

# Restudy of Changes in Land Value, Land Use, and Business Activity Along a Section of Interstate Highway 35, Austin, Texas

by

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## **Acknowledgment**

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## Foreword

In November of 1957, the U. S. Bureau of Public Roads and the Texas Highway Department authorized the Texas Transportation Institute to conduct an economic impact study along sections of the Interstate Highway System in Texas. This authorization called for joint financial support by the Bureau of Public Roads and the Texas Highway Department.

This study was to include an analysis of the economic impact on local areas of the Interstate Highway System. The specific objectives were to measure the changes in land value, land use, business activity, travel habits, and general community development that could be associated with this new highway facility.

At the time the study was authorized, very little of the Interstate System had been constructed within the state. There were, however, several sections of expressway-type roadway which had already been constructed and which, with minimum alterations, would meet the Interstate construction standards. It was decided to select three sections of expressway-type roadway which had been completed for a minimum of two years as the starting point for this study. This would allow a "before and after" study to be conducted within these areas while basic data were being accumulated from other sites.

With the advice of the Project Advisory Committee, three such sites were selected: one each in or near the cities of Austin and Temple, and one in Rockwall County. Field work was initiated immediately in order to establish base period land value, land use, and business activity information as soon as possible.

At the time the study was authorized, it was requested that a preliminary report of findings be submitted to the Bureau of Public Roads by July 1, 1958. These findings were to be used by the Department of Commerce in its report to Congress on nonvehicular benefits as required under Section 210 of the Highway Revenue Act of 1956.

In September, 1960, a complete report of findings for the Austin area was made to sponsors in the form of a bulletin entitled, "Changes in Land Value, Land Use, and Business Activity Along a Section of the Interstate Highway System in Austin, Texas," by C. V. Wootan and C. R. Haning.

At a later date the Project Advisory Committee requested that a restudy be made of the Austin area. This report presents the results of the restudy and includes much of the data contained in the previous reports.

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## Summary of Findings

This report shows the result of an analysis of land value, land use, business activity, and other data collected for a restudy of the Austin study area in a further effort to isolate and measure some of the economic effects that construction of Interstate Highway 35 has had on this area. This study is in a rural-urban fringe area where the new highway (IH 35) has been located in a new area paralleling old U. S. Highway 81 to the west by about a half mile. Generally speaking, the study area is about four miles from the central business district.

The study of four additional years (1958-61) of changes in the original study and control areas has augmented some of the conclusions drawn in the previous report which covered the period 1941-57. The major findings of this report are as follows:

1. Based on the number of land sales transactions (especially repeat sales of the same tract), the turnover of real estate was greater in the study area than in the control area.

2. Since its completion in 1953, the new highway has had a marked influence on unimproved land prices in the study area. Based on data not area weighted, the probable highway influence on adjusted land prices in the study area was \$856 per acre or 163 percent as reflected by a before and whole after construction period comparison. Actual dollar and percent changes were \$2,110 or 402 percent increase for the study area as opposed to a \$498 or 383 percent increase for the control area. Most of the study area increase occurred in the first after period (1958-61).

3. The new highway had a less pronounced influence on unimproved subdivided land than nonsubdivided land prices in the study area. Between the construction and whole after periods, the probable highway influence on actual land prices was \$.00836 per square foot or 22 percent. Most of the price increase for the study area occurred during the second after period (1958-61).

4. The new highway had more influence on land values in Section 2 (the area furthest from the central business district) than in Section 1. The probable highway influence on the price of unimproved acreage land in Section 2 was \$424 per acre or 235 percent greater than that of Section 1. To a lesser extent, the same distance relationship was true for unimproved subdivided land.

5. After the new highway was opened to traffic, the value of abutting acreage land increased rapidly and considerably more than nonabutting land values. It had about the same effect on the prices of abutting subdivided land as those of nonabutting subdivided land.

6. Both abutting and nonabutting land values in Section 2 increased more than in Section 1.

7. Changes in the use of land abutting or near the new highway have been extensive and have occurred at a fairly rapid rate since the completion of the facility. A

primarily agricultural area was converted into extensive urban and rural residential usage. There were only five subdivisions in the area by 1948 compared to 22 by 1961. None of the land was in commercial usage before the new highway was constructed. By 1961, 24 commercial businesses were located on land formerly in agricultural use, with 12 opening in each of the after periods. Nineteen of these firms are located on land that abut the new highway. In addition to these commercial businesses, there were three office buildings, three industrial businesses, one nursing home, and one retirement home located in the area near the new highway. Since 1961 several other businesses have located in the area.

8. Land value and land use comparisons showed that as land succeeded to higher uses in the study area, it increased in value accordingly. Even the values of land lying idle increased at an increasing rate, with the largest gains occurring in the last study period after completion of the new highway.

9. The new highway stimulated new business activity along both routes. In 1961, there were 54 percent more businesses of all types located along both the old and new highways than in 1953. There were 21 percent more businesses on both routes in 1961 than in 1957. Most of these were retail businesses. After the new highway was constructed, eighty-six new businesses were established as opposed to 29 businesses which closed.

10. The new route reduced traffic volumes on the old route with a corresponding decrease in gross dollar sales of most traffic serving businesses. In some cases, individual losses were high; however, during the last period (1957-61), many of these businesses regained some of their gross sale losses of the first period. All old route businesses of the traffic serving type experienced a 1.7 percent increase in gross sales between 1957 and 1961.

