category the Managers Reported Before and During Construction		
	Increase	No Change	Decrease
Increase	0	2	1
No Change	0	13	0
Decrease	0	21	4

After Construction

Managers' Opinions. Abutting business managers' opinions about their change in gross sales after construction are listed in Table 17. Thirty-eight percent (15) of the business managers thought that their gross revenue did not change during the highway widening. Almost half (18 or 47%) of the managers thought that their sales increased. Four (11%) managers thought their gross sales decreased.

Several business owners think that the construction will make their businesses better off now. One business is coming back slowly. Another's business has picked up again. However, one business is doing less business now than during the construction.

Annual Sales. Thirteen business managers reported their sales volumes for 1990 and 1996. As seen in Table 23, the net change in actual reported sales by 13 managers after construction was \$2,858,800, which is a 24% increase. Real gross sales, presented in Table 24, increased \$434,849, which is a 3% increase in 1996 dollars. Service sales increased the most: 114% nominally and 78% in real terms.

As seen in Table 25, 75% (9) of the managers' perception of their change in gross sales was the same when they provided sales figures before and after construction (Table 23) and when they were asked to give their opinion, presented aggregately in Table 17. Two managers' estimates were more negative when they did not provide the figures, and one manager's estimates was more positive when he provided the figures. Twenty-seven managers did not provide sales figures.

Sales Level. More managers were willing to provide their sales volume level than their actual sales volume (see Table 26). These figures suggest that business sales tended toward the \$100,000 to \$1,000,000 range after construction.

Managers' Opinions Versus Changes in Sales Category. Businesses can gain or lose sales and remain in the same sales category. Therefore, comparing changes in sales categories after construction with the managers' opinion of the change is not as

Table 23. Nominal Sales for Businesses Abutting Construction Reporting Their Sales Before and After Construction of S.H. 21

Business Type	Gross Sales (\$)			Number of Businesses
	1990	1996	Change	
Retail	11,798,000	14,322,000	2,524,000	9
Service	294,000	628,800	334,800	4
Other	0	0	0	0
Total	12,092,000	14,950,800	2,858,800	13

Table 24. Reported Abutting Businesses' Sales Before and After Construction of S.H. 21 in Caldwell

Business Type	Real Gross Sales (\$) (1996 = 100)			Number of Businesses
	1990	1996	Change	
Retail	14,163,016	14,322,000	158,984	9
Service	352,935	628,800	275,865	4
Other	0	0	0	0
Total	14,515,951	14,950,800	434,849	13

**Table 25. Managers' Perceptions of Gross Sales Changes
When Providing Their Opinion and Their Sales Figures After
Construction**

Managers' Opinions of Their Change in Sales	Change in Sales Volume the Managers Reported Before and After Construction		
	Increase	No Change	Decrease
Increase	6	0	1
No Change	2	3	0
Decrease	0	0	0

**Table 26. Nominal Gross Sales Levels of Responding Businesses Abutting
Construction in Caldwell, Texas, Before and After Construction**

Gross Sales Volume	1990		1996	
	Number of Businesses	Percent of Businesses	Number of Businesses	Percent of Businesses
Less Than \$100,000	6	15	4	10
\$100,000 - \$500,000	7	18	10	26
\$500,000 - \$1,000,000	3	8	4	10
More Than \$1,000,000	5	13	4	10
No Response	18	46	17	44
Total	39	100	39	100

informative as it is for reported sales figures. However, as seen in Table 27, one-third of the managers reported the same sales category before and after construction, reported aggregately in Table 26, and also reported no change in sales during that time period, reported aggregately in Table 17. Two managers said that their sales decreased and 11 said they increased, yet all remained in the same sales category. Two said their business sales increased and reported a higher sales category after construction.

Net Profit

During Construction

Opinions on changes in net profit were similar to changes in gross sales, as can be seen in Table 28. Fifteen (28%) business managers thought that their net profit did not change, while thirty-one (57%) thought their sales declined. Only two managers (4%) thought their sales increased.

After Construction

Changes in net profit were similar to changes in gross sales after construction, as can be seen in Table 28. Fifteen (38%) business managers thought that their net profit did not change, while three (8%) thought their sales declined. Fifteen managers (39%) thought their sales increased.

IMPACT ON ALL HIGHWAY AND OTHER CITY BUSINESSES

Individual business owners or managers were asked their opinion about the gross sales impact of construction activities on all highway businesses and also on other city businesses. These opinions are presented below.

All Abutting Businesses

During Construction

Most business managers (71%) on S.H. 21 thought that sales for all businesses on S.H. 21 decreased during construction (Table 29). Assuming that the 23 businesses that reported their actual sales are representative of all abutting businesses, this expectation was true. The net change in actual reported sales by 23 businesses was -\$855,520 (Table 18). Twenty-eight percent of the managers did not know what the impact was.

After Construction

While few managers thought that business sales decreased after construction, the rest were almost evenly split between thinking that sales increased, did not change, or they did not know if they changed (Table 29). The net change in sales derived from 13

Table 27. Managers' Perceptions of Their Change in Sales Volume When They Provided Sales Categories and When They Didn't

Managers' Opinions of Their Change in Sales Category	Change in Sales Category the Managers Reported Before and After Construction		
	Increase	No Change	Decrease
Increase	2	11	0
No Change	2	4	0
Decrease	0	2	0

* Eighteen managers did not provide sales categories.

managers' reported sales is \$2,858,800 (Table 23). Assuming those that reported sales are representative of all businesses, sales increased after construction.

Other City Businesses

Gross Sales

During Construction. Business managers on S.H. 21 were asked their opinion of the construction's impact on gross sales of Caldwell businesses not located on S.H. 21. As can be seen in Table 30, almost one-third of the managers did not think that other Caldwell businesses' sales changed due to the construction. One-fourth thought that non-S.H. 21 businesses' sales decreased, while 15% thought they increased. Thirty percent did not know. Therefore, most business managers on S.H. 21 did not think other Caldwell businesses were impacted as much as the highway businesses.

After Construction. Most managers (44%) thought that nonabutting businesses' sales did not change, and 14 (36%) did not know how they had changed. One manager (3%) thought that nonabutting businesses' sales decreased, while seven (18%) thought they increased.

Employment

During Construction. Many respondents (22 businesses, or 41% of the respondents) didn't know how employment changed for Caldwell businesses not located along S.H. 21. Seventeen managers (31%) did not think that employment for non-S.H. 21 businesses changed, while 11 businesses (21%) thought that it decreased. Four businesses (8%) thought it increased. These results can be seen in Table 31.

Table 28. Abutting Business Managers' Opinion on Their Change in Net Profit

Change in Net Profit	During Construction		After Construction	
	Number of Businesses	Percent of Businesses	Number of Businesses	Percent of Businesses
Up 50% - 100%	0	0	1	3
Up 25% - 50%	2	4	1	3
Up 10% - 25%	0	0	6	15
Up 5% - 10%	0	0	2	5
Up 0% - 5%	0	0	5	13
No Change	15	28	15	38
Down 0% - 5%	4	7	0	0
Down 5% - 10%	2	4	2	5
Down 10% - 25%	5	9	0	0
Down 25% - 50%	9	17	1	3
Down 50% - 100%	11	20	0	0
Don't Know	6	11	4	10
No Answer	0	0	2	5
Total	54	100	39	100

Table 29. Abutting Business Managers' Opinions on the Change in Gross Sales of State Highway 21 Businesses

Change in Gross Sales of Businesses on S.H. 21	During Construction		After Construction	
	Number of Businesses	Percent of Businesses	Number of Businesses	Percent of Businesses
Up 50% - 100%	0	0	0	0
Up 25% - 50%	0	0	1	3
Up 10% - 25%	0	0	2	5
Up 5% - 10%	0	0	4	10
Up 0% - 5%	0	0	5	13
No Change	1	2	11	28
Down 0% - 5%	6	11	1	3
Down 5% - 10%	4	7	0	0
Down 10% - 25%	10	19	1	3
Down 25% - 50%	9	17	0	0
Down 50% - 100%	9	17	0	0
Don't Know	15	28	14	36
No Answer	0	0	0	0
Total	54	101*	39	101*

* Percentages may not add to 100% due to rounding.

Table 30. Abutting Business Managers' Opinions on Changes in Gross Sales of Caldwell Businesses Not Located on S.H. 21 During Construction

Change in Gross Sales for All Businesses in Caldwell Not Located on S.H. 21	During Construction		After Construction	
	Number of Businesses	Percent of Businesses	Number of Businesses	Percent of Businesses
Up 50% - 100%	0	0	0	0
Up 25% - 50%	1	2	0	0
Up 10% - 25%	1	2	0	0
Up 5% - 10%	5	9	3	8
Up 0% - 5%	1	2	4	10
No Change	17	31	17	44
Down 0% - 5%	3	6	1	3
Down 5% - 10%	2	4	0	0
Down 10% - 25%	4	7	0	0
Down 25% - 50%	3	6	0	0
Down 50% - 100%	1	2	0	0
Don't Know	16	30	14	36
No Answer	0	0	0	0
Total	54	101*	39	101*

* Percentages may not add to 100% due to rounding.

Table 31. Abutting Business Managers' Opinion About Nonabutting Businesses' Change in Employment During Construction

Change in Employment	During Construction		After Construction	
	Number of Businesses	Percent of Businesses	Number of Businesses	Percent of Businesses
Up 50% - 100%	0	0	0	0
Up 25% - 50%	1	2	0	0
Up 10% - 25%	0	0	0	0
Up 5% - 10%	1	2	4	10
Up 0% - 5%	2	4	2	5
No Change	17	31	16	41
Down 0% - 5%	4	7	0	0
Down 5% - 10%	3	6	1	3
Down 10% - 25%	3	6	0	0
Down 25% - 50%	0	0	0	0
Down 50% - 100%	1	2	0	0
Don't Know	22	41	15	38
No Answer	0	0	1	3
Total	54	101*	39	100

* Percentages may not add to 100% due to rounding.

After Construction. Most managers (16, or 41%) thought that other businesses' employment did not change after construction (Table 31). Fifteen managers (38%) did not know how other businesses' employment were affected. Six (15%) thought their number of employees increased and one (3%) thought they decreased.

COMPARISON OF CHANGES IN HIGHWAY, CITY, AND COUNTY BUSINESS GROSS SALES

Before versus during construction sales are compared for S.H. 21, Caldwell, and Burleson County based on data obtained from highway businesses and the State Comptroller's Office. These comparisons are made to determine the extent of the construction impact on the gross sales of the S.H. 21 businesses.

Highway Versus City Businesses

The total gross sales for Caldwell businesses are presented in Table 32. The actual sales reported by 23 abutting business managers that reported their gross sales before and during construction plus two businesses that started during construction are presented in Table 33 and real sales are reported in Table 34. Abutting businesses' sales decreased 4% while Caldwell businesses' sales increased 7%. The decrease in abutting businesses' sales is supported by the opinions of abutting businesses, presented earlier in Table 17. If the businesses reporting their actual gross sales are assumed to be representative of all abutting businesses, gross sales did decrease, but not by as much as the businesses' opinions would indicate.

Thirteen managers reported their gross sales after construction. Their sales are summarized in Table 23. Eight firms' sales were reported for both surveys, and these sales are reported nominally in Table 33 and in real terms in Table 34. Reported sales for 1990 from both during and after surveys differed for six of the eight firms. If the during construction survey responses for 1990 sales are used, sales increased 45% after construction, while if the after construction survey responses for 1990 sales are used, sales increased 18% after construction. During construction, figures are probably more accurate because less time had passed between the time the survey was administered (1993) and the time period for which sales figures were requested (1990). In either case, assuming that these firms are representative of all abutting firms, nominal sales increased greatly after construction. In real terms, sales increased 21% using the during construction responses but decreased 2% using the after construction responses. In real terms, Caldwell sales increased 2% (see Table 32).

In conclusion, since the 25 businesses abutting S.H. 21 experienced a 4% decrease in nominal sales compared to a 7% increase in sales for all Caldwell businesses, it is reasonable to conclude that the highway businesses' gross sales were negatively impacted from 5% to 10% due to the highway construction. The impact on sales after construction is not as clear.

**Table 32. Gross Sales and Number of Reporting Outlets for
Caldwell, Texas, 1990 - 1994**

Industry	Year	Gross Sales (\$)¹	Average Gross Sales (\$)²	Number of Reporting Outlets¹
Retail Trade	1990	37,819,652	45,400,944	62
	1991	39,277,337	45,246,800	68
	1992	42,530,927	47,563,097	71
	1993	50,270,473	54,584,341	76
	1994	52,933,323	56,040,745	78
Services	1990	1,712,767	2,056,107	23
	1991	4,239,120	4,883,392	24
	1992	4,345,049	4,859,146	24
	1993	5,071,903	5,507,139	29
	1994	4,283,522	4,534,984	32
All Major Divisions	1990	84,511,505	101,452,602	110
	1991	90,248,721	103,964,936	117
	1992	85,975,101	96,147,494	121
	1993	113,982,873	123,764,102	134
	1994	120,000,315	127,044,868	138

¹ Source: State Comptroller's Office.
² column 3 / column 4.

Table 33. Abutting Businesses' Nominal Sales for Before, During, and After Construction

	All Respondents		Those Providing Sales During and After Construction	
	During	After	During	After
Number of Firms	23	13	8	8
1990 Sales (\$)	15,738,258	12,092,000	6,762,222	8,340,000
1991/92 Sales (\$)	15,122,738	-	5,873,575	-
1996 Sales (\$)	-	14,950,800	-	9,810,000
% Change	-5	+24	-13	+18

Table 34. Abutting Businesses' Real Sales for Before, During, and After Construction

	All Respondents		Those Providing Sales During and After Construction	
	During	After	During	After
Number of Firms	23	13	8	8
1990 Sales (\$) (1996 = 100)	18,893,135	14,515,951	8,117,771	10,011,829
1991/92 Sales (\$) (1996 = 100)	17,162,804	-	6,665,923	-
1996 Sales (\$) (1996 = 100)	-	14,950,800	-	9,810,000
% Change	-9	+3	-18	-2

Highway Versus County

The number of Burleson County businesses and gross sales are presented in Table 35. While the number of businesses increased 10%, from 308 to 340, real gross sales increased nearly 25%, from \$155 million to \$194 million, during construction. The number of retail businesses increased from 177 in 1990 to 194 in 1992, but the number of services decreased from 60 in 1990 to 51 in 1992. Approximately 60% of the businesses were involved in retail trade and 19% in services.

After construction, Burleson County nominal sales were \$188 million while real sales were \$199 million. The number of businesses increased to 370.

SUMMARY OF HIGHWAY CONSTRUCTION IMPACTS ON BUSINESSES

Business impacts were assessed using survey results supplemented with secondary data. All but one abutting business manager answered a survey on during-construction impacts. Few businesses were less than five years old, so most existed during construction. The after-construction survey focused on businesses that responded to the during-construction survey.

Over half of the businesses' buildings were over 20 years old. Therefore, land value may be a more accurate gauge of changes in property values due to the aging of the improvements. However, 70% of the buildings were owned by the business and, therefore, may be better maintained than average.

Almost half of the businesses were retail, which are more dependent on customers coming to their location. Some of the service-oriented businesses were able to travel to their customers, and thus were not impacted as negatively as retail stores during construction.

For certain impacts, managers were asked for their opinions on how the aspect changed, and later were asked to provide numbers before, during, and after construction. This situation allowed comparison of perceptions to actual numbers.

No right-of-way was taken for this project, but 50 parking spaces (7%) were lost due to parking spaces located on the right-of-way or lost due to curbing and guttering. Of those reporting their number of parking spaces, 88% provided numbers that supported their opinion on whether their number of parking spaces changed during construction, and 77% provided numbers that supported their opinion after construction.

During the busiest hour of the day, 137 (24%) fewer parking spaces were occupied during construction than before construction, while the number increased by 34 (10%) after construction. The decrease during construction was attributed to reduced accessibility to businesses or the appearance of hazardous entry. One business noted that after construction the faster traffic didn't stop.

The decreased number of occupied parking places corresponded to fewer customers per day during construction for 67% of the managers, although 24% did not think there was a change in their number of customers per day. The reported percentage of customers from out-of-town fell from 27% to 20% during construction because out-of-towners did not know back ways into the businesses, or did not want to get off the

**Table 35. Gross Sales and Number of Reporting Outlets for
Burleson County, Texas, 1990 - 1994**

Industry	Year	Gross Sales (\$)¹	Real Gross Sales (\$) (1996 = 100)²	Number of Reporting Outlets¹
Retail Trade	1990	54,770,109	65,749,274	177
	1991	59,269,452	68,277,364	185
	1992	65,088,892	72,790,072	194
	1993	74,588,389	80,989,054	193
	1994	78,313,851	82,911,223	205
Services	1990	4,139,938	4,969,826	60
	1991	7,386,403	8,509,006	55
	1992	7,240,720	8,097,427	51
	1993	10,221,483	11,098,621	62
	1994	8,337,904	8,827,376	74
All Major Divisions	1990	129,450,212	155,399,681	301
	1991	149,030,089	171,680,036	308
	1992	147,203,852	164,620,701	318
	1993	178,430,300	193,741,966	340
	1994	188,103,470	199,145,981	370

¹ Source: State Comptroller's Office.

² column 3 / column 4.

highway amid all of the construction. After construction, 49% thought that there was no change in their number of customers per day, but 42% thought the number increased. The reported percentage of out-of-town customers increased from 30% to 34%.

Most managers realized that the construction was only temporary and tried to retain their employees during construction. Approximately 80% reported no change in part-time and full-time employees during and after construction. Of those reporting their number of employees, 70% to 80% provided numbers that supported their opinion on their change in number of employees during and after construction.

The net change in sales for the 23 businesses that reported their sales before and during construction was \$855,520, a 5% decline. In real terms, the decrease was \$1,945,268, an 11% decline. After construction, sales increased \$2,858,000 (24%) for the 13 businesses with reported sales. In real terms, the increase was \$434,849 or 6%.

Nominal Caldwell sales increased 7% during construction while Burleson County sales increased 14%. In real terms, Caldwell sales increased 2% and Burleson County sales increased 10%. These figures support the abutting managers' opinions that their sales decreased during construction. After construction, Caldwell and Burleson County sales increased 42% to 45% nominally and 25% to 28% in real terms. Abutting sales did not increase this much, but this result may be due to response bias. When the sales of eight firms with reported sales for both surveys are compared, reported 1990 sales for the after-construction survey are higher and result in a lower increase in sales after construction.

RESIDENTIAL IMPACT

Residents abutting S.H. 21 were identified by the city of Caldwell and the Burleson County Appraisal District. In the summer of 1994, surveys asking the residents' opinions on various potential construction impacts were mailed. Fifty-nine surveys were mailed and 17 were returned, yielding a 29% response rate. One survey was returned with notification that the resident it was addressed to was deceased. A copy of the survey is included in Appendix C.

Most residents (88%) had lived in their present location for at least five years (Table 36). The average length of residence was 30 years. All respondents owned their own residence, which is plausible as realtors indicated there is a limited rental market in Caldwell.

The abutting residents' opinions have been combined with the abutting business managers' opinions in the property value, user cost, and environmental impact chapters that follow.

Table 36. Length of Time that Responding Residents Had Lived at Their Current Location Abutting S.H. 21 in Caldwell, Texas

Length of Residence	Number of Residents	Percentage of Residents
0 to 5 Years	2	13
6 to 20 Years	4	25
21 to 50 Years	9	56
51 to 60 Years	1	6
Total	16	100
Average Age	30.34 years	

PROPERTY VALUE IMPACT

It is important to look at changes in values of property abutting construction sites in light of changes in nonabutting property values in the vicinity of the construction. If the construction site property value trends differ from the trends in the region, the construction may have affected the property value. Therefore, Burleson County and Caldwell property value trends will be investigated to determine if abutting property value changes were similar.

Business managers were asked their opinions about the construction impact on their business property, S.H. 21 property, and Caldwell property values. The opinions were compared with actual property values obtained from the Burleson County Appraisal District. Property values were deflated to 1996 values using the Consumer Price Index (CPI).