11. Traffic serving businesses along the new route experienced a 90 percent increase in gross sales between 1957 and 1961. However, there were only seven new route businesses compared to 46 old route businesses. Therefore, dollar volume increases for both routes combined was 17 percent between 1957 and 1961, and 15 percent between 1953 and 1961.

12. Nontraffic serving businesses were generally helped by the removal of through traffic. Very few operators indicated that they lost business due to the new highway. The estimated gross sales of this group of study area businesses increased more than the average rate for the whole city of Austin between 1953 and 1961.

13. Changes in various economic indicators for the city of Austin suggest that this city has fared quite well economically between 1953 and 1961, and that its future economic growth (especially within the study area) looks bright.

# Introduction

Austin, with a population of approximately 192,500 in 1961, is the capitol of Texas and one of several sites selected in 1957 to be included as a part of the economic impact study of the Interstate Highway System. The original Austin study covering the period 1941-1957 was published in 1960 as TTI Bulletin 13. This report is a restudy of the same area to reflect a longer period in which this city has been exposed to one of the interstate highways.

The city of Austin has a diversified economy based on State Government payrolls, educational and eleemosynary institutions, a military establishment, industry, agriculture, and tourist trade. Its economy has shown a stable pattern of growth through the last two decades, as will be discussed in more detail in a later section.

Austin is serviced by three Federal Highways, one of which is a part of the Interstate System, and one State Highway. U. S. Highway 290, carrying traffic between Houston and El Paso, traverses the city from east to west. U. S. Highway 183, extending from Refugio near the coast through western Oklahoma, passes through the city north and south. U. S. Highway 79 comes from Shreveport, Louisiana, and joins with Interstate Highway 35 about 25 miles north of Austin. Interstate Highway 35 is a major traffic artery between Laredo on the Mexican border and Gainesville in the north, leading to Oklahoma City. It also serves San Antonio to the south and Fort Worth and Dallas to the north. State Highway 71, extending from near Palacios on the Gulf coast to Llano, Texas, traverses Austin in a southeasterly-northwesterly direction.

## *Study Area*

The Austin study area is located on the north side of the city and involves parts of both old U. S. Highway 81 and the new Interstate Highway 35, depending on the study objective under consideration. In the analysis of business activity, sections of both the old and new highway are considered as part of the study area; however, land value and land use analyses are concerned only with the new route.

This area was selected as one of the original three study areas. The new highway route is located on a new location paralleling the old route and is as much as one and one-half miles east of the latter in places. (See Figure 1.) Many businesses on the old route leading to Austin's central business district were bypassed by the new route. Also, this area was considered a rural-urban fringe area, with less than half the area within the city limits.

The business study area consists of a nine mile strip of old U. S. Highway 81 (North Lamar Blvd.), and an eight-mile strip of new Interstate Highway 35, with the most northerly point of each being the intersection of the new and old routes.

The land value and land use study area is located along a five-mile section of the new route, beginning at the intersection with U. S. Highway 290 and extending north to Walnut Creek. The area included averages

slightly over one mile in width, with the new route passing through approximately the middle of the strip. The exact outer boundaries were determined by existing roads, property lines, and the proximity to the old route. A total of approximately 3,250 acres of land is included in this area.

The portion of the new route under study was not originally constructed as a part of the Interstate Highway System. This section was planned and constructed as a relocated four-lane divided expressway-type highway, designed to facilitate the movement of north-south traffic into and through the city. Purchases of the rights of way for the new facility were begun in late 1948 and were largely completed in 1951. The city of Austin furnished all rights of way within the city limits, and Travis County furnished them outside the city. The 300-foot minimum width right of way was acquired at an estimated cost of about \$500,000 for the five-mile section included in this study.

Construction was begun in late 1951, and the entire section was officially completed in June, 1954. The completed facility consists of four traffic lanes divided by a median strip, with two-lane frontages roads along either side. Since several crossovers and at-grade crossing were still in use at the end of the study period, full control of access to meet Interstate standards has not yet been achieved.

## *Control Area*

To isolate the influence of the new highway on land values in the study area, a control area was selected for comparison of land value changes during the same time period. Ideally, a control area should have the same characteristics as the study area, except for the one variable being measured — location of a new interstate highway in the study area. Then the differences in the land price movements between the two areas could be considered to reflect the net influence of the facility on land values. The selection of a perfect control area is an impossibility under actual conditions; however, a concerted attempt was made to find a control area with the same general characteristics of land ownership, use, quality, and accessibility as the study area. To accomplish this, several areas were selected near Austin, but farther away than the study area (See Figure 1). The undeveloped land was quite similar in most respects to that in the study area during the base period (before purchase of rights of way and construction of the new facility). Since the control area land was somewhat further removed from the city than the study area, it was lower in base value than that of the study area.