BURLESON COUNTY

Commercial

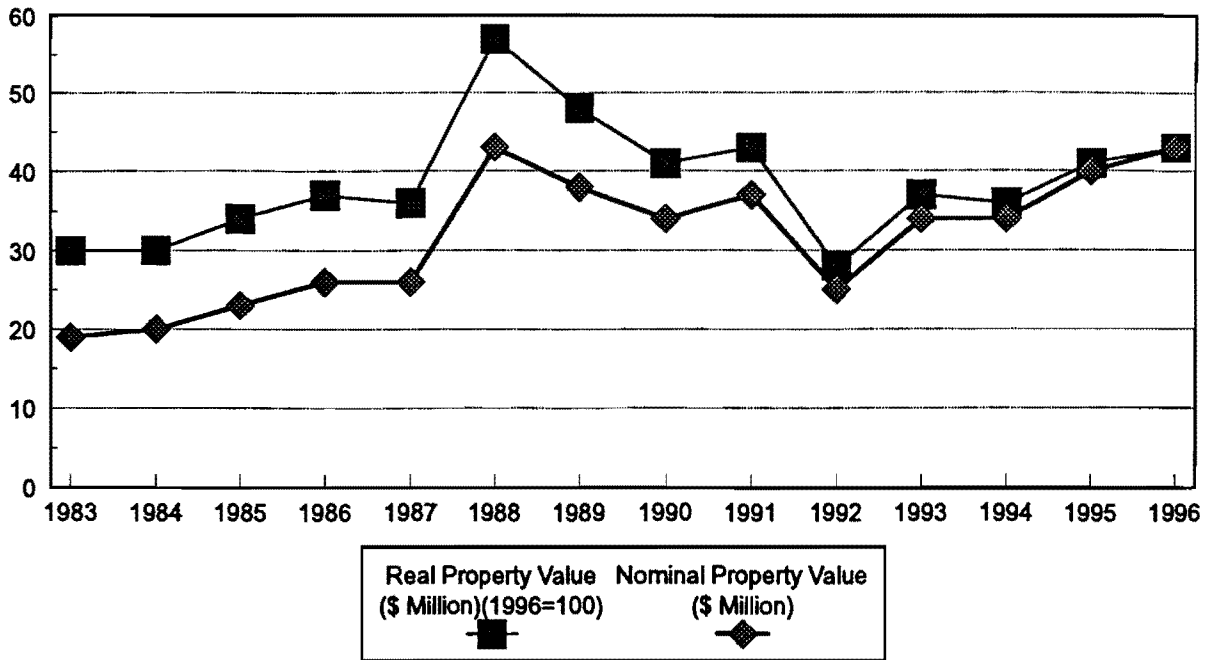
Property values for commercial and industrial property in Burleson County are presented in Figure 12. These values tended to rise and fall with no clear trend, even during construction, but have been a relatively small component (5%) of real average Burleson County property values since 1983. The real values have ranged from \$28 million in 1992 to \$57 million in 1988.

Ranch

Property values for ranch land are presented in Figure 13. The nominal values fluctuated before construction, but were relatively constant (approximately \$350 million) from 1988 through the construction period. There were approximately 393,000 acres of farm and ranch land during each of these years. Real values declined from \$641 million in 1986 to \$351 million in 1996. They averaged 62% of Burleson County property values between 1983 and 1994.

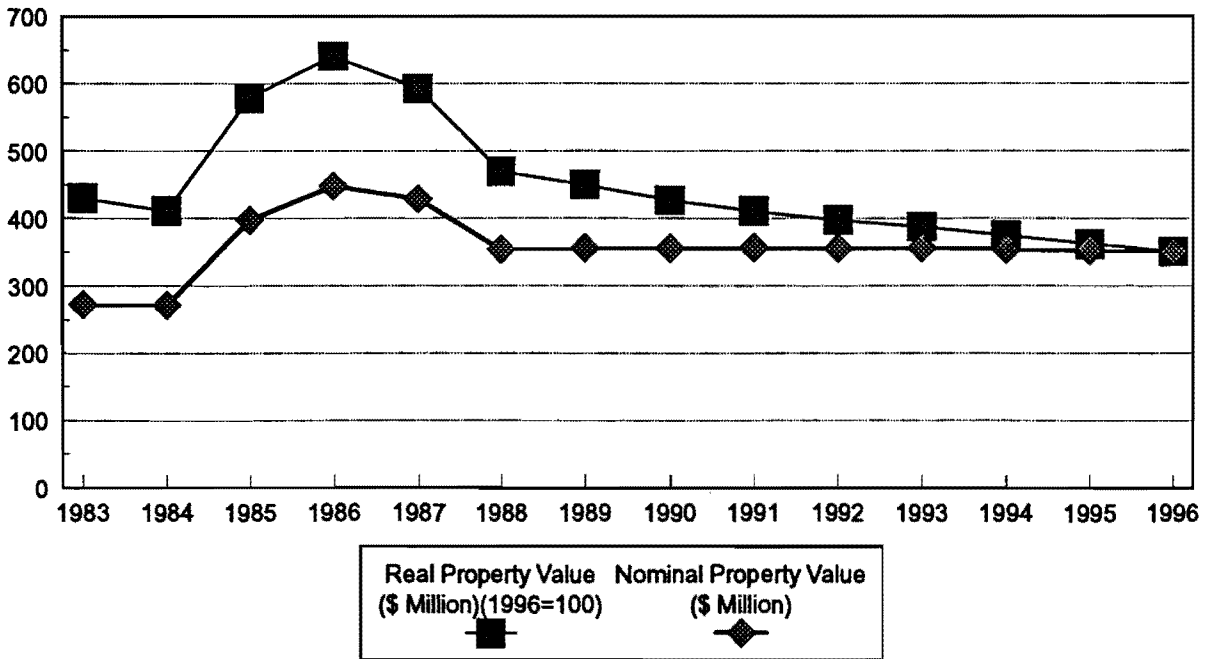
Residential

Residential property values are presented in Figure 14. Residential property includes single- and multi-family residences as well as farm and ranch houses with limited acres. The real value has slowly declined, from \$253 million in 1986 to \$191 million in 1993, while the nominal value was flat at approximately \$177 million with approximately 9,000 properties. The real value increased to \$196 million by 1996. Residential property value was an average of 29% of Burleson County property value between 1983 and 1994.



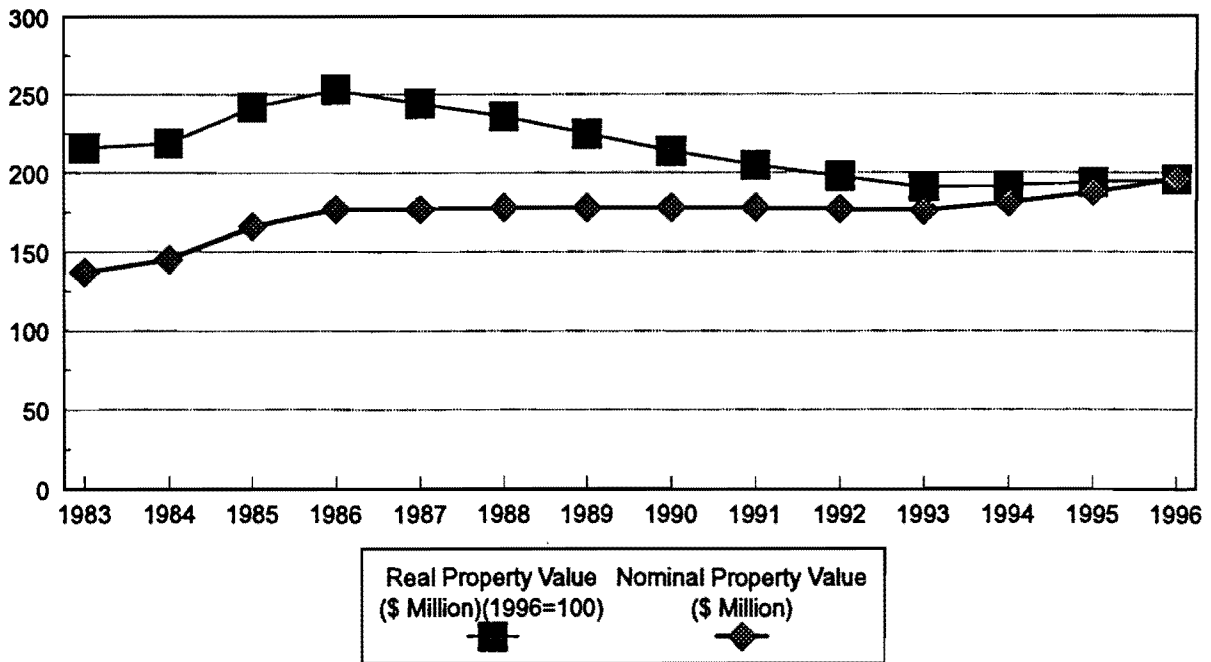
Source: Burleson County Appraisal District

Figure 12. Total Appraisal Market Value for Commercial and Industrial Property in Burleson County for 1983 to 1996



Source: Burleson County Appraisal District

Figure 13. Total Appraisal Market Value for Ranch Land in Burleson County for 1983 to 1996



Source: Burleson County Appraisal District

Figure 14. Total Appraisal Market Value for Residential Property in Burleson County for 1983 to 1996

Vacant

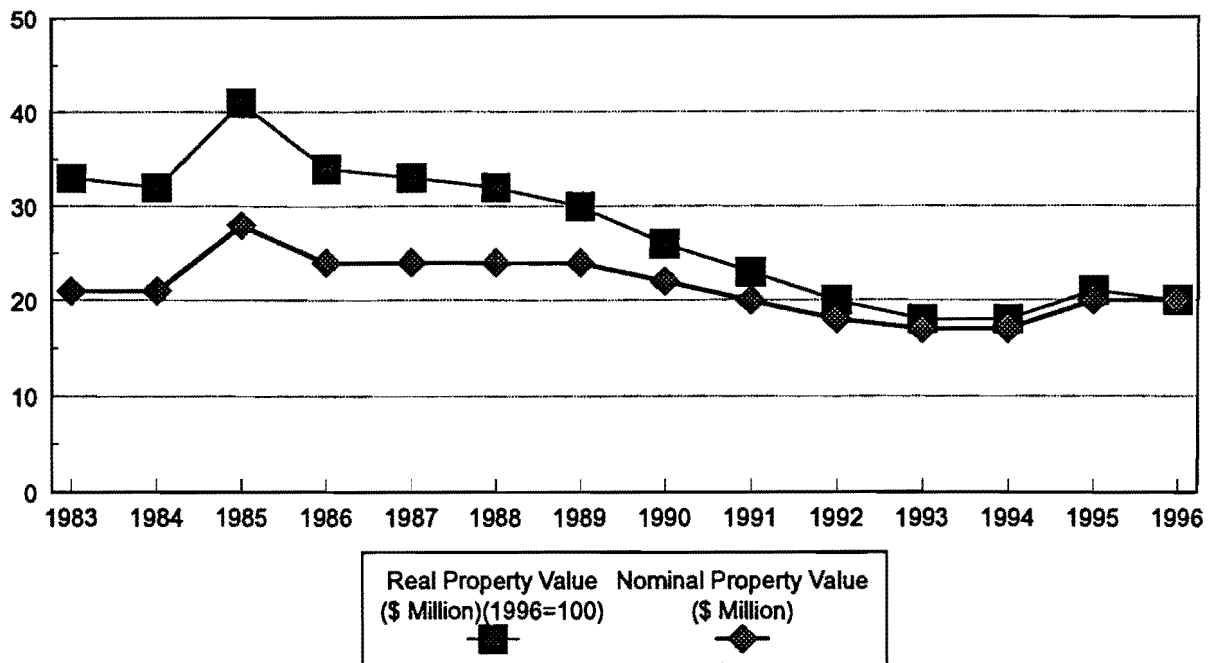
Property values for vacant property are listed in Figure 15. The nominal values were fairly constant before construction but declined from \$20 million to \$17 million during construction. They rose to \$20 million after construction. There have been approximately 8,000 properties since 1985. The real values show a slow, steady decline from \$41 million in 1986 to \$18 million in 1994. They rose to \$21 million in 1995 and fell to \$20 million in 1996. They only made up 4% of Burleson County property values.

CITY OF CALDWELL

Business Managers' Opinions

During Construction

Abutting business managers' opinions of how Caldwell property values changed during the construction are presented in Table 37. Twenty-six business managers (48%) did not think that Caldwell property values changed during the construction, while seventeen managers (31%) did not know if Caldwell property values changed during



Source: Burleson County Appraisal District

Figure 15. Total Appraisal Market Value for Vacant Property in Burleson County for 1983 to 1996

construction. Eight managers (16%) thought that Caldwell property values decreased during the construction, while three (6%) managers thought that they had increased.

After Construction

Abutting business managers' opinions of how Caldwell property values changed after the construction are presented in Table 37. Fifty-six percent of the business managers did not think that Caldwell property values changed after the construction, while 28% of the managers did not know if Caldwell property values changed after the construction. Six percent of the managers thought that Caldwell property values decreased after the construction, while 11% of the managers thought that they had increased.

Caldwell Property Values

Caldwell property values are presented in Figure 5. They decreased during the first two years of construction. However, during the last year, the values did not increase to their preconstruction level. Note that Caldwell property values had been falling since 1986, so the increase during the last year of construction was the first in six

Table 37. Abutting Business Managers' Opinions on the Change in Caldwell Property Values During and After Construction

Change in Caldwell Property Values	During Construction		After Construction	
	Number of Businesses	Percent of Businesses	Number of Businesses	Percent of Businesses
Up 50% - 100%	0	0	0	0
Up 25% - 50%	0	0	0	0
Up 10% - 25%	1	2	1	3
Up 5% - 10%	0	0	1	3
Up 0% - 5%	2	4	2	5
No Change	26	48	22	56
Down 0% - 5%	2	4	1	3
Down 5% - 10%	2	4	1	3
Down 10% - 25%	2	4	0	0
Down 25% - 50%	0	0	0	0
Down 50% - 100%	2	4	0	0
Don't Know	17	31	11	28
No Answer	0	0	0	0
Total	54	100	39	101*

* Percentages may not add to 100% due to rounding.

years. In nominal terms, which are probably the terms in which respondents are thinking, the property values decreased 1% between the first and last years of construction. Therefore, the 48% of the respondents who said that property values did not change were almost correct. Two percent were correct as they estimated that property values had decreased up to 5%. After construction, nominal values increased 8% from 1993 to 1994 and 1995, and 11% in 1996.

Commercial

Commercial and industrial property values in Caldwell are graphed in Figure 16. These properties make up approximately 27% of the Caldwell property values, which is a larger portion than for Burleson County. Real values decreased from \$27 million in 1988 to \$16 million in 1993. Nominal values decreased from \$17 million in 1991 to \$14 million in 1992, but rose to \$15 million in 1993, \$16 million in 1994, and back down to \$15 million in 1996. There were approximately 210 properties during the construction period.

Ranch

Ranch land values are presented in Figure 17. Recently, ranch land value has been less than 1% of the total Caldwell property values, and the nominal dollar value has been fairly constant around \$560 million during construction. The real appraisal values have slowly and steadily declined from \$805,000 in 1987 to \$571,000 in 1994. They rose to \$611,000 in 1996. Ranch land is a much smaller part of Caldwell property value than it is for Burleson County. The real value per acre fell from \$1,800 in 1987 to \$1,000 per acre in 1996.

Residential

Residential property values are presented in Figure 18. They include values for single- and multi-family residences as well as farm and ranch houses with limited acres. During construction, the nominal values were fairly constant at approximately \$42 million and the number of properties was approximately 1,200. The real values slowly declined from \$59 million in 1987 to \$44 million in 1994, but rose to \$45 million in 1996. They comprise a much greater proportion of total property value than Burleson County, but both have similar trends.

Vacant

Vacant property values for Caldwell are presented in Figure 19. The nominal values have been nearly \$1 million since 1990 and comprise 2% of Caldwell property values. Real values have slowly and steadily declined from \$2.9 million in 1987 to \$1 million in 1994, but rose to \$1.4 million in 1996. There were about 220 properties during construction. The trend and percent of total property value resemble Burleson County's.

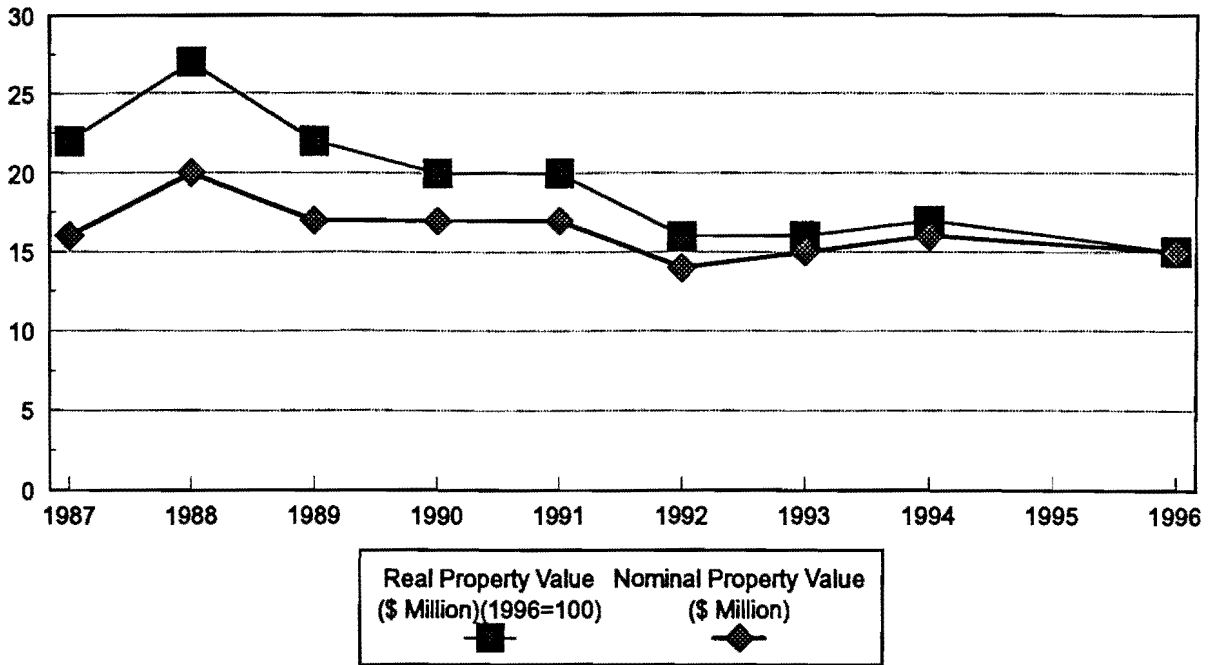


Figure 16. Total Appraisal Value for Commercial and Industrial Property in Caldwell, Texas, for 1987 to 1996

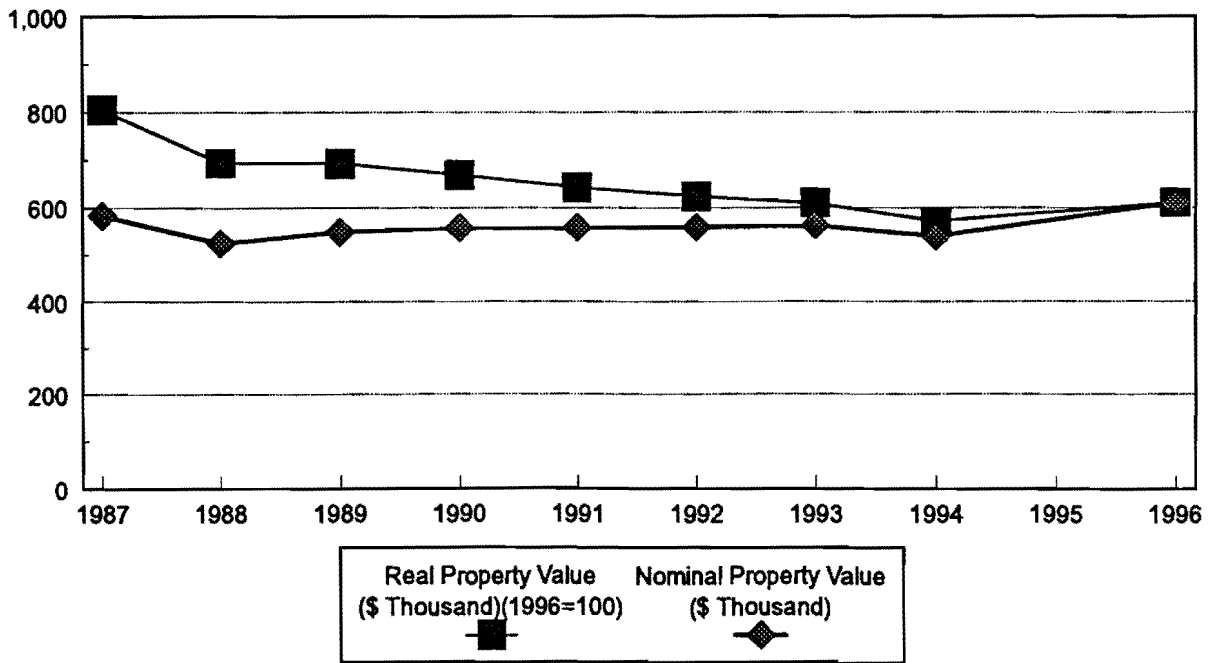
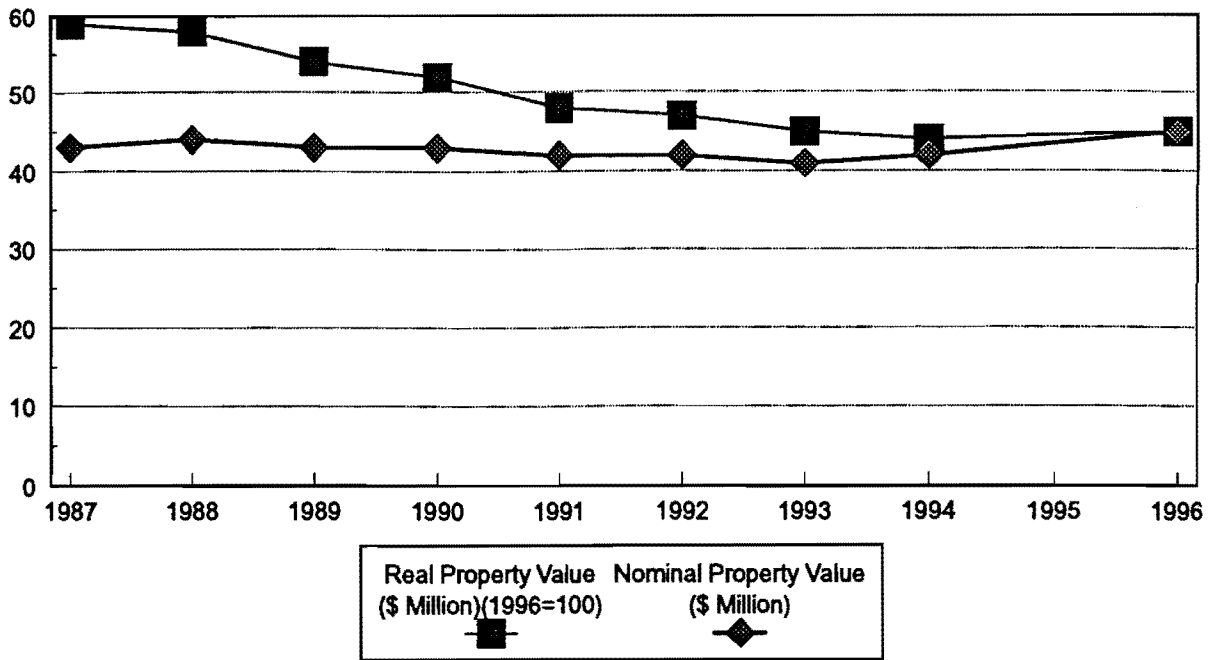
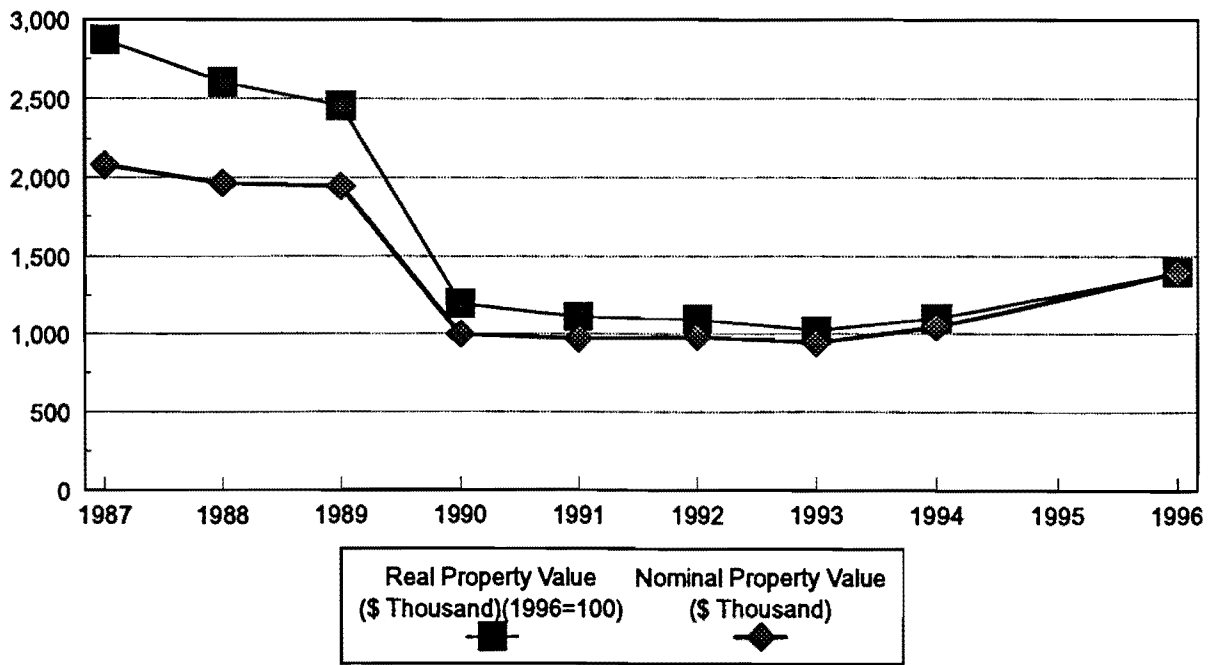


Figure 17. Total Appraisal Market Value for Ranch Land in Caldwell, Texas, for 1987 to 1996



Source: Burleson County Appraisal District

Figure 18. Total Appraisal Market Value for Residential Property Value in Caldwell, Texas, for 1987 to 1996



Source: Burleson County Appraisal District

Figure 19. Total Appraisal Market Value for Vacant Land in Caldwell, Texas, for 1987 to 1996

PROPERTIES ABUTTING CONSTRUCTION

Business Managers' Opinions

During Construction

Twenty business managers (38%) thought that property values along S.H. 21 decreased during the construction, while seventeen managers (31%) did not know if they had changed. Fifteen (28%) managers thought that these property values did not change, while two managers (4%) thought that S.H. 21 property values increased during construction. These results are shown in Table 38.

After Construction

Twelve business managers (31%) thought that property values along S.H. 21 did not change after construction, and the same number did not know if they changed. Thirteen managers (23%) thought that S.H. 21 property values increased after construction, while two (6%) thought they decreased. These results are shown in Table 38.

Property Value

The property value records for each property abutting the construction were obtained from the Burleson County Appraisal District. The records include appraisal values for 1980, 1985, 1990, 1992, and 1995. The actual changes in abutting property values on S.H. 21 and S.H. 36 are presented in Table 39. The available nominal and real values show a slow, steady decline since 1985, which is consistent with the trend in most values for Caldwell and Burleson County. Therefore, any decline in highway property values is not entirely due to the construction. Land values rose in 1995 despite representing fewer properties.

Land Value

The land value per acre is more relevant than the total land value due to the building age, reported in the introduction. Land values for all properties for which acreage was reported for each appraisal year are presented in Table 40. Land values per square foot declined between appraisal years 1980 and 1992, but rose 5% in 1995. Land values for 101 properties for which acreage was reported each year are presented in Table 41, and the changes are similar to those for all properties for which acreage was reported.

The Burleson County Appraisal District provided property classification for 1992 and 1995, and property was classified according to the 1995 assignment. The relative distribution of property types differs greatly from that of Burleson County or Caldwell,

Table 38. Business Managers' Opinions of the Change in S.H. 21 Property Values in Caldwell During and After Construction of S.H. 21

Change in S.H. 21 Property Values	During Construction		After Construction	
	Number of Businesses	Percent of Businesses	Number of Businesses	Percent of Businesses
Up 50% - 100%	0	0	0	0
Up 25% - 50%	0	0	2	5
Up 10% - 25%	0	0	4	10
Up 5% - 10%	2	4	4	10
Up 0% - 5%	0	0	3	8
No Change	15	28	12	31
Down 0% - 5%	3	6	1	3
Down 5% - 10%	3	6	1	3
Down 10% - 25%	10	19	0	0
Down 25% - 50%	0	0	0	0
Down 50% - 100%	4	7	0	0
Don't Know	17	31	12	31
No Answer	0	0	0	0
Total	54	100	39	100

Table 39. Property Value for All Properties Abutting Construction in Caldwell, Texas*

Year	Land Value (\$1,000)	Total Value (\$1,000)	Real Total Value (1996 = 100) (\$1,000)	Number of Properties
1980	1,526	5,456	10,389	119
1985	1,939	8,625	12,577	125
1990	1,981	8,378	10,057	135
1992	1,973	8,086	9,043	136
1995	2,085	7,126	7,336	118

* Source: Burleson County Appraisal District.

Table 40. Caldwell Land Values per Acre for All Properties for Which Acreage was Reported in Each Appraisal Year*

Year	Land Value (\$)	Number of Square Feet	Value per Square Foot (\$)	Real Average Value per Square Foot (\$) (1995 = 100)	Percent Change in Real Land Value per Square Foot	Number of Properties
1980	1,414,610	2,920,619	0.48	0.91	NA	101
1985	1,736,691	3,172,300	0.55	0.80	-11	107
1990	1,787,782	3,388,504	0.53	0.64	-21	114
1992	1,779,710	3,413,725	0.52	0.58	-10	115
1995	2,019,320	3,413,725	0.59	0.61	5	115

* Source: Burleson County Appraisal District.

Table 41. Land Value per Acre for 101 Abutting Caldwell Properties for Which Acreage Was Reported Every Appraisal Year¹

Year	Land Value (\$) ²	Value per Square Foot (\$)	Real Average Value per Acre (1995 = 100)	Percent Change in Real Average Value per Acre
1980	1,414,610	0.48	0.91	NA
1985	1,627,191	0.56	0.82	-10
1990	1,610,002	0.55	0.66	-19
1992	1,596,100	0.55	0.61	-8
1995	1,811,060	0.62	0.64	5

¹ Source: Burleson County Appraisal District.

² Figures for 2,920,619 acres of 101 properties for which acreage figures were given for all years.

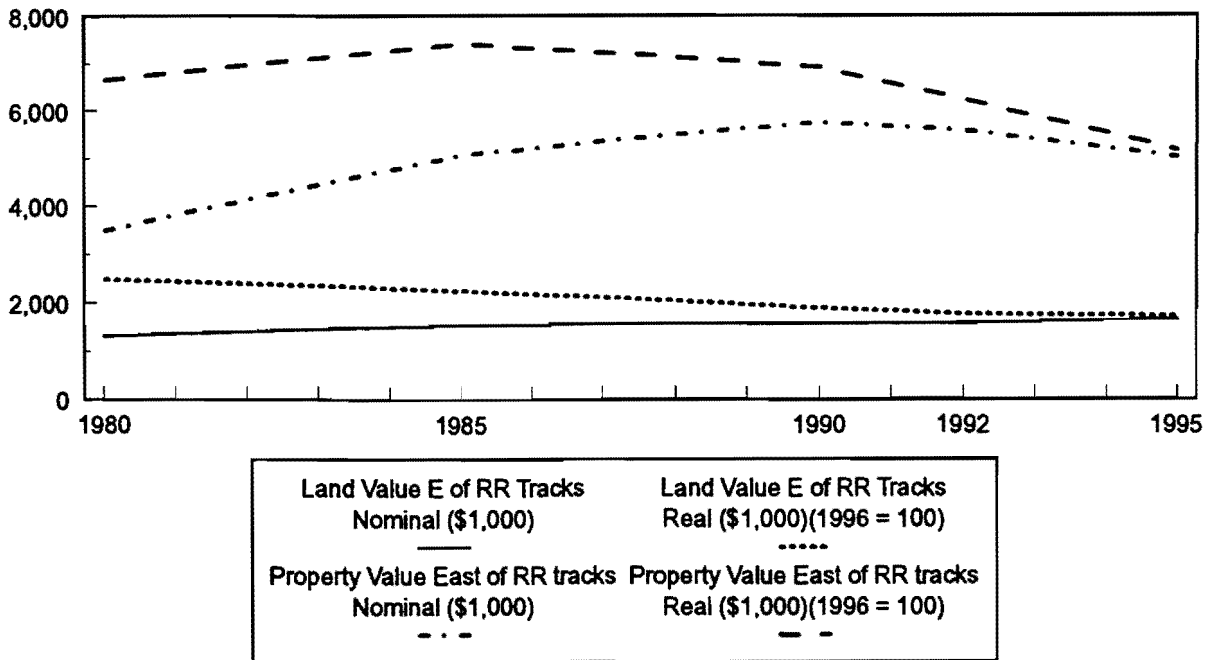
with most (72%) of the property value devoted to commercial property. Twenty-seven percent of the property value was for residences, while 2% was for vacant property.

East of the Railroad Tracks

S.H. 21 east of the railroad tracks had four lanes, so the construction added curbs, gutters, and a two-way left-turn lane to this portion of the highway. The affected section of S.H. 36 was widened to four lanes. The changes in values of property abutting the construction east of the railroad tracks are presented in Figure 20. The real property value fell from \$7 million in 1985 to \$5 million in 1995. The land value increased in 1995 while the total value fell.

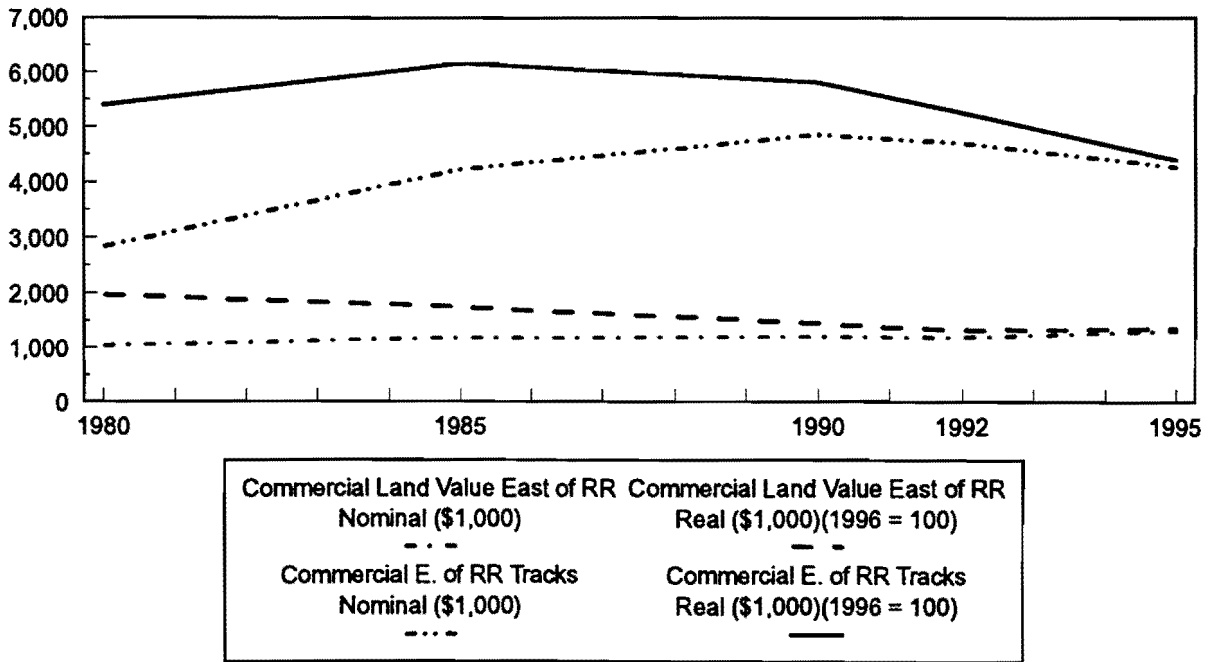
Commercial. Real appraisal values for commercial and industrial properties abutting construction east of the railroad tracks on S.H. 21 are found in Figure 21. Eighty-four percent of the property value on the east end is commercial property. The real value slowly declined from \$6.2 million in 1985 to \$4.4 million in 1995. The nominal land value increased to \$1.3 million in 1995 from \$1.2 million in 1992, while the total value fell. Burleson County and Caldwell property value dipped in 1992 and rose in 1995, but not to 1990 levels.

Residential. Real appraisal values for residential property abutting construction east of the railroad tracks are found in Figure 22. Real property values have decreased from \$1 million in 1980 to \$643,000 in 1995. The land value increased in 1992 while the total value fell. Land and property values fell after construction. Burleson County



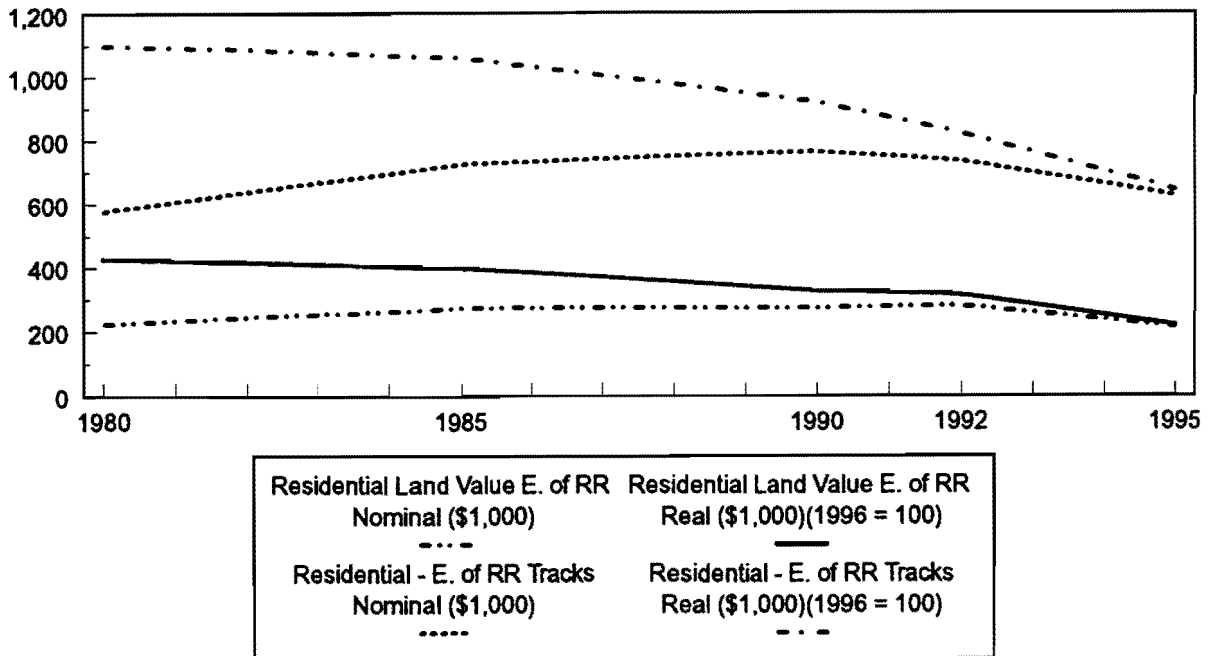
Source: Burleson County Appraisal Office

Figure 20. Property Values Abutting Construction East of the Railroad Tracks in Caldwell, Texas



Source: Burleson County Appraisal Office

Figure 21. Commercial Property Values Abutting Construction East of the Railroad Tracks in Caldwell, Texas



Source: Burleson County Appraisal Office

Figure 22. Appraisal Value for Residential Property Abutting Construction East of the Railroad Tracks in Caldwell

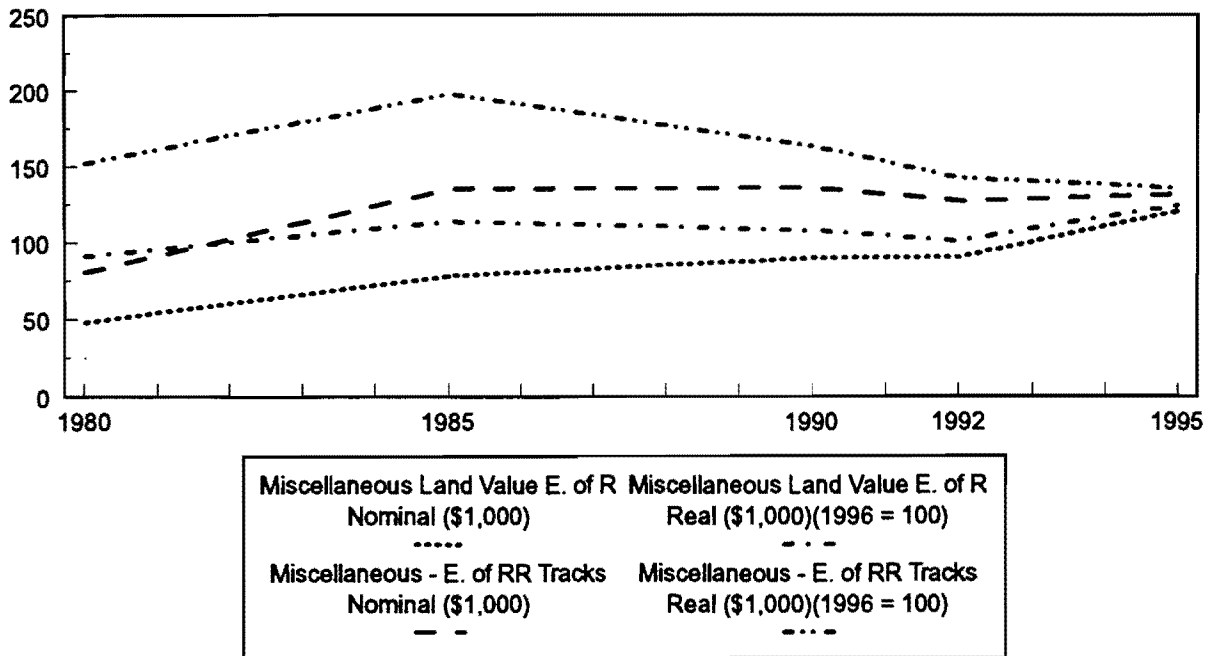
and Caldwell nominal property values have been flat while their real values have slowly fallen. Only 14% of the east end's property value is residential, and this is a lower percentage than Burleson County, Caldwell, or the abutting property in general.