Due to the method in which land transactions are recorded by abstract companies, whole land surveys were selected as the acreage control area. By using such records, it was possible to obtain all the property transactions within a given survey for a number of years without tracing individual land owners through the county deed books, a rather time consuming and costly procedure. Thus, six different land surveys were selected to serve as a control area for undeveloped land. These

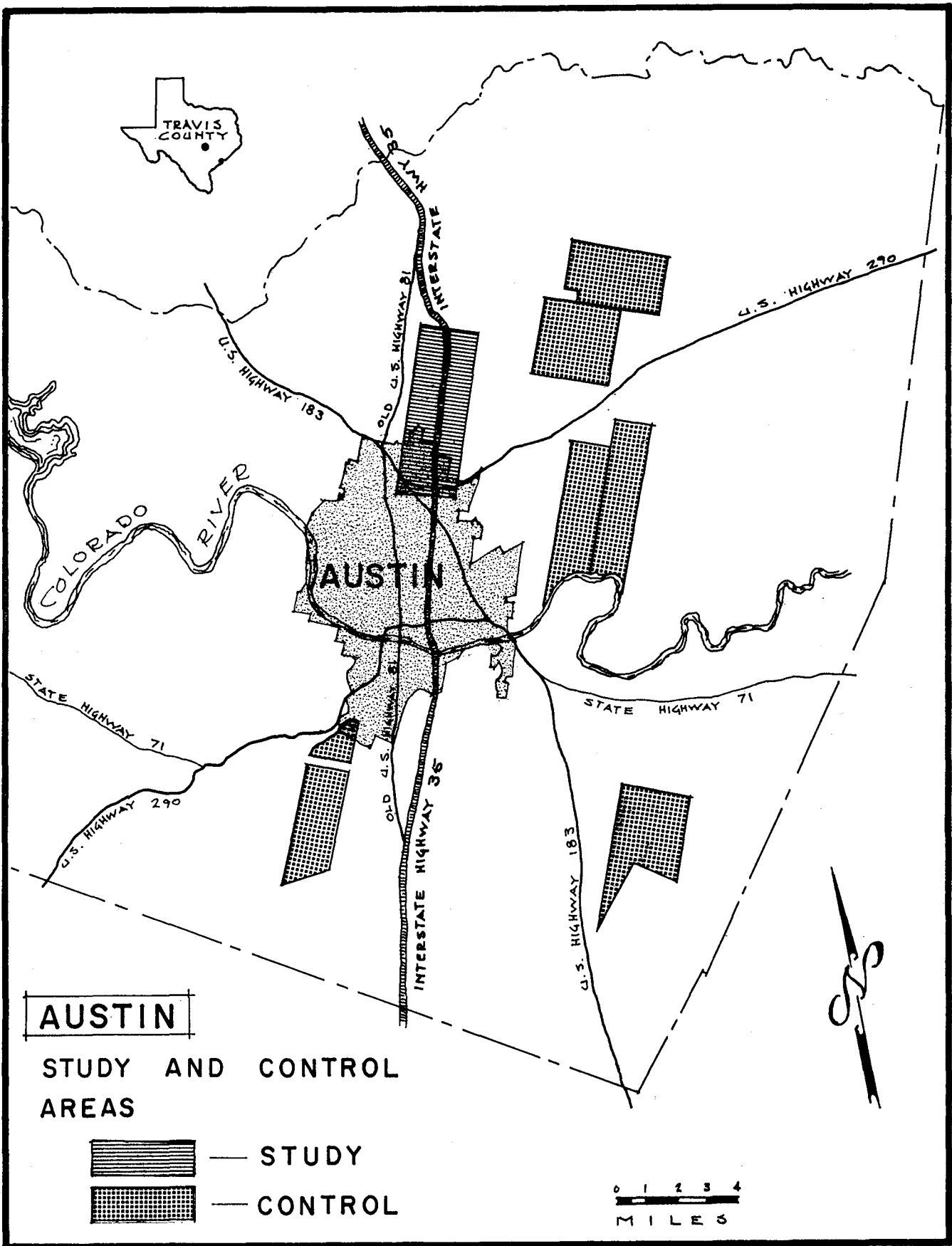


Figure 1.



were the Mariguita Castro, William Caldwell, James Burleson, Phillip McElroy, William Lewis, Sr., and Theodore Bissel surveys. The surveys were each approximately one Spanish League in size and collectively included over 27,000 acres of land.

In an effort to analyze the new facility's influence, if any, on land values of subdivided land in the study area, several control subdivisions possessing the general characteristics of the study area subdivisions were selected in or near the city. Theoretically, each control subdivision should have the same dates of dedication, type of improvements, restrictions, lot sizes, distance from town, proximity to major traffic arteries, etc., as one in the study area. The control subdivisions finally selected failed to meet all the above requirements, but were considered to be the best representation available within the Austin area.

All of the control subdivisions are located on the south side of Austin in the urban-rural fringe area. Some of them are within the city limits, while others are outside — the same distribution as in the study area.

No individual businesses were selected to help measure the new highway's impact on old route businesses in the business study area. However, secondary data representing all the retail businesses in the city were used as a control. Changes in business activity by study area firms were related directly to business activity within the entire city.

### ***Methods Used***

The same methods and procedures used in the collection of field data for the original Austin study were followed closely for this study. They are set forth in the appendix of this report. The same general methodology was followed in the collection of field data for the other study areas in the over-all analysis of the economic impact of the Interstate System on local areas.

Briefly, land sales data were obtained from the files of an abstract company and the County Clerk and Tax Assessor-Collector. Land use changes were determined by field inspections and from area photographs obtained from the U. S. Department of Agriculture. Personal interviews were used to collect pertinent economic data from merchants who had businesses located along old U. S. 81 and the new highway. Other economic data were collected from city and county officials, Texas Al-

manac, Sales Management Magazine, and other secondary sources.

The treatment of data prior to analysis involved punching the usable land value, land use, and retail business information onto IBM cards. The A&M University Data Processing Center was used to make all necessary calculations for the tables that appear in this report. Appropriate tests of significances were made on these data to augment the basic analysis. (See the appendix for further details.) Consideration was given in the land value analysis of repeat sales of identical properties in this report. Also, some land value tabulations have been presented regarding acreage size groups.

All of the analyses were done on a before and after construction period basis. Then study area data were compared to that of the control area.

### ***Definition of Terms***

So far as this report is concerned, the terms listed below will carry the following definitions:

1. Before and after — a technique used for comparative purposes to measure changes in land values, land uses, gross dollar sales, etc. One time period is designated as the before period and another the after period. For analysis purposes the after period has been divided into two periods.

2. Area weighted—a figure derived by summing all purchase prices for a particular number of land sales and dividing by the sum of all acres represented by those sales. The resultant average price is fully influenced by the area involved.

3. Figure not area weighted — a figure derived by summing the price per acre paid for individual land sales transactions and dividing by the total number of sales transactions represented by those sales.

4. Adjusted land values — values which are deflated to a common dollar basis by using the consumer's price index. (See explanation and schedule in the appendix.)

5. Abutting and nonabutting land — refers only to land in the study area with the abutting land being that having frontage on the new I. H. 35 and nonabutting land being all other land in the study area.

Repeat sale combination — two sales of the same property where no change in land use or improvements occurred between sales.

# Changes In Land Value

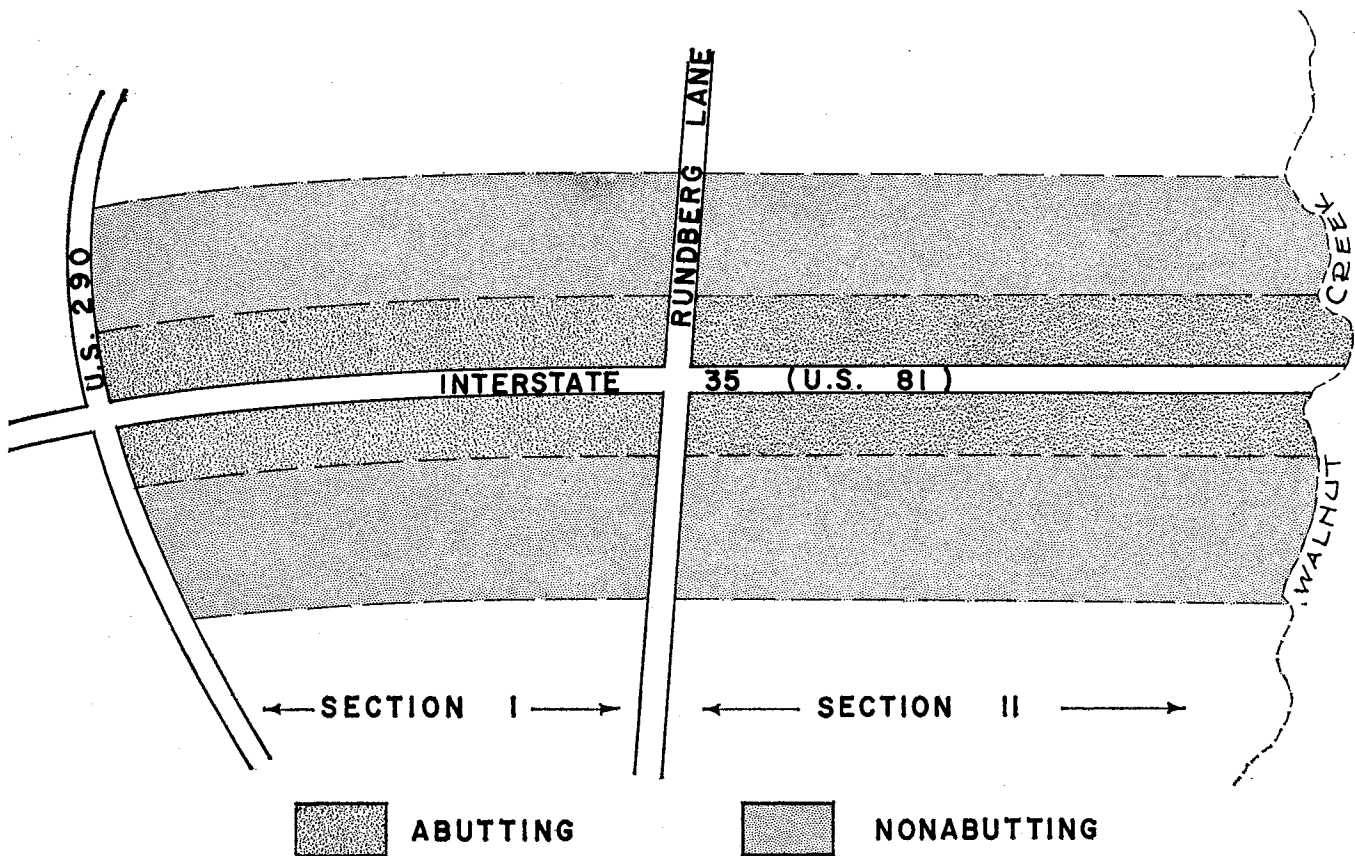
Measurements of changes in land value cover 21 years; eight before construction, five during construction, and eight after construction. The before construction (base) period covers the years 1941-48 inclusive. The construction period covers the years 1949-53, and the after period covers 1954-61. The after period is further divided into two periods, with the first four years being designated the first after period and the last four years the second after period. (See the appendix for additional details about time periods.)