Miscellaneous. Real appraisal values for miscellaneous property abutting construction east of the railroad tracks are found in Figure 23. These values comprise 2% of the east end property values, which are comparable to Burleson County, Caldwell, and abutting highway properties in general. The real values fell from \$197,000 in 1985 to \$135,000 in 1995. While the real total decreased, the nominal land value increased from \$48,000 in 1980 to \$120,000 in 1995.

West of the Railroad Tracks

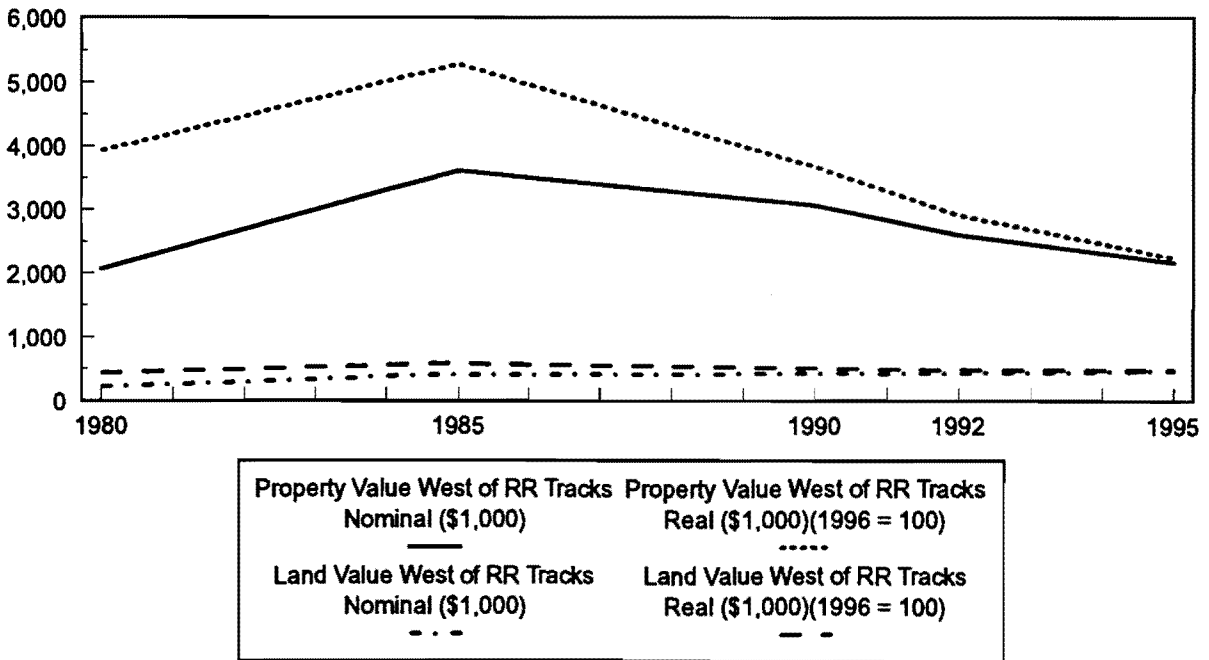
The section of S.H. 21 west of the railroad tracks was two lanes before construction, so the construction added two lanes as well as curbs, gutters, and a two-way left-turn lane. Real values for property abutting the construction west of the railroad tracks are presented in Figure 24. The real value fell from \$5.3 million in 1985 to \$2.2 million in 1995. In 1995, nominal land values increased while the total value decreased.

Commercial. Real appraisal values for commercial and industrial properties abutting construction areas west of the railroad tracks are found in Figure 25. The total



Source: Burleson County Appraisal Office

Figure 23. Total Appraisal Value for Miscellaneous Property Abutting S.H. 21 East of the Railroad Tracks in Caldwell



Source: Burleson County Appraisal Office

Figure 24. Total Market Value for Property Abutting Construction West of the Railroad Tracks in Caldwell, Texas

value decreased from \$2.6 million in 1985 to \$1.1 million in 1995. The nominal land value fell from \$191 thousand in 1985 to \$176 thousand in 1995. The trend in value is similar to that of the east end, but the percentage of Caldwell property value represented by east end commercial property is lower than that for abutting properties in general. The percentage of Burleson County or Caldwell property value comprised by commercial property is lower than that for the east end, however.

Residential. Real appraisal values for residential property abutting construction west of the railroad tracks are found in Figure 26. Total real property value fell from \$2.6 million in 1985 to \$1.1 million in 1995. However, nominal land value increased from \$197 thousand in 1985 to \$267,000 in 1995. The trend in value is similar to that of the east end, but it comprises the highest percentage of total property value of Burleson County, Caldwell, or abutting properties in general.

Miscellaneous. Real appraisal value for miscellaneous property abutting construction west of the railroad tracks is found in Figure 27. The real property value fell from \$23,000 in 1980 to \$17,000 in 1995. The land value equaled the property value, so it changed similarly to the property value. The percentage of total property value is similar to Burleson County, Caldwell, and abutting properties.

INDIVIDUAL S.H. 21 PROPERTIES

Residents' Opinion

Eight out of the 16 responding residents thought that their property value increased up to 50% due to the construction (Table 42). Forty-four percent of the respondents did not think that their abutting property value changed due to the construction. The graphs show that the residential property values continued to decline during and after construction as they had before construction.

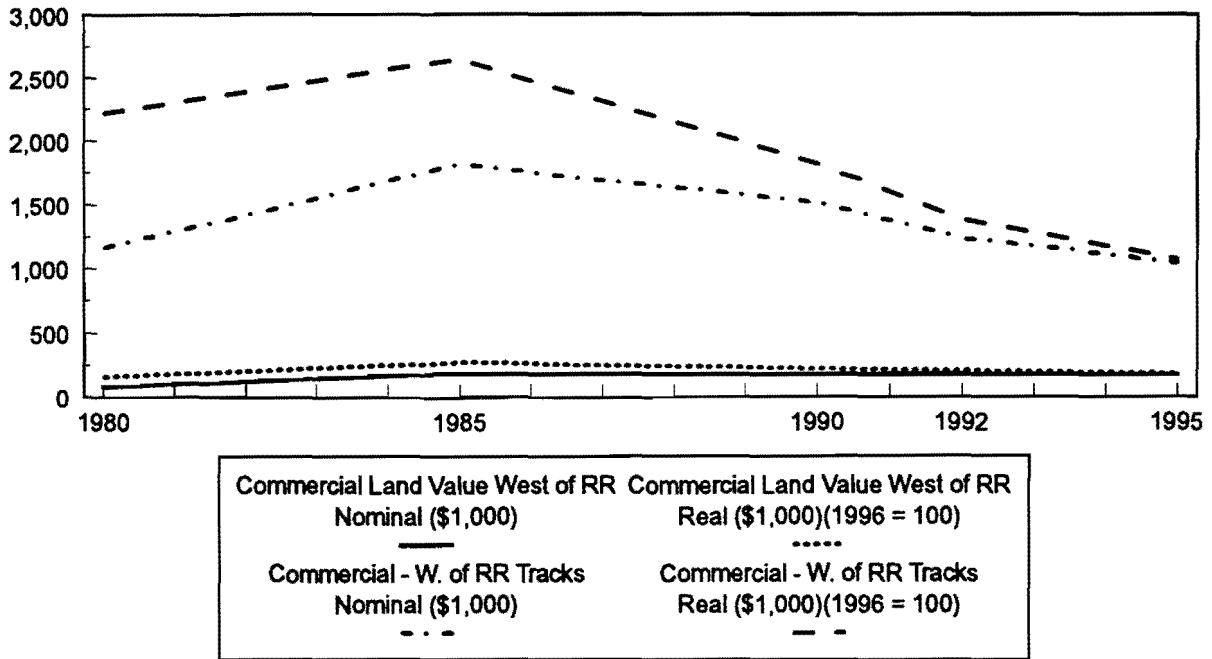
Abutting Business Managers' Opinions

During Construction

Abutting businesses' opinions about how their property value changed during construction are shown in Table 43. Most businesses (28 businesses, or 52%) did not think that their property values changed during the construction. Twelve business managers (22%) did not know if their property values changed during the construction. Eleven business managers (20%) thought their property value decreased, while three business managers (6%) thought their property value increased.

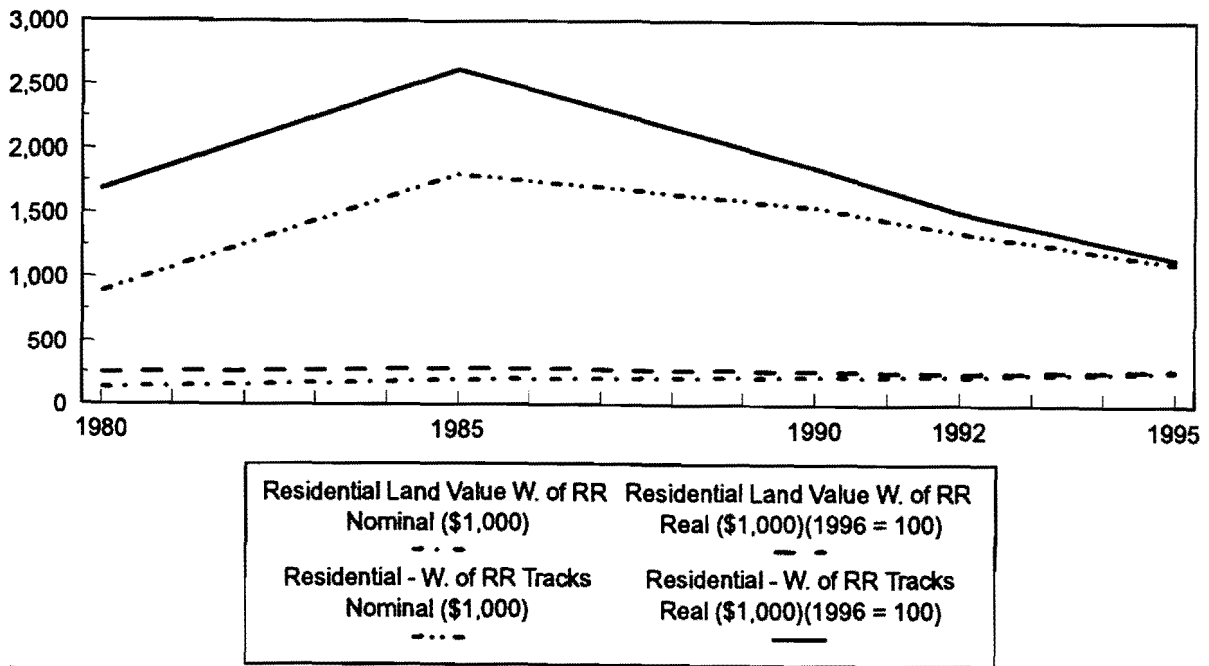
After Construction

Abutting business managers' opinions about how their property value changed after construction are shown in Table 43. Most managers (21 managers, or 54%) did not think that their property values changed after construction. Ten managers (26%) did not



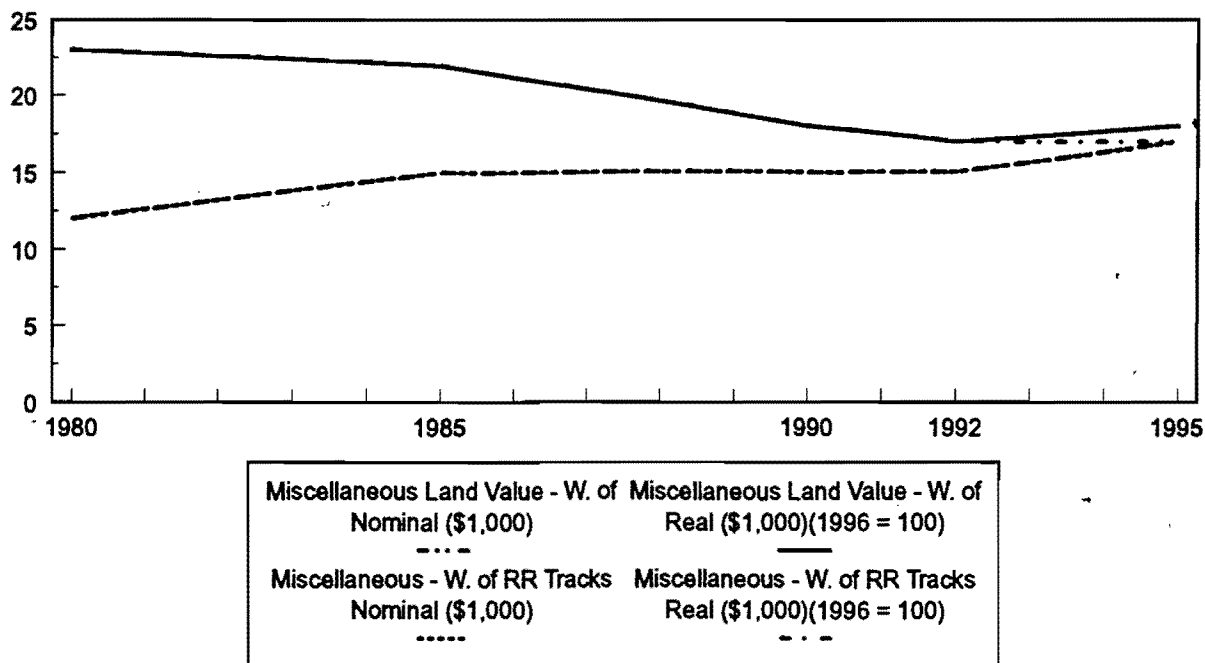
Source: Burleson County Appraisal Office

Figure 25. Appraisal Values for Commercial Property Abutting Construction West of the Railroad Tracks in Caldwell



Source: Burleson County Appraisal Office

Figure 26. Total Appraisal Value for Residential Property Abutting Construction West of the Railroad Tracks in Caldwell



Source: Burleson County Appraisal Office

Figure 27. Values for Miscellaneous Property Abutting Construction West of the Railroad Tracks in Caldwell

know if their property values changed after construction. Eight managers (21%) thought their property value increased.

Most managers thought the property value would rise after construction. One noted that owners would probably wait until after construction to sell properties. Many felt that, in the long run, the curbs, gutters, and general beautification helped property values. The Deputy Chief Appraiser says that all of these speculations have been realized.

Abutting Business Property Value

The actual direction of change for each business property is summarized in Table 44. Ninety-two percent of the property values did not change during construction. Of the remaining property values, almost the same number increased as decreased. Therefore, a greater percentage of property values remained unchanged than was anticipated by the business owners. Part of this lack of change was due to the pre-1992 appraisal rules which didn't require each property to be reappraised on a specific time schedule. Starting in 1992, each property had to be reappraised every 3 years. In 1995, only 1% of the properties (1 property) had the same value as the 1992 value. Sixty-five percent of the property values had increased and 34% had decreased. Therefore, if only the construction impact and the age of the improvements were considered, the

Table 42. Distribution of Abutting Residents' Opinions of the Impact of S.H. 21 Construction on Their Property Value

Change in Property Values	During Construction	
	Number of Residences	Percent of Residences
Up 50% - 100%	0	0
Up 25% - 50%	1	6
Up 10% - 25%	3	19
Up 5% - 10%	1	6
Up 0% - 5%	3	19
No Change	7	44
Down 0% - 5%	0	0
Down 5% - 10%	0	0
Down 10% - 25%	0	0
Down 25% - 50%	0	0
Down 50% - 100%	1	6
Don't Know	0	0
No Answer	0	0
Total	16	100

Table 43. Abutting Business Managers' Opinion of Their Change in Property Value During and After Construction of S.H. 21

Change in Property Values	During Construction		After Construction	
	Number of Businesses	Percent of Businesses	Number of Businesses	Percent of Businesses
Up 50% - 100%	0	0	1	3
Up 25% - 50%	0	0	2	5
Up 10% - 25%	0	0	2	5
Up 5% - 10%	1	2	3	8
Up 0% - 5%	2	4	0	0
No Change	28	52	21	54
Down 0% - 5%	3	6	0	0
Down 5% - 10%	2	4	0	0
Down 10% - 25%	3	6	0	0
Down 25% - 50%	1	2	0	0
Down 50% - 100%	2	4	0	0
Don't Know	12	22	10	26
No Answer	0	0	0	0
Total	54	102*	39	101*

* Percentages may not add to 100% due to rounding.

construction impact outweighed the age of the improvements for 65% of the properties and the age of the improvements outweighed the construction impact for 34%.

Realtors' Opinions

One realtor indicated that during construction the rental market was full due to increased oil drilling activity. Houses were for sale, not for lease. In the 1980s, there was an oil boom followed by an oil bust. The oil business picked up again during construction. The depressed economy, followed by the oil boom, were the primary influences on property values. Another real estate agent thinks that the highway improvement caused S.H. 21 property values to increase 20% or more.

The Deputy Chief Appraiser's Opinion

The Deputy Chief Appraiser for Caldwell agrees that the property values peaked in 1985 due to the oil boom, and says that since then, the declining trend in property values is due to the aging of the improvements. He said that immediately after construction, properties sold for higher prices than they sold for before or during construction. People selling property now are asking for more than they did right after construction. He attributes this increase to the construction improvements.

COMPARISON OF PROPERTY VALUES BY TYPE OF PROPERTY

The total before, during, and after construction property values for each type of property for Burleson County, Caldwell, and abutting property are presented in this section. Note that, in 1992, the Burleson County Appraisal District was required to reassess the value of each property every three years. Therefore, the values between 1990 and 1992 might be quite similar if few properties were sold and, therefore, the values of few properties were reassessed. However, the 1995 property values could be vastly different. Note also that these are property values, not land values, so the age of the improvements could greatly impact the property values as well.

Commercial

Commercial property values are presented in Table 45. Commercial property values in Caldwell decreased 20% during construction. Highway property values only decreased 13%, while nonabutting property values decreased 24%. This situation could be due to the fact that few abutting properties were sold during construction and, therefore, few property values were reassessed. After construction, Caldwell property values were still 20% below 1990 levels, but abutting property values dropped 28%. Nonabutting property values dropped 14% overall, and 17% on average.

Table 44. Actual Change for Highway Business Property Value During and After Construction, S.H. 21 and S.H. 36

Type of Property Change	During Construction		After Construction	
	Number of Properties	Percent of Properties	Number of Properties	Percent of Properties
Increase	5	4	89	65
No Change	125	92	1	1
Decrease	7	5	46	34

Ranch

Ranch property values are presented in Table 46. During construction, ranch properties in all areas - Burlison County, Caldwell, abutting, and nonabutting property - decreased 7%. After construction, Caldwell and Burlison County ranch property values decreased approximately 15% from their 1990 values, but abutting ranch property values decreased 30%.

Residential

Residential property values are presented in Table 47. During construction, Caldwell and Burlison County property values fell between 7% and 10%, while abutting property values fell 16%. After construction, Caldwell and Burlison County property values fell between 12% and 17% from their 1990 values while abutting property values fell 36%.

Vacant

Vacant property values are presented in Table 48. Burlison County property values fell approximately 25%, while Caldwell values decreased 8%. Abutting property values decreased 13%. After construction, Burlison County property decreased 34% to 37%. Caldwell values decreased approximately 10%, while abutting properties decreased 18%.

Table 45. Commercial Property Values for Burleson County, Caldwell, and Abutting Property Before and After Construction¹

During Construction					
Location	Sum or Average	1990 Real Property Value (\$)	1992 Real Property Value (\$)	Actual Difference (\$)	Percent Difference (%)
Highway Property	Sum	7,457,624	6,489,912	-967,712	-13
	Average	111,308	96,864	-14,444	-13
Caldwell (all)	Sum	20,098,206	16,058,810	-4,039,396	-20
	Average	94,358	76,471	-17,887	-19
Caldwell (other than highway) ²	Sum	12,640,582	9,568,898	-3,071,684	-24
	Average	86,579	66,915	-19,664	-23
Burleson (all)	Sum	40,620,606	28,339,917	-12,280,689	-30
	Average	75,785	54,500	-21,285	-28
Burleson (other than Caldwell) ³	Sum	20,522,400	12,281,107	-8,241,293	-40
	Average	63,537	39,616	-23,921	-38
After Construction					
Location	Sum or Average	1990 Real Property Value (\$)	1995 Real Property Value (\$)	Actual Difference (\$)	Percent Difference (%)
Highway Property	Sum	7,457,624	5,392,400	-2,065,224	-28
	Average	111,308	80,484	-30,824	-28
Caldwell (all)	Sum	20,098,206	16,306,215	-3,791,991	-19
	Average	94,358	74,458	-19,900	-21
Caldwell (other than highway) ²	Sum	12,640,582	10,913,816	-1,726,766	-14
	Average	86,579	71,801	-14,778	-17
Burleson (all)	Sum	40,620,606	35,094,754	-5,525,852	-14
	Average	75,785	63,007	-12,778	-17
Burleson (other than Caldwell) ³	Sum	20,522,400	18,788,538	-1,733,862	-8
	Average	63,537	55,587	-7,950	-13

¹ Source: Burleson County Appraisal District.