The primary land value analysis was based on the above time periods with acreage sales kept separate from subdivision sales. Sales prices are considered the best measure of land values. Within the framework of these time periods, additional analyses were then made of study area sales based on several interior classifications. First, the sales were divided on a sectional basis to relate the changes in land value to the proximity of Austin's central business district. (See Figure 2 for a view of the major divisions of the study area.) Second, the sales were divided on an abutting and nonabutting basis to relate changes in land value to proximity of the new facility. Third, a comparison was made of the changes in the value of abutting and nonabutting land in Section

1 versus Section 2. Fourth, study and control area land sales were divided into four acreage size groups to relate changes in land value to size of property sold in each area. Fifth, and finally, land sales in the study and control areas were separated on the basis of the number of times individual properties sold in order to isolate changes in land value as affected by the frequency of repeat sales.

All sales involving improvements of any consequence were separated and left out of the primary analyses except in the case of some large acreage tracts where improvements were a minor part of the total property value, such as farm houses and barns. The bias induced in such cases was not considered to be great enough to warrant an investigation of all the transactions involved.

Finally, the land value analysis is based primarily on adjusted land values where all prices are deflated to a common dollar base. This adjustment has the effect of maintaining a uniform pricing base throughout the large number of years covered. The weight used was the Consumer Price Index of the United States. (See the appendix for schedule.)



**MAJOR DIVISIONS OF STUDY AREA**

Figure 2.

**Table 1**  
**NUMBER OF LAND SALES TRANSACTIONS USED IN THE ANALYSIS OF LAND VALUES IN THE AUSTIN STUDY AND CONTROL AREAS, 1941-61**

Item	Number of Sales Transactions				Grand Total
	Unimproved		Improved		
	Acreage	Subdivided	Acreage	Subdivided	
<b>Study Area, Section I</b>					
Before Period (1941-48)	64	266	10	38	378
Construction Period (1949-53)	27	112	9	64	212
First After Period (1954-57)	25	96	4	69	194
Second After Period (1958-61)	17	91	2	269	379
Subtotal	133	565	25	440	1163
<b>Study Area, Section II</b>					
Before Period (1941-48)	32		3		35
Construction Period (1949-53)	15	48	3		66
First After Period (1954-57)	39	313	4	149	505
Second After Period (1958-61)	16	262	6	259	543
Subtotal	102	623	16	408	1149
<b>Total Study Area Sales</b>	<b>235</b>	<b>1188</b>	<b>41</b>	<b>848</b>	<b>2312</b>
<b>Control Area</b>					
Before Period (1941-48)	152	3			155
Construction Period (1949-53)	139	84	2	1	226
First After Period (1954-57)	81	166	9	74	330
Second After Period (1958-61)	96	78	28	167	369
<b>Total Control Area Sales</b>	<b>468</b>	<b>331</b>	<b>39</b>	<b>242</b>	<b>1080</b>
<b>Total Sales Analyzed</b>	<b>703</b>	<b>1519</b>	<b>80</b>	<b>1090</b>	<b>3392</b>

***Volume of Land Sales in Study and Control Areas***

A total of 3,392 usable land sales transactions were recorded in the study and control areas, 2,312 in the study area, and 1,080 in the control area (See Table 1). In the study area, 276 of the sales were acreage tracts, and 2,036 were subdivided lots. In the control area, 507 were acreage tracts, and 573 were subdivided lots. Fig-

ure 3 shows a three-year moving average of the number of acreage land sales which occurred in the study and control areas. It was assumed that the number of sales not usable (no consideration, love and affection, etc.) were about the same for both areas. It is evident that the number of study area sales fluctuated considerably more than in the control area. It appears that the volume of land sales in the study area experienced two cycles, the first brought on by World War II and the