² Caldwell property values minus the highway property values.

³ Burleson County property values minus Caldwell property values.

Table 46. Values for Burleson County, Caldwell, and Abutting Ranch Properties Before, During, and After Construction

During Construction					
Location	Sum or Average	1990 Real Property Value ¹ (\$)	1992 Real Property Value (\$)	Actual Difference (\$)	Percent Difference (%)
Highway Property	Sum	95,593	89,052	-6,541	-7
	Average	NA	NA	NA	NA
Caldwell (all)	Sum	669,136	624,346	-44,790	-7
	Average	1,282	1,194	-88	-7
Caldwell (other than highway) ²	Sum	573,543	535,294	-38,249	-7
	Average	NA	NA	NA	NA
Burleson (all)	Sum	426,920,248	398,557,072	-28,363,176	-7
	Average	1,086	1,012	-74	-7
Burleson (other than Caldwell) ³	Sum	426,251,112	397,932,727	-28,318,385	-7
	Average	1,086	1,012	-74	-7
After Construction					
Location	Sum or Average	1990 Real Property Value (\$)	1995 Real Property Value (\$)	Actual Difference (\$)	Percent Difference (%)
Highway Property	Sum	95,593	67,166	-28,427	-30
	Average	NA	NA	NA	NA
Caldwell (all)	Sum	669,136	560,526	-108,610	-16
	Average	1,282	1,051	-231	-18
Caldwell (other than highway) ²	Sum	573,543	493,360	-80,183	-14
	Average	NA	NA	NA	NA
Burleson (all)	Sum	426,920,248	364,143,095	-62,777,153	-15
	Average	1,086	924	-162	-15
Burleson (other than Caldwell) ³	Sum	426,251,112	363,582,568	-62,668,544	-15
	Average	1,086	924	-162	-15

¹ Source: Burleson County Appraisal District.

² Caldwell property values minus highway property values.

³ Burleson property values minus Caldwell property values.

Table 47. Values for Burleson County, Caldwell, and Abutting Residential Property Before and After Construction

During Construction					
Location	Sum or Average	1990 Real Property Value ¹ (\$)	1992 Real Property Value (\$)	Actual Difference (\$)	Percent Difference (%)
Highway Property	Sum	2,775,593	2,335,817	-439,776	-16
	Average	47,855	40,273	-7,582	-16
Caldwell (all)	Sum	51,223,376	46,411,038	-4,812,338	-9
	Average	43,154	38,773	-4,381	-10
Caldwell (other than highway) ²	Sum	48,447,782	44,075,221	-4,372,561	-9
	Average	42,912	38,696	-4,216	-10
Burleson (all)	Sum	214,174,019	197,404,835	-16,769,184	-8
	Average	24,368	22,000	-2,368	-10
Burleson (other than Caldwell) ³	Sum	162,950,643	150,993,798	-11,956,845	-7
	Average	21,435	19,418	-2,017	-9
After Construction					
Location	Sum or Average	1990 Real Property Value (\$)	1995 Real Property Value (\$)	Actual Difference (\$)	Percent Difference (%)
Highway Property	Sum	2,775,593	1,768,981	-1,006,612	-36
	Average	47,855	30,500	-17,355	-36
Caldwell (all)	Sum	51,223,376	43,036,996	-8,186,380	-16
	Average	43,153	36,014	-7,139	-17
Caldwell (other than highway) ²	Sum	48,447,782	41,268,015	-7,179,767	-15
	Average	42,912	36,296	-6,616	-15
Burleson (all)	Sum	214,174,019	186,124,080	-28,049,939	-13
	Average	24,368	20,528	-3,840	-16
Burleson (other than Caldwell) ³	Sum	162,950,643	143,087,084	-19,863,559	-12
	Average	21,435	18,177	-3,258	-15

¹ Source: Burleson County Appraisal District.

² Caldwell property values minus abutting property values.

³ Burleson County property values minus Caldwell property values.

Table 48. Values for Burleson County, Caldwell, and Abutting Vacant Properties Before, During, and After Construction

During Construction					
Location	Sum or Average	1990 Real Property Value (\$)	1992 Real Property Value (\$)	Actual Difference (\$)	Percent Difference (%)
Highway Property	Sum	151,402	131,302	-20,100	-13
	Average	12,617	10,942	-1,675	-13
Caldwell (all)	Sum	1,198,022	1,097,372	-100,650	-8
	Average	5,278	4,921	-357	-7
Caldwell (other than highway) ²	Sum	1,046,620	966,070	-80,550	-8
	Average	4,868	4,579	-289	-6
Burleson (all)	Sum	26,897,291	20,205,402	-6,691,889	-25
	Average	3,368	2,635	-733	-22
Burleson (other than Caldwell) ³	Sum	25,699,269	19,108,030	-6,591,239	-26
	Average	3,312	2,567	-745	-22
After Construction					
Location	Sum or Average	1990 Real Property Value (\$)	1995 Real Property Value (\$)	Actual Difference (\$)	Percent Difference (%)
Highway Property	Sum	151,402	124,418	-26,984	-18
	Average	12,617	10,368	-2,249	-18
Caldwell (all)	Sum	1,198,022	1,069,257	-128,765	-11
	Average	5,278	4,364	-914	-17
Caldwell (other than highway) ²	Sum	1,046,620	944,839	-101,781	-10
	Average	4,868	4,055	-813	-17
Burleson (all)	Sum	26,897,291	17,291,709	-9,605,582	-36
	Average	3,368	2,229	-1,139	-34
Burleson (other than Caldwell) ³	Sum	25,699,269	16,222,452	-9,476,817	-37
	Average	3,312	2,160	-1,152	-35

¹ Source: Burleson County Appraisal District.

² Caldwell property values minus abutting property values.

³ Burleson County property values minus Caldwell property values.

SUMMARY OF PROPERTY VALUE IMPACTS

Abutting property values slowly and steadily declined from 1985 through the end of construction. A realtor and the Deputy Chief Appraiser agree that the oil boom was the most significant factor which caused a decline in property values. Since the oil boom in 1985, the values have decreased due to the aging of the improvements. Property values decreased during construction because no one tried to sell their property during construction. They said that immediately after construction, properties sold for higher prices than they sold for before or during construction. People selling property now are asking for more than they did right after construction. They attribute this increase to the construction improvements.

There was no consensus among abutting business managers as to how abutting property values had changed during and after construction. Before and after construction, one-third said that the values did not change, and another third said that they did not know how they changed. During construction, one-third thought they decreased, while after construction, one-third thought they increased.

One-half of the residents thought that their property values increased due to construction. During and after construction, roughly one-half of abutting businesses thought their property value did not change due to construction and one-fourth did not know how it had changed. During construction, one-fifth thought that their property value decreased, and after construction one-fifth thought that their property value increased.

Looking at each property value, 75% did not change during construction, while 17% decreased and 8% increased. Therefore, the managers slightly overestimated the negative impact of the construction. A higher percentage of the property values were unchanged and a lower percentage decreased.

Land values abutting the construction decreased less than 1% overall. The values east of the railroad tracks decreased 0.6% while the values west of the tracks increased 0.4%. Therefore, most of the property value decline involved the improvements. Land value rose 5% after construction.

Comparing abutting property values to Caldwell and Burleson County property values is complicated due to the different proportions of property types in the various regions. Commercial property value makes up 72% of the abutting property value, and residential property value makes up 27% of it. Caldwell property values are roughly the inverse - 70% from residential and 27% from commercial. The major components of Burleson County property value are ranch land (62%) and residential (29%). Abutting residential property values fell more (16% during, 36% after) than Caldwell or Burleson County residential property values (10% during, 12% - 15% after). Abutting commercial property values fell less during construction (13%) and more after construction (28%) than Caldwell property values (20% during and 16% after).

Most managers (48%) thought that Caldwell property values did not change during construction. Thirty-one percent did not know how they changed, while 15 percent thought they decreased and 6% thought they increased. Nominal values fell 1% during construction. Values increased after construction, but not to their preconstruction levels.

USER COST IMPACTS

TRAFFIC VOLUME, TRAVEL TIME, AND ACCIDENT RATE TRENDS ON STATE HIGHWAY 21

Traffic volume, travel time, and accident rates on the highway may have been affected by changes in the highway during construction. These changes will be summarized in the first section. The business managers were asked to estimate the extent to which highway construction activities affected traffic volumes, travel times, and accident numbers in the construction area. The opinions and actual numbers are compared in the following sections. The benefit-cost ratio was also estimated.

Highway Changes Due to Construction

Changes to the highway during construction included changes in the capacity, the highway margins, the signal lights, the roadway lights, and the general construction activity. These changes are briefly described in this section.

Capacity

There were many changes in the highway capacity during construction. On S.H. 21 east of the railroad tracks, the four-lane, undivided highway was reduced to a two-lane undivided highway with construction permitting left turns only at street intersections. On S.H. 21 west of the railroad tracks, the two-lane undivided highway remained a two-lane undivided highway, but the construction permitted left turns only at street intersections. The railroad underpass was a two-lane undivided highway and remained a two-lane undivided highway, but during the first year it was down to one-lane with two-way traffic part of the time. S.H. 36 remained a two-lane undivided road during construction.

Margins

The open ditch on either side of the road was reduced to a partial ditch or eliminated. One ditch was partially filled in to add a temporary travel lane during construction on the other half of the existing right-of-way.

Signal Lights

Three lights with no left-turn arrows remained in operation during construction. Before and during construction, the light at the S.H. 21/S.H. 36 intersection delayed oncoming traffic long enough for a car or two to make a left turn.

Roadway Lighting

Special lighting at the S.H. 21/S.H. 36 intersection remained during construction. Regular street lighting remained during construction.

Construction Activity

The railroad bridge had a flagman part of the time during the first year of construction. Construction caused one lane to be closed while dirt, etc. was being removed. Half of the right-of-way and pavement were under construction east and west of the railroad tracks. The entire S.H. 21/S.H. 36 intersection was under construction. Half of the pavement was torn up through most of the construction period. The bypass yield lanes were rebuilt. The construction lasted from January 1991 until July 1993, one month longer than planned.

Traffic Volumes

Residents' Opinions

Eighty-one percent of the residents thought that the traffic volume on S.H. 21 increased due to the construction (Table 49).

Business Managers' Opinions

During Construction. Abutting business managers' opinions on the change in traffic volume are shown in Table 50. Most managers (24, or 44%) thought that there was no change in the traffic volume on S.H. 21 during construction, while 11 managers (20%) thought that the traffic volume increased. Thirteen managers (24%) thought that the traffic volume decreased, while six (11%) did not know.

In general, travel was very frustrating for everyone. Traffic was backed up, and lights would change quickly, letting three or four cars through at a time. It was especially bad on weekends and during Texas A&M University football games. At those times, the city would assign a patrolman at the S.H. 21/S.H. 36 intersection. The traffic would back up to the hospital, but some people would detour through Deanville to avoid the traffic, or go through town to avoid S.H. 21.

After Construction. Almost half of the respondents thought that traffic increased after construction, while approximately one-fourth thought there was no change and one-fourth did not know if there had been a change. Managers noted that the traffic flowed more smoothly and major traffic congestion was alleviated. One manager noted that the traffic is faster, and the people in faster traffic don't stop to buy things.

One manager thinks that traffic should have increased more now that the construction is complete, while another believes that it has increased tremendously and that traffic still backs up to the light.

Table 49. Distribution of Abutting Residents' Opinions on the Change in Traffic Volume Due to Construction on S.H. 21

Change in Traffic Volume	Number of Residences	Percent of Residences
Up 50% - 100%	7	44
Up 25% - 50%	3	19
Up 10% - 25%	2	13
Up 5% - 10%	1	6
Up 0% - 5%	0	0
No Change	1	6
Down 0% - 5%	0	0
Down 5% - 10%	0	0
Down 10% - 25%	0	0
Down 25% - 50%	1	6
Down 50% - 100%	0	0
Don't Know	0	0
No Answer	1	6
Total	16	100

Table 50. Abutting Business Managers' Opinions About the Change in Traffic Volume on S.H. 21 in Caldwell During and After Construction

Change in Traffic Volume	During Construction		After Construction	
	Number of Businesses	Percent of Businesses	Number of Businesses	Percent of Businesses
Up 50% - 100%	3	6	1	3
Up 25% - 50%	1	2	3	8
Up 10% - 25%	2	4	7	18
Up 5% - 10%	1	2	7	18
Up 0% - 5%	4	7	0	0
No Change	24	44	10	26
Down 0% - 5%	5	9	0	0
Down 5% - 10%	0	0	0	0
Down 10% - 25%	3	6	0	0
Down 25% - 50%	3	6	0	0
Down 50% - 100%	2	4	0	0
Don't Know	6	11	11	28
No Answer	0	0	0	0
Total	0	101*	39	101*

* Percentages may not add to 100% due to rounding.

Traffic Counts

Automatic traffic counter data averaged over several days and locations on S.H. 21 and S.H. 36 are presented in Table 51. S.H. 21 traffic volumes dropped by 5% between 1991 and 1992, and rose by 6% between 1992 and 1993. The traffic volume on S.H. 36 rose by 3% between 1992 and 1993. After construction, traffic counts on S.H. 21 rose 20% while those on S.H. 36 rose 17%.

Travel Time

Residents' Opinions

Travel Time to Work. Most residents (56%) did not think that the time it took to get to work changed due to construction (Table 52). Nineteen percent thought that the travel time decreased, while 12% thought it increased.

Travel Time to Buy Gas and Food. There was no consensus about the impact of construction on the time it took to buy gas or food (Table 53). Thirty-eight percent thought that it increased, 25% thought that it did not change, and 25% thought that it decreased.

Business Managers' Opinions

During Construction. Abutting business managers' opinions on the change in time it took to travel through Caldwell on S.H. 21 are presented in Table 54. Most managers (42, or 78%) thought that the time it took to travel through Caldwell on S.H. 21 increased during the construction. Three managers (6%) thought that it did not change, while seven (14%) thought that it decreased. Two managers (4%) did not know.

Some of the travel delay was due to construction obstructions. Two managers said that people had to drive around things that the construction workers had left in the road. Also, the railroad underpass construction held up traffic a while.

Another aspect of delay was the signal lights. The light at S.H. 21 and S.H. 36 was too short. One manager wanted the lights adjusted for traffic flows so they did not stop everybody. His philosophy is that if people are forced to stop for lights in a city, they won't stop there for gas, drinks, or food.

Other people did not try to explain the delay, just the problems it caused. One business owner said that traffic was backed up to the next stop light. Another said that he had to leave earlier for work or go around the construction. It reminded him of Houston.

Many business owners noted that the traffic flows through faster and easier, with fewer wrecks, due to the completed construction, the widened road, and the turn lanes. Speeding has also become a problem. Now people are driving faster and do not want to slow down to pull into driveways and buy things. Another business owner noted that the demand signal in Caldwell is better than the previous timed signal.

Table 51. Traffic Volumes for Various Years in Caldwell, Texas

Year	Traffic Volume	
	S.H. 21	S.H. 36
1991	6,960	--
1992	5,583	5,055
1993	5,947	5,208
1996	7,149	6,248

Table 52. Distribution of Residents' Opinions on the Change in Travel Time to Work Due to Construction on S.H. 21 in Caldwell

Change in Travel Time to and from Work	Number of Residences	Percent of Residences
Up 50% - 100%	1	6
Up 25% - 50%	0	0
Up 10% - 25%	0	0
Up 5% - 10%	1	6
Up 0% - 5%	0	0
No Change	9	56
Down 0% - 5%	0	0
Down 5% - 10%	3	19
Down 10% - 25%	0	0
Down 25% - 50%	0	0
Down 50% - 100%	0	0
Don't Know	0	0
No Answer	2	13
Total	16	100

Table 53. Distribution of Residents' Opinions About the Change in Shopping Travel Time Due to the Construction on S.H. 21 in Caldwell, Texas

Change in Travel Time to Buy Gas/Food	Number of Residences	Percent of Residences
Up 50% - 100%	1	6
Up 25% - 50%	1	6
Up 10% - 25%	0	0
Up 5% - 10%	2	13
Up 0% - 5%	2	13
No Change	4	25
Down 0% - 5%	1	6
Down 5% - 10%	2	13
Down 10% - 25%	1	6
Down 25% - 50%	0	0
Down 50% - 100%	0	0
Don't Know	1	6
No Answer	1	6
Total	16	100

Table 54. Abutting Business Managers' Opinion on the Change in the Travel Time Through Caldwell on S.H. 21 During and After Construction

Change in Travel Time through Caldwell	During Construction		After Construction	
	Number of Businesses	Percent of Businesses	Number of Businesses	Percent of Businesses
Up 50% - 100%	26	48	0	0
Up 25% - 50%	8	15	0	0
Up 10% - 25%	4	7	1	3
Up 5% - 10%	1	2	0	0
Up 0% - 5%	3	6	0	0
No Change	3	6	1	3
Down 0% - 5%	1	2	2	5
Down 5% - 10%	0	0	4	10
Down 10% - 25%	3	6	6	15
Down 25% - 50%	2	4	5	13
Down 50% - 100%	1	2	8	21
Don't Know	2	4	12	31
No Answer	0	0	0	0
Total	54	102	39	101*

* Percentages may not add to 100% due to rounding.

After Construction. Most (64%) of the respondents thought that the traffic volume decreased after construction, but 31% did not know if it had changed.

Instrumented Vehicle Travel Times

The average travel time for instrumented vehicle runs in 1991 was 4 minutes and 21 seconds, while the average travel time in 1992 was 4 minutes and 43 seconds. Therefore, travel time increased by 8.4% during the first year of construction. This fact supports most managers' opinions that the travel time increased during construction. After construction, the average instrumented vehicle travel time was 3 minutes and 49 seconds, which was 12% less than 1991 and 19% less than 1992 average travel times.

Accidents

Residents' Opinions

Most of the responding abutting residents who gave an opinion (44%) did not think that the number of accidents on S.H. 21 changed due to construction, while 31% thought they decreased (Table 55).

Business Managers' Opinions

During Construction. Most of the business managers (28, or 51%) thought that the number of accidents on S.H. 21 increased during the construction, while 11 (20%) did not think that the number of accidents changed. Two managers (4%) thought that the number of accidents went down, while 13 (24%) did not respond to the question. These results are shown in Table 56.

Some managers commented that during the construction, the contractors were not marking the highway properly for people driving down S.H. 21. Drivers did not know which lane they were supposed to be driving in. Each day they would travel in different lanes going different directions and there were a lot of near accidents.

One business owner notes that the number of accidents has increased now because people are trying to beat the light and turn into each other. Another business owner said they should have put a "turn on arrow only" light at the S.H. 21/S.H. 36 intersection, not a "protected left on arrow" light. A business manager noted that the S.H. 21/S.H. 36 protected left-turn arrow does not come on properly -- it signals you through and lets oncoming traffic have a green light. In addition, some people do not know how to use the turn lanes. However, one manager does think that there are fewer traffic accidents, making it safer to drive through Caldwell.

After Construction. There was no consensus in the change in number of accidents after construction. Thirty-seven percent thought there was a decrease in the number of accidents, 20% thought they increased, and 36% did not know if the number of accidents had changed. One manager thought that the turning lanes helped customers

Table 55. Distribution of Abutting Responding Residents' Opinions About the Construction Impact on the Number of Accidents on S.H. 21

Change in No. of Accidents	Number of Residences	Percent of Residences
Up 50% - 100%	0	0
Up 25% - 50%	0	0
Up 10% - 25%	0	0
Up 5% - 10%	0	0
Up 0% - 5%	1	6
No Change	7	44
Down 0% - 5%	2	13
Down 5% - 10%	1	6
Down 10% - 25%	1	6
Down 25% - 50%	0	0
Down 50% - 100%	1	6
Don't Know	1	6
No Answer	2	13
Total	16	100

Table 56. Abutting Business Managers' Opinion on the Change in Number of Accidents on State Highway 21 During and After Construction

Change in Number of Accidents	During Construction		After Construction	
	Number of Businesses	Percent of Businesses	Number of Businesses	Percent of Businesses
Up 50% - 100%	6	11	1	3
Up 25% - 50%	4	7	3	8
Up 10% - 25%	6	11	1	3
Up 5% - 10%	5	9	1	3
Up 0% - 5%	7	13	1	3
No Change	11	20	4	10
Down 0% - 5%	2	4	1	3
Down 5% - 10%	0	0	5	13
Down 10% - 25%	0	0	2	5
Down 25% - 50%	0	0	3	8
Down 50% - 100%	0	0	3	8
Don't Know	13	24	14	36
No Answer	0	0	0	0
Total	54	99*	39	103*

* Percentages may not add to 100% due to rounding.

get in and out of businesses faster. Another thought that accidents were due to people getting in to the turn lane and getting confused about how to proceed.

Number of Accidents

The number and type of accidents on S.H. 21 in Caldwell by type of accident damage for 1990 to 1995 is shown in Table 57. There was a slight increase in accidents during construction. The number of accidents did not change much during the year after construction, but did decrease two years after construction ended.

IMPACT ON USER COSTS: ESTIMATES USING MicroBENCOST

The MicroBENCOST computer program was used to analyze the benefits and costs to motorists of the highway widening construction. In general, the program compares the motorist costs before an improvement with those existing after an improvement has been made. In this report, the model was also used to calculate during-construction impacts on motorists.

Data Used to Analyze the Problem in MicroBENCOST

The information needed to run this model includes the type of construction, the cost of the construction, the length and number of segments of the project, and the average daily traffic and average speed for the segments. Widening construction is classified as an added-capacity problem in MicroBENCOST. The construction costs were \$6.095 million, and the discount rate used was 5%. Input data are presented in Table 58.

Total Estimated Benefits Versus Costs

The MicroBENCOST benefit-cost model was used to analyze the benefits and costs to motorists of the highway-widening construction. Construction period negative benefits totalled \$54,300, but benefits discounted over 20 years totalled \$7,399,950.

The cost figures are summarized in Table 59. The benefit-cost ratio was 1.54, which means that the motorists are receiving \$1.54 in benefits for every dollar spent on the project.

SUMMARY

Traffic Volume

Most residents (81%) thought that the traffic volume on S.H. 21 increased due to construction, but there was no consensus among business managers on the change in traffic volume either during or after construction. Almost half thought it did not change during construction, but over half thought it increased after construction.

Table 57. Number of Accidents per Year, S.H. 21 in Caldwell, 1990 -1993

Year	Fatal	Injury or Possible Injury	Non-Injury	Total
1990	0	12	39	51
1991	0	16	19	35
1992	0	16	32	48
1993	0	14	18	32
1994	0	14	23	37
1995	1	12	11	24

Source: Texas Accident Database.

Table 58. Input Data Used to Analyze User Benefits and Costs with the MicroBENCOST Model

S.H. 21 Segment	Segment Length (miles)	Additional Local S.H. 21 AADT ¹	Cross Street AADT	S.H. 21 Speed Limit (MPH)	Cross Street Speed Limit (MPH)
S.H. 36 to Main Street	0.20	0	5120	30	40
Main to Railroad Tracks	0.73	40	2340	35	30
Railroad Tracks to Banks Street	0.22	40	NA	40	NA
Banks Street to the West End of the Project	0.93	440	1140	40	30

¹ The Base Year AADT is 6470, and the Completion Year AADT is 7371. The annual growth rate in AADT is 4.44%.

Table 59. Summary of Discounted Benefits, Costs, and the Benefit-Cost Ratio, 1994

Motorist Benefits	Benefit Value (\$)
Delay Savings	7,895,680
Reduced Vehicle Operating Costs	-1,629,480
Accident Reduction	1,133,750
Total Discounted User Benefits	7,399,940
Discounted Construction Costs	5,770,000
Discounted Maintenance Costs	203,000
Salvage Value	1,685,000
Total Discounted Costs Less Salvage Value	4,288,000
Netted Benefit-Cost Ratio	1.54

During construction, travel was generally frustrating for everyone. The lights changed quickly, and traffic was backed up. People would detour around Caldwell during holidays and Texas A&M football games. After construction, some managers said that the traffic volume increased but it flowed more smoothly. The actual traffic volume, as measured by instrumented vehicle runs, decreased 5% in the first year of construction. The volume rose 3% to 6% each year during construction after that. It rose 20% after construction, and was 3% higher than it was the first year of construction.

Travel Time

Slightly over half of the responding residents thought that their travel time to work did not change due to construction, and 19% thought that it decreased. There was no consensus on the change in travel time to buy gas and food.

Most responding managers (78%) thought that the travel time increased during construction, although 13% said it decreased. Reasons for the increased travel time include construction workers leaving things in the road, construction of the railroad underpass, and short signal lights.

After construction, most (64%) said that travel time decreased, although 31% did not know if it had changed or not. One manager said that travel was faster and easier, but another said that people no longer wanted to pull over and buy things.

The instrumented vehicle runs indicated that travel time increased 8.4% during construction. After construction, it was 12% lower than it was in 1991 and 19% lower than it was in 1992.

Accidents

Forty-four percent of the responding residents thought that the number of accidents did not change due to construction, while 31% thought they decreased. There was no consensus among responding managers either during or after construction, about the change in the number of accidents. Slightly over half thought that they increased during construction. During construction, there was a problem with knowing which lane they were supposed to be traveling in. After construction, commenting managers did not agree on whether the two-way continuous left-turn lane helped customers get in and out of the businesses, or if drivers in the lane got confused about what they were supposed to do while they were there.

Benefit-Cost Ratio

The MicroBENCOST computer program yielded a benefit-cost ratio for the project of 1.54, indicating that motorists are receiving \$1.54 worth of benefits for every \$1 spent on construction.

IMPACT ON GROSS TAX REVENUES FOR CITY AND COUNTY

Gross business sales, and therefore sales tax revenues, for abutting businesses may decrease during highway construction and may be permanently affected after construction ends. Land values, and thus property taxes, may also be affected by construction. In this section, estimation of these tax revenue consequences is described. Note that the highway widening may create additional demand for tax revenue dollars, but this aspect of the tax revenue impact is not investigated in this report.

BUSINESSES AND PROPERTY ABUTTING CONSTRUCTION

Sales Tax Revenue

Before and During Construction

The first step in estimating the impacts on gross business sales of constructing a new highway is to classify the businesses in the study according to business type. Business type refers to whether the businesses are retail, service, manufacturing, wholesale, mining, or finance/insurance/real estate (F.I.R.E.) businesses. Many managers who provided their actual sales represented business extremes in their industry classification. Some businesses that did not report their sales were not in industries represented by businesses that reported their sales. Therefore, the collected data could not be used to estimate total industry sales for abutting businesses.

Before Construction. The number of businesses that reported their gross sales for 1990 and 1991/1992 and the 1990 total gross sales of these businesses are presented in Table 60. To evaluate the impact on gross sales tax revenues, the percent of gross sales that are taxable was estimated from the sales and taxable sales from the state comptroller's office for each business classification (Table 61). The gross sales for each business type was then multiplied by this percentage to estimate the amount of sales that were taxable (Table 62). This amount of taxable sales was then multiplied by the tax rates for the city to estimate the dollar amount of the tax revenue, \$132,707 (Table 63).

During Construction. The above procedure was repeated using 1991 gross sales data. The gross sales for each business type was multiplied by the estimated percentage subject to sales tax to arrive at the amount of sales that were taxable (Table 64). This amount of taxable sales was then multiplied by the tax rates for the city to estimate the dollar amount of the tax revenue, \$126,689 (Table 65). Therefore, sales tax receipts from these businesses decreased 4.5% during the first year of construction.

Before and After Construction

Before Construction. The above procedure was repeated using 1990 gross sales data reported by 13 businesses for the after-construction survey. The gross sales for each business type was then multiplied by the estimated percentage subject to tax to estimate the amount of sales that were taxable (Table 66). This amount of taxable sales was then

Table 60. Gross Sales of Abutting Businesses on S.H. 21 and S.H. 36 in Caldwell, Texas, That Reported Sales Before and During Construction

Industry	Number of Outlets Reporting Sales for 1990 and 1991/1992	1990 Gross Sales (\$)	Real 1990 Gross Sales (\$) (1996 = 100)
Retail Trade	17	15,285,036	18,349,060
Services ¹	6	453,222	544,074
All Businesses	23	15,738,258	18,893,135

¹ The two "other" businesses listed in the business chapter are listed as services here because this is the most appropriate classification.

**Table 61. Estimated Amount Subject to Sales Tax for Caldwell, Texas,
Businesses, 1990 - 1994**

Industry	Year	Gross Sales (\$)¹	Amount Subject to Sales Tax (\$)	Percent Subject to Sales Tax (%)²
Retail Trade	1990	37,819,652	17,947,584	47
	1991	39,277,337	20,114,763	51
	1992	42,530,927	21,071,444	50
	1993	50,270,473	22,358,603	44
	1994	52,933,323	23,548,367	44
Services	1990	1,712,767	709,978	41
	1991	4,239,120	864,960	20
	1992	4,345,049	989,872	23
	1993	5,071,903	1,969,843	39
	1994	4,283,522	1,719,421	40
All Major Divisions	1990	84,511,505	24,831,887	29
	1991	90,248,721	27,730,647	31
	1992	85,975,101	31,359,511	36
	1993	113,982,873	31,376,937	28
	1994	120,000,315	29,792,912	25

¹ Source: State Comptroller's Office.

² column 4 / column 3.

Table 62. Estimated 1990 Gross Sales Subject to Tax for Businesses Abutting Construction with Reported Gross Sales Before and During Construction

Industry	1990 Gross Sales (\$) (1996 = 100) ¹	Percent Subject to Sales Tax in 1990 (%) ²	Estimated Real 1990 Gross Sales Subject to Sales Tax (\$) (1996 = 100) ³
Retail Trade	18,349,060	47	8,624,058
Services	544,074	41	223,070
All Businesses ⁴	18,893,134	29	8,847,128

¹ From Table 60.

² From Table 61.

³ column 2 * column 3.

⁴ Estimated gross sales subject to sales tax for all businesses is the sum of the values for all businesses that reported actual sales for 1990 and 1991/1992.

Table 63. Estimated Sales Tax Revenue from Sales of Businesses Abutting Construction with Reported Gross Sales Before and During Construction

Industry	Estimated Real 1990 Gross Sales Subject to Sales Tax (\$) (1996 = 100) ¹	Sales Tax Rate in 1990 ²	Estimated Real 1990 Caldwell Sales Tax Revenue (\$) (1996 = 100) ³
Retail Trade	8,624,058	0.015	129,361
Services	223,070	0.015	3,346
All Businesses ⁴	8,847,128	0.015	132,707

¹ From Table 62.

² Source: City of Caldwell.

³ column 2 * column 3.

⁴ Estimated sales tax revenue for all businesses is the sum of the sales tax revenue for all businesses that reported their actual sales for 1990 and 1991/1992.

Table 64. Estimated 1991 Gross Sales Subject to Tax for Businesses Abutting Construction with Reported Gross Sales Before and During Construction

Industry	Estimated 1991-1992 Gross Sales (\$) ¹	Estimated Real 1991-1992 Gross Sales (\$) (1996 = 100)	Estimated Percent Subject to Sales Tax in 1991 ²	Estimated Real 1991-1992 Gross Sales Subject to Sales Tax (\$) (1996 = 100) ³
Retail Trade	14,404,663	16,347,860	51	8,337,409
Services	478,075	542,568	20	108,514
All Major Divisions ⁴	14,882,738	16,890,427	31	8,445,923

¹ From 23 businesses that reported actual sales for 1990 and 1991-1992.

² From Table 61.

³ column 2 * column 3.

⁴ Taxable gross sales for all major divisions is the sum of the listed industries' gross sales.

Table 65. Estimated 1991 Sales Tax Revenue from Businesses Abutting Construction with Reported Gross Sales Before and During Construction

Industry	Estimated Real 1991 Gross Sales Subject to Sales Tax (\$) (1996 = 100) ¹	Sales Tax Rate in 1991 ²	Estimated Real 1991 Caldwell Sales Tax Revenue (\$) (1996 = 100) ³
Retail Trade	8,337,409	0.015	125,061
Services	108,514	0.015	1,628
All Major Divisions ⁴	8,445,923	0.015	126,689

¹ From Table 64.

² Source: City of Caldwell.

³ column 2 * column 3.

⁴ Estimated taxable sales for all major divisions is the sum of that for all listed industries.

Table 66. Estimated 1990 Gross Sales Subject to Sales Tax for Businesses Abutting Construction with Reported Gross Sales Before and After Construction

Industry	Estimated 1990 Gross Sales (\$) ¹	Estimated Real 1990 Gross Sales (\$) (1996 = 100)	Estimated Percent Subject to Sales Tax in 1990 ²	Estimated Real 1990 Gross Sales Subject to Sales Tax (\$) (1996 = 100) ³
Retail Trade	11,798,000	14,163,016	47	6,656,618
Services	294,000	352,935	41	144,703
All Major Divisions ⁴	12,092,000	14,515,951	29	6,801,321

¹ From 23 businesses that reported actual sales for 1990 and 1991-1992.

² From Table 61.

³ column 2 * column 3.

⁴ Taxable gross sales for all major divisions is the sum of the listed industries' gross sales.

multiplied by the tax rates for the city to estimate the dollar amount of the tax revenue, \$102,020 (Table 67).

After Construction. The above procedure was repeated using 1996 gross sales data. The estimated gross sales for each business type was multiplied by the estimated percentage subject to sales tax to arrive at the amount of sales that were taxable (Table 68). This amount of taxable sales was then multiplied by the tax rates for the city to estimate the dollar amount of the tax revenue, \$104,323 (Table 69). Therefore, sales tax receipts from these businesses increased 2% after construction.

Property Tax Revenue

The two types of information needed to calculate property tax receipts are property values and property tax rates. The property values for all lots along the study area were obtained from the Burleson County Appraisal District for 1980, 1985, 1990, 1991, and 1992. Property along the study section on S.H. 21 is subject to county, road, hospital, schools of Caldwell, and city of Caldwell tax rates. Each type of property is subject to the same tax rates. These rates were obtained from the Burleson County Appraisal District and are presented in Table 70 for 1980, 1985, and 1990 through 1996. These rates steadily increased each year.

The abutting property values and calculated property tax revenue for 1980, 1985, 1990, 1992, and 1995 are listed in Table 71. Property values declined during

Table 67. Estimated Sales Tax Revenue from Sales of Businesses Abutting Construction with Reported Gross Sales Before and After Construction

Industry	Estimated Real 1990 Gross Sales Subject to Sales Tax (\$) (1996 = 100) ¹	Sales Tax Rate in 1990 ²	Estimated Real 1990 Caldwell Sales Tax Revenue (\$) (1996 = 100) ³
Retail Trade	6,656,618	0.015	99,849
Services	144,703	0.015	2,171
All Businesses ⁴	6,801,321	0.015	102,020

¹ From Table 66.

² Source: City of Caldwell.

³ column 2 * column 3.

⁴ Estimated sales tax revenue for all businesses is the sum of the sales tax revenue for all businesses that reported their actual sales for 1990 and 1991/1992.

Table 68. Estimated 1996 Gross Sales Subject to Sales Tax for Businesses Abutting Construction with Reported Gross Sales Before and During Construction

Industry	1996 Gross Sales (\$) ¹	Real 1996 Gross Sales (\$) (1996 = 100)	Estimated Percent Subject to Sales Tax in 1990-1994 ²	Estimated Real 1996 Gross Sales Subject to Sales Tax (\$) (1996 = 100) ³
Retail Trade	14,404,663	14,404,663	47.2	6,799,001
Services	478,075	478,075	32.6	155,852
All Major Divisions ⁴	14,882,738	14,882,738	29.8	6,954,853

¹ From 13 businesses that reported actual sales for 1990 and 1996.

² From Table 61.

³ column 2 * column 3.

⁴ Taxable gross sales for all major divisions is the sum of the listed industries' gross sales.

Table 69. Estimated 1996 Sales Tax Revenue from Businesses Abutting Construction with Reported Gross Sales Before and After Construction

Industry	Estimated Real 1996 Gross Sales Subject to Sales Tax (\$) (1996 = 100) ¹	Sales Tax Rate in 1991 ²	Estimated Real 1991 Caldwell Sales Tax Revenue (\$) (1996 = 100) ³
Retail Trade	6,799,001	0.015	101,985
Services	155,852	0.015	2,338
All Major Divisions ⁴	6,954,853	0.015	104,323

¹ From Table 68.

² Source: City of Caldwell.

³ column 2 * column 3.

⁴ Estimated taxable sales for all major divisions is the sum of that for all listed industries.

construction. Property tax revenues fell between 1990 and 1992. After construction, property tax revenue rose but did not return to its pre-construction level despite an increased tax rate. The decline was probably due to the decrease in property value during construction. Real property tax revenue has fallen since 1985.

CALDWELL

Sales Tax Revenue

The city sales, sales tax rates, and estimated sales tax receipts for Caldwell are presented in Table 72. The amount subject to sales tax increased about 15% during the first two years of construction but only increased slightly the last year. It decreased the year after construction. Since the sales tax rate was constant during that time period, sales tax receipts fluctuated with the amount subject to sales tax. However, real sales tax receipts decreased in 1993.

Property Tax Revenue

The net property values, property tax rates, and estimated property tax receipts for Caldwell are presented in Table 73. Estimated Caldwell property tax receipts fell during the second year of construction but increased the following two years. Property values steadily declined from 1990 to 1993, while property tax rates steadily increased. Therefore, the increased tax rate offset the declining property values for 1993. An

Table 70. Property Tax Rates per \$100 Valuation for the City of Caldwell in Burleson County for Various Years¹

Year	County	Road	Hospital	School ²	City	Total
	(\$ per \$100 Valuation)					
1980	0.2300	0.3000	0.0200	0.5600	0.4500	1.5600
1985	0.2000	0.0500	0.0500	0.8600	0.4400	1.6000
1990	0.3025	0.0600	0.0708	1.1000	0.3700	1.9033
1991	0.3070	0.0600	0.1130	1.1000	0.3775	1.9575
1992	0.3145	0.0555	0.1060	1.1400	0.3900	2.0060
1993	0.3390	0.0600	0.1142	1.200	0.3900	2.1032
1994	0.4030	0.0670	0.1210	1.2900	0.4232	2.3042
1995	0.4226	0.0748	0.1409	1.3900	0.4450	2.4733
1996	0.4499	0.0748	0.1409	1.4700	0.4450	2.5806

¹ Source: Burleson County Appraisal Office; City of Caldwell.

² Note: In 1991, School of Caldwell tax rate was 0.36 and CED was 0.74. In 1992, School of Caldwell tax rate was 0.35 and CED was 0.79.

Table 71. Property Tax Revenues for Properties Abutting S.H. 21 for 1980,1985, 1990, 1992, and 1995

Year	Property Value (\$) ¹	Property Tax Revenue (\$) ²	Real Property Tax Revenue (\$) (1996 = 100)
1980	5,550,400	86,586.24	164,871
1985	8,715,740	139,451.84	203,346
1990	8,755,280	166,350.32	199,697
1992	8,114,118	162,282.36	181,483
1995	7,169,247	164,892.68	169,762

¹ Source: Burleson County Appraisal Office.

² Calculated by applying exemptions to property values, and then applying property tax rates.

Table 72. Caldwell, Texas, Sales Tax Rates and Revenues for Various Years

Year	Sales Revenue (\$) ¹	Sales Revenue Subject to Sales Tax (\$)	Sales Tax Rate (%) ²	Total Sales Tax Revenue (\$) ³	Real Sales Tax Revenue (\$) (1996 = 100)
1985	84,919,703	31,098,186	0.010	310,982	453,467
1990	84,511,505	24,831,887	0.015	372,478	447,145
1991	90,248,721	27,730,647	0.015	415,960	479,179
1992	85,975,101	31,359,511	0.015	470,393	526,049
1993	113,982,873	31,376,937	0.015	470,654	511,042
1994	120,000,315	29,792,912	0.015	446,894	473,129

¹ Source: State Comptroller's Office.

² Source: City of Caldwell.

³ column 3 * column 4.

Table 73. Caldwell, Texas, Net Property Values, Property Tax Rates, and Property Tax Revenues for Various Years

Year	Total Net Appraisal Value (\$) ¹	Property Tax Rate (\$ per \$100 Valuation) ²	Estimated Property Tax Receipts (\$) ³	Real Estimated Property Tax Receipts (\$) (1996 = 100)
1985	82,035,182	1.6000	1,312,563	1,913,951
1990	76,333,575	1.9033	1,452,857	1,744,095
1991	76,211,080	1.9575	1,491,832	1,718,564
1992	73,231,058	2.0060	1,469,015	1,642,826
1993	72,411,558	2.1032	1,522,960	1,653,650
1994	81,268,390	2.3042	1,872,586	1,982,515

¹ Source: Bureson County Appraisal District.

² Source: City of Caldwell.

³ column 2 * column 3.

increase in property value and property tax rate contributed to the increased property tax revenue for 1994.

BURLESON COUNTY

Sales Tax Revenue

Burleson County sales and estimated sales tax receipts are presented in Table 74. Sales revenue fell during the second year of construction, but rose the next two years. However, the amount subject to state sales tax continued to fall in 1993 and 1994. Therefore, county sales tax revenue continued to fall as the county sales tax rate did not change during the years studied.

Property Tax Revenue

The net property values, property tax rates, and property tax receipts for Burleson County are presented in Table 75. Property tax rates and receipts have steadily increased since 1990. Property value increased during all construction years except 1993. Therefore, the tax increase offset the property value decline for that year.

SUMMARY

Sales Tax Revenue

Before- and during-construction sales figures were reported for 23 abutting businesses. Sales tax revenue from these firms decreased 4.5% between the end of construction and the year before construction. Caldwell sales tax revenue increased 14% and Burleson County sales tax revenue decreased 45% during the same time.