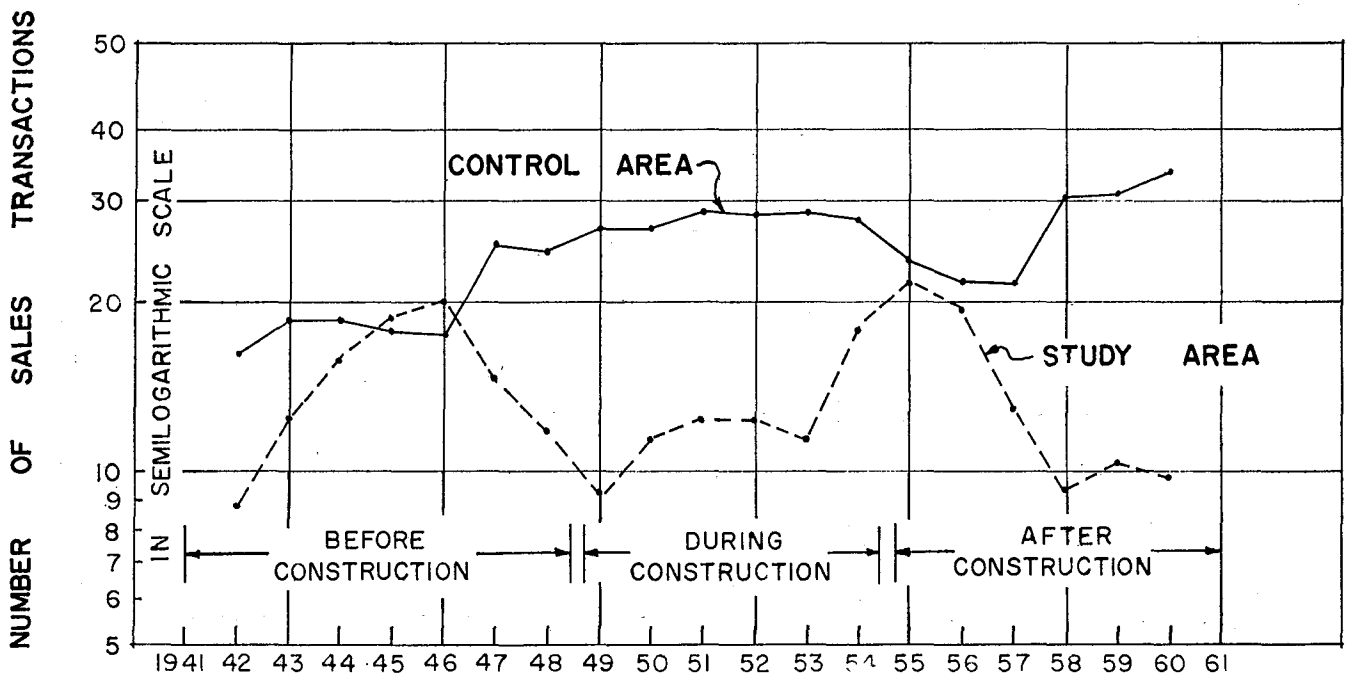


Figure 3. A three-year moving average of the number of acreage land transactions in study and control areas, 1941-1961.

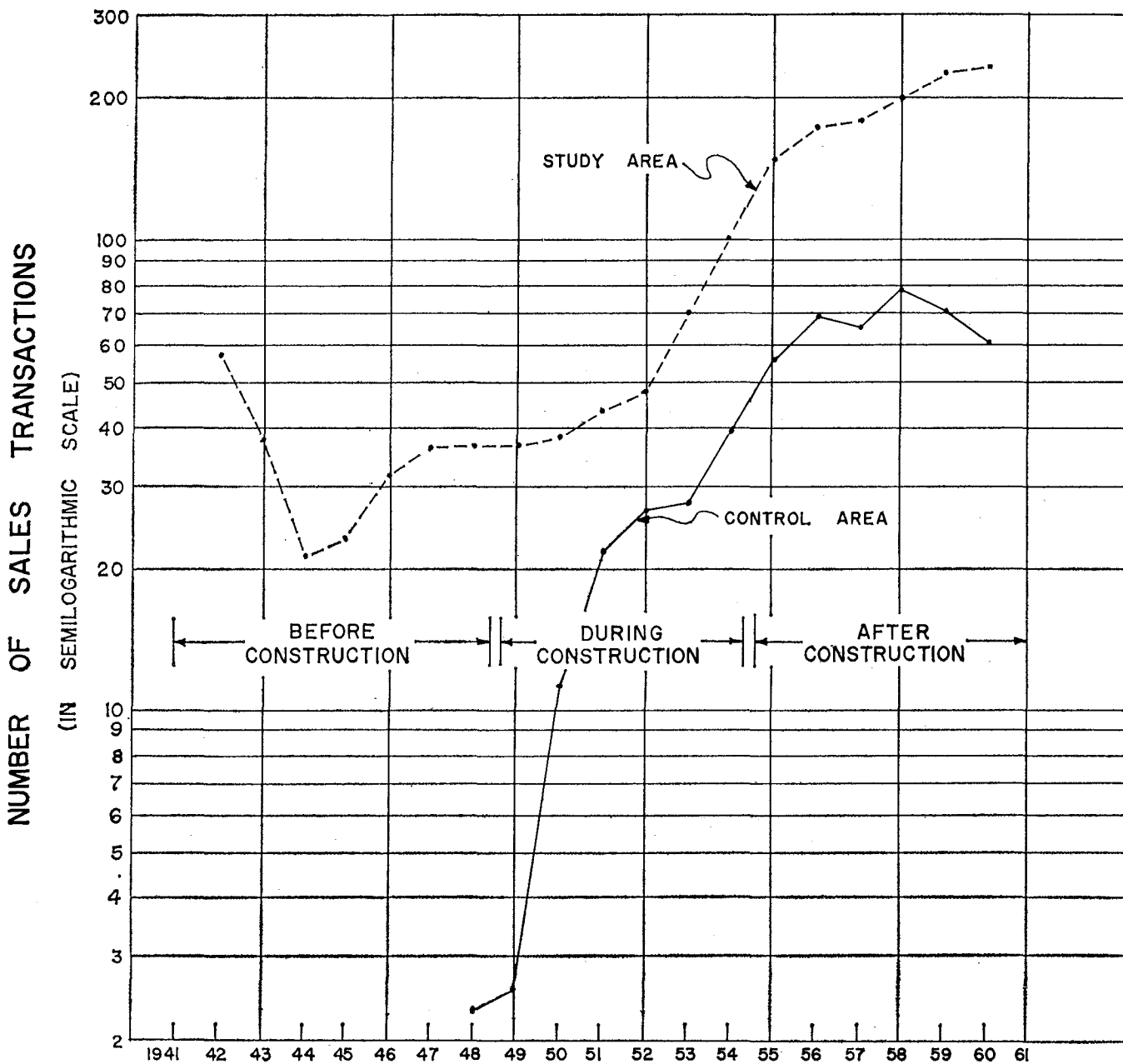


Figure 4. A three-year moving average of the number of subdivided land transactions in study and control areas, 1941-1961.

second by the construction and completion of the new highway. During the whole period, and especially in the last half, many undeveloped acreage tracts were subdivided in the study area and taken out of the supply. Yet, the volume of sales at the end of the period was still about 12 percent above the beginning of the period. On the other hand, the number of control area sales showed little annual fluctuation and increased rather steadily through the period. The total increase between 1941 and 1961 was nearly 100 percent.