Before- and after-construction sales figures were reported for 13 abutting businesses. Sales tax revenue from these firms increased 2% between the year after and the year before construction. Caldwell sales tax revenue increased 6% and Burleson County sales tax revenue decreased 49% during this time. Therefore, construction may have caused sales tax revenue from abutting businesses to decrease slightly, but the revenue rebounded after construction. Burleson County sales tax revenue was probably more affected by other factors than the construction.

Property Tax Revenue

Real abutting property tax receipts decreased 9% between the end of construction and the year before construction, while Caldwell property tax revenue decreased 5% during the same time period. Burleson County property tax revenue increased 14% during that time period.

Real abutting property tax receipts decreased 15% between the year after construction ended and the year before construction. Caldwell property tax revenue

Table 74. Burleson County Sales and Estimated Sales Tax Revenue for Various Years

Year	Sales Revenue ¹	Amount Subject to State Sales Tax ¹	Sales Tax Rate ²	Total Sales Tax Revenue	Real Total Sales Tax Revenue (1996 = 100)
1990	129,450,212	45,697,713	0.005	422,558	507,264
1991	149,030,089	63,344,446	0.005	450,700	519,198
1992	147,203,852	52,300,675	0.005	261,503	292,443
1993	178,430,300	51,846,592	0.005	259,233	281,479
1994	188,103,470	50,244,282	0.005	251,221	258,639

¹ Source: State Comptroller's Office.

² Source: City of Caldwell.

Table 75. Burleson County Property Values, Property Tax Rates, and Property Tax Revenues for Various Years

Year	Total Net Appraisal Value (\$) ¹	Property Tax Rate (\$ per \$100 Valuation) ²	Estimated Property Tax Revenue (\$) ³	Real Estimated Property Tax Revenue (\$) (1996 = 100)
1985	898,711,698	0.2000	1,797,423	2,620,963
1990	579,145,331	0.3025	1,751,915	2,103,102
1991	625,822,301	0.3070	1,921,274	2,213,274
1992	677,889,566	0.3145	2,131,963	2,384,212
1993	649,844,714	0.3390	2,202,974	2,392,018
1994	970,815,587	0.4030	3,912,387	4,142,062

¹ Source: Burleson County Appraisal District.

² Source: Burleson County Tax Assessor-Collector.

³ column 2 * column 3.

increased 14% and Burleson County property tax revenue increased 97% during the same time period. Caldwell property taxes have been increasing since 1980, and the Deputy Chief Appraiser says that properties have been selling for more since the end of construction. Therefore, abutting property values, and thus, tax receipts, will probably increase in the future.

CONTRACTOR'S EXPENDITURES

In Table 76, the contractor's expenditures are broken down by location of the supplier and type of expenditure. All expenditures were paid to Texas suppliers. Twice as much was paid to contractors outside of Caldwell as was paid to Caldwell suppliers.

Employment and output multipliers were developed from the 1986 Texas Input-Output Model to produce statewide estimates of impacts from S.H. 21 widening expenditures. Impact estimates were made using the New Road/Highway Construction expenditure category, Category 20 in the input-output model. The estimated employment multiplier in 1986 for this category is 53.76 jobs per million dollars of expenditures. This includes the direct impact of the construction expenditures, the indirect impacts on the suppliers, and the induced effect of increased consumer spending. Since costs have fallen since 1986, the multiplier can be adjusted using the Annual Price Trends for Federal-Aid Highway Construction, which gives a composite index for Texas of 114.6 for 1986 and 102.8 for 1993. An adjusted employment multiplier of 59.9 is generated by dividing the 1993 composite index by the 1986 composite index, and dividing the 1986 employment multiplier for New Road/Highway Construction by the ratio of the indices. Applying this multiplier to the \$6.095 million of construction expenditures indicates that widening S.H. 21 generated about 364 new jobs for the Texas economy. It is unknown how much employment was generated in the Caldwell area (see Table 77). However, using the multipliers, the estimated increase in Caldwell employment was 121 new jobs.

The total output multiplier is 3.69 dollars of output per dollar of expenditures. Applying this multiplier to the \$6.095 million dollars of expenditures indicates that widening S.H. 21 generated about \$22.5 million in additional output. Again, it is unknown how much of this increase benefitted the Caldwell area, but an estimate using the multipliers is \$7.5 million (see Table 78).

Table 76. Distribution of the Contractor's Expenditures by Location of Supplier and Type of Material

Type of Cost	Expenditures by Location of Suppliers (\$)			Total Cost by Type of Material (\$)
	Caldwell	Elsewhere in Texas	Outside Texas	
Labor	604,900.00	1,172,138.00	0.00	1,777,038.00
Materials	801,184.00	1,935,118.00	0.00	2,736,302.00
Overhead	625,536.00	956,405.00	0.00	1,581,941.00
Total Cost by Location	2,031,620.00	4,063,661.00	0.00	6,095,281.00

Table 77. Estimated Number of Jobs Generated from the Contractor's Expenditures by Location of Supplier and Type of Material

Type of Cost Generating Jobs	Estimated Number of Jobs Generated by Contractor Expenditures by Location of Suppliers			Total Estimated Number of Jobs by Type of Material
	Caldwell	Elsewhere in Texas	Outside Texas	
Labor	36	70	0	106
Materials	48	116	0	163
Overhead	37	57	0	94
Total Number of Jobs by Location	121	243	0	364

Table 78. Estimated Additional Output Generated from the Contractor's Expenditures by Location of Supplier and Type of Material

Type of Cost Generating Additional Output	Estimated Additional Output Generated by Contractor Expenditures by Location of Suppliers (\$ million)			Total Estimated Additional Output by Type of Material (\$ million)
	Caldwell	Elsewhere in Texas	Outside Texas	
Labor	2.23	4.32	0.00	6.56
Materials	2.96	7.14	0.00	10.10
Overhead	2.31	3.53	0.00	5.84
Total Output by Location	7.50	15.00	0.00	22.50

IMPACT ON ENVIRONMENT AND GENERAL APPEARANCE

INTRODUCTION

Impacts on the environment were assessed using the answers to opinion questions on the survey described in the Business Impact and Residential Impact chapters. The impacts are divided into three categories: those on residents, those on the individual abutting businesses, and those on all abutting businesses. The general impacts are those on noise level, air pollution level, and the general appearance of S.H. 21 and S.H. 36.

RESIDENTS' OPINIONS

Noise Level

Ninety-four percent of the residents thought that the noise level increased on S.H. 21 due to construction (Table 79).

Air Pollution Level

Most residents (70%) thought that the air pollution level on S.H. 21 increased due to construction (Table 80). Twenty-five percent thought that it did not change.

General Appearance

Most residents (82%) thought that the general appearance of S.H. 21 improved due to construction (Table 81). Thirteen percent thought that it worsened.

Desirability as a Place to Live

There was no consensus on whether the desirability of living abutting S.H. 21 increased, decreased, or stayed the same due to construction (Table 82). Fifty percent thought it increased, 38% thought that it decreased, and 12% thought that it stayed the same.

Some people really liked the improved drainage, the reduced flooding, the improved appearance, the wider underpass, the curbs and gutters, the reduced travel time, and the center left-turn lane. One man said that it protects lives, reduces accidents, increases traffic, and increases property values.

Other residents were not as pleased with the change. One man did not like the fact that the contractor did not finish any part of the work when it was started, but jumped around from place to place, leaving the entire project a complete mess. Several did not appreciate having to back out of their driveway into traffic that was traveling 50 miles per hour (MPH) or more. One man mentioned that Caldwell was the only city he knew of that had 50 to 55 MPH speed limits posted in the city limits. He said that getting his mail and edging are terrible because trucks passing through at 60 to 65 MPH

Table 79. Distribution of Abutting Residents' Opinions About the Change in Noise Level Due to Construction on S.H. 21

Change in Noise Level	Number of Residences	Percent of Residences
Up 50% - 100%	5	31
Up 25% - 50%	2	13
Up 10% - 25%	4	25
Up 5% - 10%	3	19
Up 0% - 5%	1	6
No Change	1	6
Down 0% - 5%	0	0
Down 5% - 10%	0	0
Down 10% - 25%	0	0
Down 25% - 50%	0	0
Down 50% - 100%	0	0
Don't Know	0	0
No Answer	0	0
Total	16	100

Table 80. Distribution of Residents' Opinions on the Change in Air Pollution Level Due to Construction on S.H. 21

Change in Air Pollution Level	Number of Residences	Percent of Residences
Up 50% - 100%	2	13
Up 25% - 50%	3	19
Up 10% - 25%	3	19
Up 5% - 10%	3	19
Up 0% - 5%	0	0
No Change	4	25
Down 0% - 5%	0	0
Down 5% - 10%	0	0
Down 10% - 25%	0	0
Down 25% - 50%	0	0
Down 50% - 100%	0	0
Don't Know	0	0
No Answer	1	6
Total	16	101*

* Percentages may not add to 100% due to rounding.

Table 81. Distribution of Opinions About the Change in the General Appearance of S.H. 21 Due to Construction

Change in General Appearance of Area	Number of Residences	Percent of Residences
Up 50% - 100%	7	44
Up 25% - 50%	2	13
Up 10% - 25%	3	19
Up 5% - 10%	0	0
Up 0% - 5%	1	6
No Change	0	0
Down 0% - 5%	0	0
Down 5% - 10%	0	0
Down 10% - 25%	2	13
Down 25% - 50%	0	0
Down 50% - 100%	0	0
Don't Know	0	0
No Answer	1	6
Total	16	101*

* Percentages may not add to 100% due to rounding.

Table 82. Distribution of Responding Residents' Opinions on the Change in Desirability of Living Abutting S.H. 21 Due to the Construction in Caldwell

Change in Desirability as a Place to Live	Number of Residences	Percent of Residences
Up 50% - 100%	3	19
Up 25% - 50%	1	6
Up 10% - 25%	3	19
Up 5% - 10%	1	6
Up 0% - 5%	0	0
No Change	2	13
Down 0% - 5%	1	6
Down 5% - 10%	1	6
Down 10% - 25%	0	0
Down 25% - 50%	2	13
Down 50% - 100%	2	13
Don't Know	0	0
No Answer	0	0
Total	16	101*

* Percentages may not add to 100% due to rounding.

almost knock a person off their feet. He thinks that widening does not help Caldwell citizens, but only the people driving through. He doesn't understand why the speed limit cannot be 40 MPH for the two miles through the city. One woman noted that the speed limit was too fast, and it was dangerous to enter the roadway and exit the highway. She thinks that Caldwell should have been bypassed as was Bryan, Brenham, and Hempstead because it is dangerous to the local citizens. Another woman was concerned because there is a serious speeding problem and she lives in a school zone. Another said that children are not able to play in front yards as there is not much left of their front yards due to the widening.

OPINIONS ON EFFECTS ON INDIVIDUAL BUSINESSES

Noise Level

During Construction

Businesses were first asked about the construction impact on the noise level at their own business during construction, and these results are displayed in Table 83. Thirty-four business managers (63%) indicated that the noise level went up, while one business manager (2%) indicated the noise level decreased. The noise level did not change for 18 business managers (33%) and one business manager (2%) did not know.

Several business managers noted that dump trucks, loaders, and backup noises made the widening noisy. Another business manager noted that bulldozers were inches from his building. He indicated that the construction activity affected his computers and satellite, and caused him and his employees mental anguish. A man at another business had to move his bed from the outside wall because of the noise.

After Construction

After construction, 72% of the managers said that there was no change in the noise level at their business, while 22% said that it increased (Table 83).

Air Pollution Level

During Construction

Similarly to the questions about the noise level, business managers were asked about the construction impact on the air pollution level at their own businesses during construction. The distribution of their opinions is displayed in Table 84. Most business managers (24 or 46%) experienced an increase in the air pollution level, while 22 (41%) did not think that the air pollution level changed. Two business managers (4%) thought that the air pollution level decreased during construction, and six business managers (11%) did not know.

Table 83. Abutting Business Managers' Opinions on the Change in Noise Level at Their Business During and After Construction on S.H. 21

Change in Noise Level	During Construction		After Construction	
	Number of Businesses	Percent of Businesses	Number of Businesses	Percent of Businesses
Up 50% - 100%	21	39	1	3
Up 25% - 50%	2	4	1	3
Up 10% - 25%	3	6	4	10
Up 5% - 10%	4	7	1	3
Up 0% - 5%	4	7	1	3
No Change	18	33	28	72
Down 0% - 5%	0	0	1	3
Down 5% - 10%	0	0	1	3
Down 10% - 25%	0	0	0	0
Down 25% - 50%	0	0	0	0
Down 50% - 100%	1	2	0	0
Don't Know	1	2	1	3
No Answer	0	0	0	0
Total	54	100	39	103*

* Percentages may not add to 100% due to rounding.

Table 84. Abutting Business Managers' Opinion on the Change in Air Pollution Level near Their Business During and After Construction

Change in Air Pollution	During Construction		After Construction	
	Number of Businesses	Percent of Businesses	Number of Businesses	Percent of Businesses
Up 50% - 100%	14	26	1	3
Up 25% - 50%	3	6	0	0
Up 10% - 25%	2	4	0	0
Up 5% - 10%	2	4	0	0
Up 0% - 5%	3	6	0	0
No Change	22	41	28	72
Down 0% - 5%	0	0	1	3
Down 5% - 10%	0	0	0	0
Down 10% - 25%	0	0	1	3
Down 25% - 50%	0	0	0	0
Down 50% - 100%	2	4	0	0
Don't Know	6	11	8	21
No Answer	0	0	1	3
Total	54	102*	39	105*

* Percentages may not add to 100% due to rounding.

Generally, people who commented on the air pollution level thought that the air pollution level was bad. Gravel trucks caused a dust storm, and they couldn't keep anything clean. One business owner dusted a lot during construction. Also, they indicated that construction workers seemed to sweep the highway on windy days, not on calm days. One business manager ended up in the hospital twice because her lungs got so clogged she could not breathe. One business owner said people were sick because of the dust. However, another business owner said that several people with allergies were not affected by the construction.

After Construction

After construction, 72% of the managers said that the air pollution level at their business did not change, while 21% did not know if it had changed or not (Table 84).

OPINIONS ON EFFECTS ON ALL STATE HIGHWAY 21 BUSINESSES

Noise Level

During Construction

The businesses were also asked about the change in noise level on S.H. 21. Most businesses (35, or 65%) indicated that the general noise level on S.H. 21 went up, while 10 businesses (19%) indicated that there was no change. Two businesses (4%) thought that the noise level went down, and seven (13%) did not know. These results are shown in Table 85.

After Construction

After construction, 59% of the managers said that the noise level on S.H. 21 did not change, 27% said it increased, and 10% did not know if it had changed (Table 85).

Air Pollution Level

During Construction

Half of the businesses (27 businesses) thought that the air pollution level on S.H. 21 went up during construction, while 19 (35%) thought there was no change in the air pollution level. Three businesses (6%) thought it went down, while five businesses (9%) did not know. These results are shown in Table 86.

After Construction

After construction, 67% said it did not change and 23% did not know if it had changed (Table 86).

Table 85. Abutting Business Managers' Opinion on the Change in Noise Level on S.H. 21 During and After Construction

Change in Noise Level on S.H. 21	During Construction		After Construction	
	Number of Businesses	Percent of Businesses	Number of Businesses	Percent of Businesses
Up 50% - 100%	17	31	1	3
Up 25% - 50%	2	4	2	5
Up 10% - 25%	9	17	3	8
Up 5% - 10%	1	2	3	8
Up 0% - 5%	6	11	1	3
No Change	10	19	23	59
Down 0% - 5%	0	0	1	3
Down 5% - 10%	1	2	1	3
Down 10% - 25%	0	0	0	0
Down 25% - 50%	0	0	0	0
Down 50% - 100%	1	2	0	0
Don't Know	7	13	4	10
No Answer	0	0	0	0
Total	54	101*	39	102*

* Percentages may not add to 100% due to rounding.

Table 86. Abutting Business Managers' Opinion of the Change in Air Pollution Level on S.H. 21 in Caldwell During and After Construction

Change in Air Pollution	During Construction		After Construction	
	Number of Businesses	Percent of Businesses	Number of Businesses	Percent of Businesses
Up 50% - 100%	14	26	1	3
Up 25% - 50%	2	4	0	0
Up 10% - 25%	4	7	0	0
Up 5% - 10%	2	4	0	0
Up 0% - 5%	5	9	1	3
No Change	19	35	26	67
Down 0% - 5%	2	4	1	3
Down 5% - 10%	0	0	0	0
Down 10% - 25%	0	0	1	3
Down 25% - 50%	0	0	0	0
Down 50% - 100%	1	2	0	0
Don't Know	5	9	9	23
No Answer	0	0	0	0
Total	54	100	39	102*

* Percentages may not add to 100% due to rounding.

General Appearance of S.H. 21

During Construction

Most businesses (38, or 70%) thought that the general appearance of S.H. 21 deteriorated during the construction. Three businesses (6%) thought that the appearance improved during construction, while six businesses (11%) thought that the general appearance did not change. Seven businesses (13%) did not know if the general appearance had changed. These opinions are presented in Table 87.

People who commented on the construction generally were not pleased with the appearance. Several noted that the contractors did not clean up. One business owner had a big pile of dirt in front of her business for six months. Another business owner noted that the contractors piled debris in front of another shop, carelessly leaving signs everywhere. Another business' parking lot was a mess and the employees had to sweep it often. A business manager's allergies flared up because the contractors parked their construction equipment across the street from her. The trash was emptied once during construction. It was everywhere, and the lot was overgrown with weeds. Another business owner noted that tar and tractors were everywhere. However, one business owner noted that, as far as construction goes, it was pretty clean.

A few people are not happy with the "after appearance" of S.H. 21. One business owner does not like the curbs and gutters, and does not like the way the driveway and property were changed. Another said that the signal box that was installed right in front of his building destroyed its appearance.

However, most people who chose to comment on the general appearance after the construction were pleased with it, and are glad the construction is over. Different business owners complimented the curbs, gutters, lights, turning lanes, and improved looks of the buildings. One business owner did not like people parking in the grass, and really appreciates the curbs' and gutters' appearance. Another said that they should have done it years ago. Another business owner said the new appearance was worth all of the construction hassles.

After Construction

After construction, 88% of the managers said that the appearance improved. One said that it looks like a park, while another said that it looks like there is more room. The appearance was enhanced when the city put out banners. It makes it more pleasant for travelers going through Caldwell, and it gives them a better perception of the town. Another manager liked the lighting effects.

Some managers had suggestions for improvement, however. One said that it needs to be cleaned a little more, that there is quite a bit of trash now that it is four-lane. More rest areas are needed on both ends of town. Another said that the concrete existing before was easier to clean. A third said that cheaper Bermuda grass was put in instead of the nice carpet grass that was planted before. The grass area of the right-of-way is still

Table 87. Abutting Business Managers' Opinions of the Change in General Appearance of S.H. 21 in Caldwell During and After Construction

Change in General Appearance	Before Construction		After Construction	
	Number of Businesses	Percent of Businesses	Number of Businesses	Percent of Businesses
Up 50% - 100%	1	2	18	46
Up 25% - 50%	0	0	5	13
Up 10% - 25%	1	2	8	21
Up 5% - 10%	0	0	2	5
Up 0% - 5%	1	2	1	3
No Change	6	11	3	8
Down 0% - 5%	8	15	0	0
Down 5% - 10%	6	11	0	0
Down 10% - 25%	5	9	1	3
Down 25% - 50%	0	0	1	3
Down 50% - 100%	19	35	0	0
Don't Know	7	13	0	0
No Answer	0	0	0	0
Total	54	100	39	102*

* Percentages may not add to 100% due to rounding.

not covered well, so it gets muddy and unsightly. One manager said that plants make more headaches and cost money to keep up. There was no consensus about drainage. Some managers said that drainage had improved, while others said that there is more flooding due to the curbs.

SUMMARY

Noise Level

Over 60% of the responding business managers thought that the noise level at their business or along S.H. 21 increased during construction, while 20% to 30% did not think it changed. After construction, 60% to 70% of the business managers thought that the noise level at their business or along S.H. 21 did not change during construction, while 20% to 30% thought it increased. Ninety-four percent of the responding residents thought that the noise level increased due to construction.

Air Pollution Level

Forty to 50% of the managers thought that the air pollution near their business or on S.H. 21 increased during construction, while 35% to 40% of them thought that it did not change. After construction, 67% to 72% thought that the air pollution level did not change near their business or on S.H. 21 and 21% to 23% did not know. Sixty-nine percent of the responding residents thought that the air pollution level increased, and 25% thought it did not change.

General Appearance

Seventy percent of the responding managers thought that the general appearance of S.H. 21 declined during construction, while 88% thought that it improved after construction. Eighty percent of the responding residents thought that it improved due to construction.

Many managers liked the appearance of the new highway. One thought that it looked like a park and another thought it looked like it had more room. Others didn't like the grass, concrete, or increased trash due to the construction.

Desirability as a Place to Live

Fifty-five percent of the responding residents thought that the desirability of living abutting construction increased due to the construction, while 38% thought it did not change and 12% thought it decreased. Improvements included better drainage, reduced flooding, improved appearance, wider underpass, curbs and gutters, reduced travel time, and the center left-turn lane. The major drawback was the increased traffic speed.

CONTRACTOR AND TXDOT PERFORMANCE

Business managers were asked to rate the performance of the contractor and the TxDOT personnel involved in widening S.H. 21 and S.H. 36 in Caldwell, Texas. Supporting comments were encouraged.

CONTRACTOR'S PERFORMANCE

The area engineer's assessment of the contractor between June 1992 and January 1993 was that he was meeting specification requirements and conformed to acceptable standards, an assessment which is represented by a numeric rating of 8. His monthly ratings ranged from 7.95 to 8.50 during this time. The subcontractor's ratings ranged from good (8) to very good (9) during this time.

There was no clear consensus among business managers on the contractor's performance, as can be seen by Table 88. Seven business managers (13%) thought the contractor did a very good job, while 14 business managers (26%) thought he did a good job. Twelve business managers (22%) thought he did a fair job. Seven business managers (13%) thought he did a poor job while 12 (22%) thought he did a very poor job. Two business managers (4%) did not know how the contractor performed.

Many respondents were negative about the contractor's performance. Although the project was completed within TxDOT's projected time limit, one big issue was the amount of time it took to complete the project. Many people noted that the weather affected the contractor's progress, and the contractor had no control over that. However, one business manager said that, knowing construction, the contractor did not use all of his good weather time. He did not pursue this job because he had three or four other jobs going on in the area. Another business manager said that Young Brothers has a reputation of being slow. They did more in the three weeks after TxDOT and the city got on them for being so slow. He said that the incentive structure should be changed to pay more if they finish faster.

Construction was also delayed because the contractor had to remove some of the work and redo it. Some business managers felt this was due to lack of planning on the part of the contractor. Others felt that the contractor did not know what he was doing.

Examples of work that had to be redone are many. The concrete at several businesses was replaced because it cracked or it was poured in the wrong location. Some concrete was replaced several times.

Major problems were related to drainage. One business manager thought that the road flooded before the construction, but that flooding was worse after the construction. Another thought that when the contractor put in cement driveways, he did not put in proper drainage. Specifically, he thought two concrete culverts should have been installed, not just one. The contractor did replace some storm sewers, some several times, due to bad drainage.

Other business managers were unhappy with the way the contractor did his job. Specific incidences include taking 8 hours to put reflector dots on one part of the 'Y', not opening the road for the Kolache Festival, leaving the underpass unfinished all winter,

Table 88. Abutting Business Managers' Evaluations of the Contractor's Performance During Construction on S.H. 21 in Caldwell, Texas

Contractor Performance	Number of Businesses	Percent of Businesses
Very Good	7	13
Good	14	26
Fair	12	22
Poor	7	13
Very Poor	12	22
Don't Know	2	4
Total	54	100

cutting off one business' water during business hours, not marking traffic lanes well, not cleaning up debris, and cutting ruts in property. One business manager thought the contractor showed favoritism by always keeping a certain business' driveway open.

There are differing opinions about general construction at the 'Y'. Two business managers said the contractor should have done the corners of the 'Y' one at a time instead of all at once, and two other business managers said he should have done all of the 'Y' at one time. Another thought the contractor was insensitive to business on how work was done so poorly from one side of the 'Y' to the other. One business manager was upset because the contractor tore up his blacktop and did not replace it.

Certain things still need to be fixed. The contractor scraped the concrete near the intersection of S.H. 21 and S.H. 36, and one business manager would like to know if they will replace the top coat or put a sealant over it. It is disappointing to see that they are already tearing up parts of it. One business manager thinks the original road was better, the underpass is better, and the turns are still a mess.

Some of the things the contractor did did not make sense to one business manager. For example, the workers would start something new before they finished what they had already started. Another business manager thought the contractor could have come in with lots of people, shut down the business for a month, and started and finished the construction in front of a business.

Some business managers did not like some qualities of the employees. One business manager said that the contractor employed the laziest and most unorganized group of people he's ever met. Another said the workers would watch cars and women instead of work. One business manager thought that their attitude was very bad, even disrespectful.

Another business problem was the lack of communication between the contractor and the business managers. Some business managers said that the contractor did not talk to them about the construction and how it would proceed.

Other people had more positive experiences with the contractor. Some business managers said that the contractor was very considerate although they had problems with some property lines and some businesses. Some business managers said the contractor did a wonderful job. One business manager had no dealing with the contractor but thinks he probably cooperated well with the city of Caldwell. The contractor was slow in starting, but kept busy after he started. The concrete people did a good job with the curbs and gutters.

TXDOT PERFORMANCE

Ten business managers (19%) thought that the TxDOT supervisor did a very good job, while 16 business managers (30%) thought that he did a good job. Four (7%) business managers thought that he did a fair job. Five business managers (9%) thought that he did a poor job, and 10 (19%) business managers thought that he did a very poor job. Eight (15%) business managers did not know how to rate his performance. These results are presented in Table 89.

Several business managers had problems with TxDOT's construction plans. One business manager was not happy that construction occurred during football and holiday seasons. The engineer did not locate the curb correctly, in the opinion of one business manager. Another business manager would prefer a red light to the right-turn only situation at the end of Stone Street.

Another business manager was concerned about the safety of some of TxDOT's plans. The lane closure required a 'U' turn to get to one business from the west. Also, there were not enough barrels to protect cars from dropping off the edge of the pavement.

TxDOT is given partial blame for drainage problems resulting from the construction. One business manager said the plan requires water to go uphill to drain. The problem was fixed two months after he called. Another business manager said the intake for the storm sewer is too small, and water goes right by it. Although one business manager said there is a water problem that TxDOT will not acknowledge, another said that TxDOT made Young Brothers tear up some drains where water was standing.

Other business managers had communication problems with the TxDOT personnel. One business manager complained a lot to the TxDOT supervisor because of poor access to his businesses, but he did not get a response as quickly as he would have liked. One business manager had to call the Bryan TxDOT office three times to get a resolution to his complaint, while another business manager said the assigned engineer would not return phone calls or speak to him about complaints. One business manager said they would not talk to him -- he had to chase them down to talk to them. Another business manager said that he never had contact with TxDOT -- they never told him what was going on. Another said that if TxDOT had told the business managers what they

Table 89. Abutting Business Managers' Opinions on TxDOT Performance During Construction on State Highway 21 in Caldwell

TxDOT Performance	Number of Businesses	Percent of Businesses
Very Good	10	19
Good	16	30
Fair	4	7
Poor	5	9
Very Poor	10	19
Don't Know	8	15
No Answer	1	2
Total	54	100

were going to do years ago, they would not have felt so bad about it. Another business manager never saw the TxDOT personnel, but said they did a bad job because they hired Young Brothers.

In several instances, the business manager considered communication a problem because the outcome of the discussion was not in his favor. One business manager fought with them for eight months. TxDOT compromised, but not enough. The manager also wants to know who is supposed to take care of the grass.

A major miscommunication issue was loss of property. No right-of-way was acquired to complete the project, but some business managers did not understand that some of their parking or curbing was located on the existing right-of-way. One business manager thought the businesses could have shared where the frontage was taken from. Several business managers were very frustrated that they did not have much choice about losing land when faced with widening. Business managers did not feel that they could reason with TxDOT. One said that TxDOT will pay to put up a farm fence taken by construction, but will not pay to replace parking.

One business manager said that TxDOT seemed to have a calloused attitude towards business managers. Another thought that TxDOT was insensitive to businesses because the work was done so poorly from one side of the 'Y' to the other.

Other business managers were more pleased with TxDOT. Four business managers said that TxDOT personnel came to inform them of when work would start. One business manager added that the TxDOT personnel were very nice and helpful. They would answer questions and solve problems as quickly as they could. Business managers mentioned Chester Price and Pat Williams specifically. Two business

managers mentioned that both men were constantly going up and down the road checking on everybody, although one business manager was not sure why TxDOT personnel drove up and down the road all the time. One said that they were always with the contractor, willing to help and follow through if they could. Another noted that they seemed to keep things moving on schedule.

Some business managers were glad that Caldwell was not bypassed. One business manager felt that most S.H. 21 businesses would have shut down if Caldwell had been bypassed. He also noted that the underpass does not flood anymore.

Others said that TxDOT did the best they could. One business manager said TxDOT was good considering how people work/do not work these days. One said that in the field office, they seemed to do what they were supposed to do. The home office might have been holding them back.

SUMMARY

In general, business managers were more pleased with TxDOT personnel than with the contractor. Opinions of the contractor were distributed between very good and very poor, while almost half of the business managers thought TxDOT did a very good or good job.

Major problems with the contractor related to construction delays, employee attitude, employee performance, and communication with business managers. Positive aspects included considerate relationship with business managers, steady work once work was started, and good curbs and gutters from the concrete people.

Major problems with TxDOT included dislike of the construction plan, of the safety of the plan, and of communication with business managers. Positive aspects were that the personnel were nice and helpful, and they kept construction moving on schedule.

CONCLUSIONS

The following conclusions are based on the findings of this study. They are not the only conclusions that might be supported by the findings, but seem to be the most meaningfully supported.

1. Although no right-of-way is purchased, the use of all of the existing right-of-way can cause abutting businesses to lose parking spaces. Caldwell businesses lost 7% of their parking spaces.
2. Businesses were affected more negatively during construction than after construction. Reported business sales increased after construction, while they decreased during construction. During construction, business managers were more optimistic about their change in sales than their sales figures indicated they should be.
3. Managers' opinions about changes in their number of parking spaces, full-time employees, and part-time employees agreed with the numbers they reported before, during, and after construction at least 67% of the time.
4. Property abutting the construction area has been selling for more than it did before or during construction despite the age of the improvements. Land values apparently have not experienced even a short-run negative effect from the widening of S.H. 21.
5. Motorists using the widened facility will benefit greatly. Travel time and accidents have declined 12% and 54%, respectively, since the construction was completed. The negative user costs generated during construction were more than offset by the benefits, as calculated using the MicroBENCOST benefit-cost model. The S.H. 21 project yielded a benefit-cost ratio of 1.54.
6. Residents are not pleased with the increased travel speed. Some business managers think that the traffic flows too fast for people to consider stopping and shopping.
7. The construction period produced a negative impact on some businesses and tax revenues, but these negative effects were offset by construction expenditures in the Caldwell area. Business customers and motorists will greatly benefit from the widened facility in the years to come. Therefore, it has and will continue to produce a positive effect on the economy of the Caldwell area.
8. The overall economic impact of the S.H. 21 widening project in Caldwell, Texas, has been positive on business activity and property values after construction was completed and is expected to accelerate in the future.

REFERENCES

1. Buffington, J.L. and M.T. Wildenthal. *Estimated Economic Impact of Widening U.S. Highway 80 (Marshall Avenue) in Longview, Texas*. Research Report TX-92/968-1F, Texas Transportation Institute, The Texas A&M University System, College Station, Texas, November 1992.

APPENDIX A

Business Survey During Construction

Date _____

Texas Transportation Institute
 Texas A & M University System
 College Station, Texas 77843-3135

CONFIDENTIAL
 Code No. _____

STATE HIGHWAY 21 WIDENING BUSINESS IMPACT SURVEY

Caldwell, Texas

Purpose of Survey

The Texas Transportation Institute is studying the economic impact of widening State Highway 21 through the city of Caldwell for the Texas Department of Transportation (TxDOT). TxDOT needs the findings of an impartial study to help it in planning highway widening projects to maximize positive impacts and minimize negative impacts during and after construction, especially on abutting businesses. ALL ANSWERS TO THE FOLLOWING QUESTIONS WILL BE HELD CONFIDENTIAL. Your name or the name of your business will not be used in any way that would identify you.

Highway Widening Impact on Your Business During Construction

1. There are several ways that widening of State Highway 21 could have affected your business DURING the construction period. How do you think the construction activities impacted the following things? (Please give your best estimate of the percentage impact, up or down, on your business!)

Possible Effects	Up 50% to 100%	Up 25% to 50%	Up 10% to 25%	Up 5% to 10%	Up 0% to 5%	No ch	Dwn less th 5%	Dwn 5% to 10%	Dwn 10% to 25%	Dwn 25% to 50%	Dwn more th 50%
1. Number of usable parking spaces?											
2. Number of customers per day?											
3. Number of full-time employees?											
4. Number of part-time employees?											
5. Gross sales?											
6. Net profit?											
7. Property values?											
8. Noise level?											
9. Air pollution level?											
10. Other effects (state)? _____											

2. There are several ways that widening State Highway 21 could have affected the people, businesses and travelers in the city of Caldwell DURING the construction period. How do you think the construction activities impacted the following things? (Please give your best estimate of the percentage impact, up or down, on the city of Caldwell!)

Possible Effects	Up 50% to 100%	Up 25% to 50%	Up 10% to 25%	Up 5% to 10%	Up 0% to 5%	No ch	Dwn less th 5%	Dwn 5% to 10%	Dwn 10% to 25%	Dwn 25% to 50%	Dwn more th 50%
1. The time it takes to travel through Caldwell?											
2. Number of accidents on Highway 21?											
3. Traffic volumes on Highway 21?											
4. Employment in other parts of Caldwell?											
5. Gross sales volumes for all businesses on Highway 21?											
6. Gross sales volumes for all other businesses in Caldwell?											
7. Property values on Highway 21?											
8. Property values for all properties in Caldwell?											
9. Noise level on Highway 21?											
10. Air pollution level on Highway 21?											
11. General appearance of the roadside and area near Highway 21?											
12. Other effects (state)? _____ _____											

Evaluation of Performance of Contractor and TxDOT Personnel

1. How would you rate the overall performance of the Highway 21 project contractor? (Please check one below.)

Very good__ Good__ Fair__ Poor__ Very poor__ Don't know__

Comments_____

2. How would you rate the overall performance of the TxDOT personnel supervising the Highway 21 project? (Please check one below.)

Very good__ Good__ Fair__ Poor__ Very poor__ Don't know__

Comments_____

Other comments about widening State Highway 21 through the city of Caldwell?_____

Basic Information About Your Business

To help us to properly analyze the answers given by all the Highway 21 businesses, would you furnish the following information about your business?

1. What type is your business?

Retail sales__ Retail service__ Professional service__ Other (Please describe.)__

2. When did you start your business at this location?

Month__ Year__

3. Do you own or lease this building?

Own__ Lease__

4. About how old is this building?

Number of years__ Don't know__

5. How many parking spaces did you have for your customers before (1990) and during (1991-1992) the highway widening?
 Number before _____ Number after _____
6. How many of your parking spaces were occupied by customers during the busiest hour of an average day before (1990) and during (1991-1992) the highway widening?
 Number before _____ Number after _____
7. What percent of your customers were from out-of-town before (1990) and during (1991-1992) the highway widening?
 Percent before _____ Percent during _____
8. How many people were employed by your business at this location before (1990) and during (1991-1992) the highway widening? (Please give the average annual number, including working owner and/or manager.)

	<u>1990</u>	<u>1991-1992</u>
Full-time	_____	_____
Part-time	_____	_____

9. What was the annual gross sales volume of this business at this location in 1990 before the highway widening and in 1991-1992 during the widening?

	<u>1990</u>	<u>1991-1992</u>
Gross Sales Volume (annual)	\$ _____	\$ _____

AND/OR check proper category as follows:

	<u>1990</u>	<u>1991-1992</u>
Less than \$100,000	_____	_____
\$100,000 to \$500,000	_____	_____
\$500,000 to \$1,000,000	_____	_____
More than \$1,000,000.	_____	_____

APPENDIX B
Business Survey After Construction

Date _____

Texas Transportation Institute
 Texas A & M University System
 College Station, Texas 77843-3135

CONFIDENTIAL
 Code No. _____

STATE HIGHWAY 21 WIDENING BUSINESS IMPACT SURVEY

Caldwell, Texas

Purpose of Survey

The Texas Transportation Institute is studying the economic impact of widening State Highway 21 through the city of Caldwell for the Texas Department of Transportation (TxDOT). TxDOT needs the findings of an impartial study to help it in planning highway widening projects to maximize positive impacts and minimize negative impacts during and after construction, especially on abutting businesses. **ALL ANSWERS TO THE FOLLOWING QUESTIONS WILL BE HELD CONFIDENTIAL.** Your name or the name of your business will not be used in any way that would identify you.

Highway Widening Impact on Your Business After Construction

1. There are several ways that widening of State Highway 21 could have affected your business AFTER the construction period. How do you think the widened highway has impacted the following things? (Please give your best estimate of the percentage impact, up or down, on your business!)

Possible Effects	Up 50% to 100%	Up 25% to 50%	Up 10% to 25%	Up 5% to 10%	Up 0% to 5%	No ch	Dwn less th 5%	Dwn 5% to 10%	Dwn 10% to 25%	Dwn 25% to 50%	Dwn more th 50%
1. Number of usable parking spaces?											
2. Number of customers per day?											
3. Number of full-time employees?											
4. Number of part-time employees?											
5. Gross sales?											
6. Net profit?											
7. Property values?											
8. Noise level?											
9. Air pollution level?											
10. Other effects (state)? _____											

2. There are several ways that widening State Highway 21 could have affected the people, businesses and travelers in the city of Caldwell AFTER the construction period. How do you think the widened highway has impacted the following things? (Please give your best estimate of the percentage impact, up or down, on the city of Caldwell!)

Possible Effects	Up 50% to 100%	Up 25% to 50%	Up 10% to 25%	Up 5% to 10%	Up 0% to 5%	No ch	Dwn less th 5%	Dwn 5% to 10%	Dwn 10% to 25%	Dwn 25% to 50%	Dwn more th 50%
1. The time it takes to travel through Caldwell?											
2. Number of accidents on Highway 21?											
3. Traffic volumes on Highway 21?											
4. Employment in other parts of Caldwell?											
5. Gross sales volumes for all businesses on Highway 21?											
6. Gross sales volumes for all other businesses in Caldwell?											
7. Property values on Highway 21?											
8. Property values for all properties in Caldwell?											
9. Noise level on Highway 21?											
10. Air pollution level on Highway 21?											
11. General appearance of the roadside and area near Highway 21?											
12. Other effects (state)? _____ _____											

Other comments about the effects of the widened State Highway 21 through the city of Caldwell?

Basic Information About Your Business

To help us to properly analyze the answers given by all the Highway 21 businesses, would you furnish the following information about your business?

1. What type is your business?
Retail sales___Retail service___Professional service___ Other (Please describe.)___
2. When did you start your business at this location?
Month___ Year___
3. Do you own or lease this building?
Own___ Lease___
4. About how old is this building?
Number of years___ Don't know___
5. How many parking spaces did you have for your customers before (1990) and after (after 1992)the highway widening?
Number before_____ Number after_____
6. How many of your parking spaces were occupied by customers during the busiest hour of an average day before (1990) and after (after 1992) the highway widening?
Number before_____ Number after_____
7. What percent of your customers were from out-of-town before (1990) and after (after 1992) the highway widening?
Percent before_____ Percent after_____

8. How many people were employed by your business at this location before (1990) and after (after 1992) the highway widening? (Please give the average annual number, including working owner and/or manager.)

	<u>1990</u>	<u>After 1992</u>
Full-time	—	—
Part-time	—	—

9. What was the annual gross sales volume of this business at this location in 1990 before the highway widening and after 1992, after the widening?

	<u>1990</u>	<u>After 1992</u>
Gross Sales Volume (annual)	\$ _____	\$ _____

AND/OR check proper category as follows:

	<u>1990</u>	<u>After 1992</u>
Less than \$100,000	—	—
\$100,000 to \$500,000	—	—
\$500,000 to \$1,000,000	—	—
More than \$1,000,000.	—	—

APPENDIX C
Residential Survey During Construction

Date_____

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STATE HIGHWAY 21 WIDENING IMPACT RESIDENTIAL SURVEY

Caldwell, Texas

Purpose of Survey

The Texas Transportation Institute is studying the economic impact of widening State Highway 21 through the city of Caldwell for the Texas Department of Transportation (TxDOT). TxDOT needs the findings of an impartial study to help it in planning highway widening projects to maximize positive impacts and minimize negative impacts during and after construction, especially on abutting businesses and residents. Please return this form to us as soon as possible. **ALL ANSWERS TO THE FOLLOWING QUESTIONS WILL BE HELD CONFIDENTIAL.** Your name and address will not be used in any way that would identify you.

1. What is your current address?

2. How long have you lived at this residence?

Months

Years

3. Do you own or rent this residence?

own _____

rent _____

4. What effects of the widening of Highway 21 have you and your family experienced and observed? (Please give your best estimate of the percentage impact, up or down, observed by you and your family.)

Possible Effects	Up 50% to 100%	Up 25% to 49%	Up 10% to 24%	Up 5% to 9%	Up 0% to 4%	No ch	Dwn less th 5%	Dwn 5% to 9%	Dwn 10% to 24%	Dwn 25% to 49%	Dwn more th 50%
1. Number of accidents?											
2. Traffic volume?											
3. Travel time to and from work?											
4. Travel time to buy gas/food?											
5. Desirability as a place to live?											
6. General appearance of area?											
7. Residential property values?											
8. Noise level?											
9. Air pollution level?											
10. Other effects (state)? _____ _____											

5. Other comments: _____