Figure 4 shows a three-year moving average of the number of subdivided lot sales occurring in both the study and control areas. Except for four early years, the number of study area sales increased rather steadily through the period. A significant drop in sales occurred during the first part of World War II when only one new subdivision was dedicated. Between 1944 and 1952,

five more new subdivisions were dedicated but sales failed to increase much during four of these years. After 1952, 19 new subdivisions were dedicated and the selling rate increased measurably. Much of the increase in volume of lot sales which occurred after 1952 can be attributed to the opening of the new facility in late 1953.

Due to the fact that none of the selected control area subdivisions were dedicated prior to 1946, no sales are shown on Figure 4 for the years before 1947. In the period 1948 through 1952, the volume of control area sales climbed sharply and rather steadily. From 1952 to 1956, control sales increased at about the same rate as in the study area. During the next five years, however, the volume of sales moved irregularly downward.

As Table 1 shows, only 848 or 37 percent of 2,312 study area subdivision sales and 242 or 22 percent of the

**Table 2**  
**SUMMARY DATA OF LAND SALES TRANSACTIONS**  
**OCCURRING IN THE STUDY AND CONTROL AREAS**  
**FOR THE 1941-61 PERIOD**

Item	Amounts	
	Study Area	Control Area
	Number	Number
Number of Sales Recorded	2,312	1,080
Acreage Land	276	507
Subdivided Land	2,036	573
Total Area Sold (In Acres)	4,100	32,909
Acreage Land (In Acres)	3,403	32,654
Number of Acres Per Sale	12.3	64.4
Subdivided Land (In Sq. Ft.)	30,376,551	11,127,706
Number of Sq. Ft. Per Sale	14,927	19,420
Number of Repeat Sales Transactions <sup>1</sup>	940	275
	Dollars	Dollars
Total Price Paid, All Transactions <sup>2</sup>	\$1,265,617	\$574,710
Acreage Land	\$ 496,113	\$312,999
Subdivided Land	\$ 769,504	\$261,711
Average Price Paid Per Sale	\$ 548	\$ 532
Acreage Land	\$ 1,796	\$ 617
Subdivided Land	\$ 378	\$ 457

<sup>1</sup>Does not include those repeat transactions of the same property where improvements were added or removed between the two sales.

<sup>2</sup>Actual price paid.

1,080 control area sales were improved with buildings. Since there were so few improved acreage or lot sales in both areas, especially during the before period, very little of the analysis could be based on the price changes of improved properties.

The number of sales in Section 1 and 2 of the study area were remarkably even. However, Table 1 shows that most of the sales in Section 1 occurred during the first two periods and most of the Section 2 sales occurred during the last two periods, after the new highway was completed. Thus, it seems that the presence of the new facility stimulated more sales activity in Section 2 than in Section 1. A reason may be that the new highway removed the travel time differential between the two sections. With this difference in travel time virtually nullified, much of the underdeveloped land in Section 2 was more desirable for subdivision purposes than the remaining Section 1 land.

### ***Changes in Land Values in the Study and Control Areas***

Summary data of land sales occurring in the study and control areas are presented in Table 2. It is of interest to note that the number of acres per sale of acreage land in the study was 12.3 compared to 64.4 in the control area. This indicates that numerous small tracts in the study area were sold for uses other than agricultural. Of course, in the before period, the average size tract sold was considerably larger than the average for the whole study period, indicating that fewer tracts were selling for more intensive uses in the before period than in the after period. The average size subdivided lot sold in the study area was 14,927 sq. ft. compared to 19,420 sq. ft. in the control area, the relative difference being much smaller than in the case of acreage tracts.

Although the average size per sale of the study area acreage tracts is small in comparison with that of the control area, the average price paid per sale for study area acreage was \$1,796 compared to only \$617 for the control area. This is almost three times the control area price, of which very little of the difference could be attributed to size variation between the areas. For subdivided tracts, the average price paid was slightly lower in the study area than in the control area.

As Table 2 shows, the proportion of repeat sales in the study area was almost double that of the control area. This indicates that the new facility has stimulated a much more rapid turnover of real estate in the study area than in the control area.

Figure 5 shows fluctuations in the average adjusted price per acre of unimproved land in the study and control areas. The three-year moving average indicates that land prices in the study area moved upwards at a faster rate than in the control area through most of the period. Two periods reflect a particularly high rate of upward movement in the study area. The first period, 1943-47, was during World War II and two years immediately afterward. During these years, land values increased almost 500 percent in the study area compared to 68 percent in the control area. The second period, 1952-58, began just before the completion of the new highway and extended for five years afterward. Land values in the study area increased about 220 percent compared to about 80 percent in the control area. During the interim period, 1948-51, land values held steady in the study area compared to about a 20 percent increase in the control area. It seems that the new highway played a major role in setting off the second period land price increases.

The control area price increases were rather steady throughout the whole period, averaging about 34.6 percent per year as opposed to 87.6 percent per year increase for the study area. Land prices in both areas were fairly comparable sometime before World War II, but afterwards, study area prices began to increase more rapidly. The war and new highway may have been the major factors causing the wide divergence between the prices in the two areas.

Fluctuations in land values of unimproved subdivided lots in the study and control areas are shown in Figure 6. The three-year moving average shows that the prices of study area lots increased similarly to those of acreage land. Prices increased rapidly from 1942 through 1949, and then declined until 1953. From 1953 through 1961, the prices resumed their upward swing; this, of course, coincided with the opening of the new highway.

Since no subdivision sales were recorded in the control area between 1941 and 1947, only the price movements from 1948 through 1961 can be observed and compared with the study area. Control area prices were below those of the study area through the whole period. Between 1949 and 1952, control area prices declined fairly sharply, corresponding to a lesser decline in the study area. Then prices took a decided upturn and did not level off again until 1958. Over-all, the study area lot prices increased considerably more during the period 1948-60 than those of the control area. Prices in the study area increased 263 percent more than prices in the control.

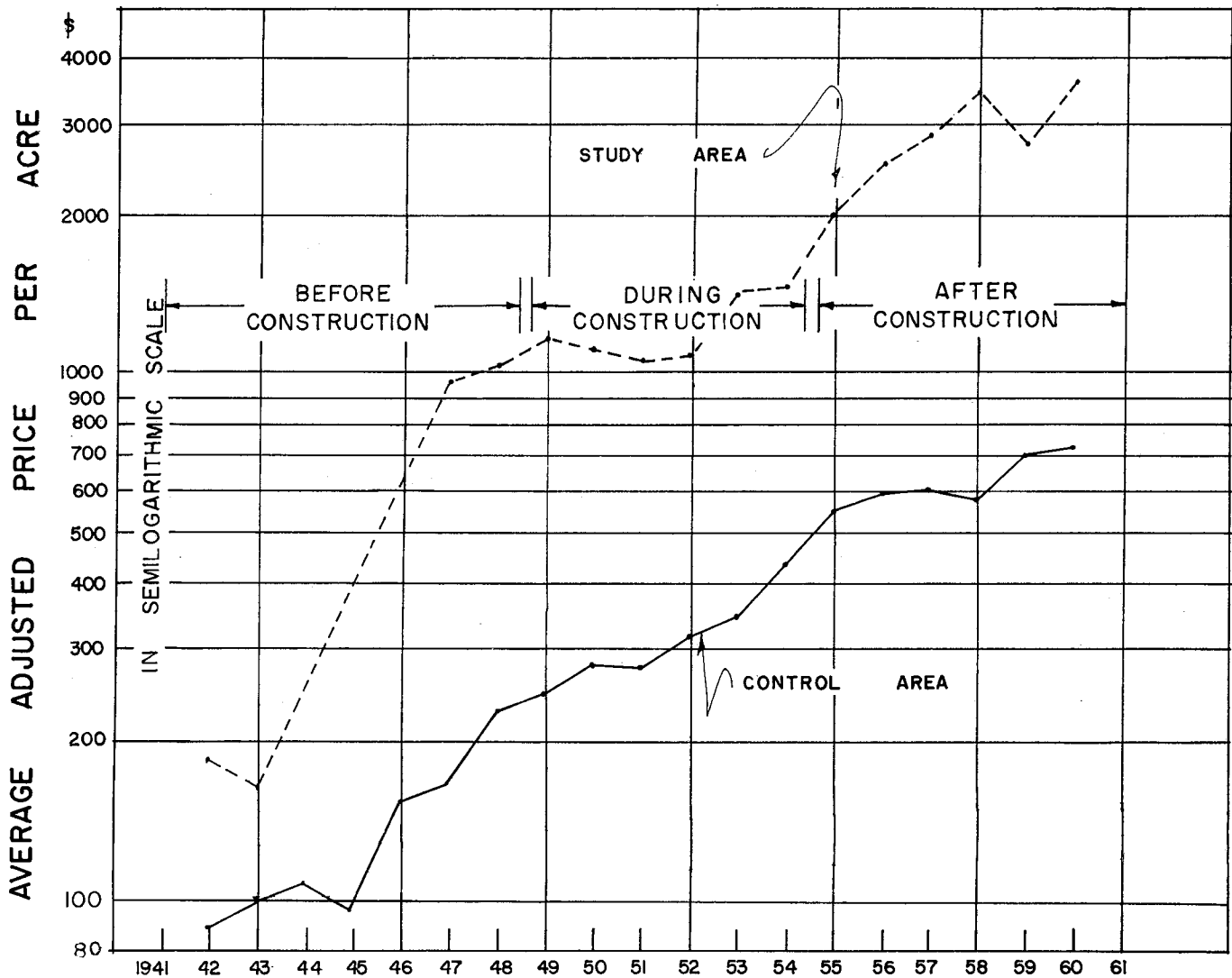


Figure 5. A three-year moving average of the average adjusted price per acre of unimproved acreage land in the study and control areas, 1941-1961.

### Changes in Land Value in the Study and Control Areas by Time Periods

Using the popular and realistic before and after technique as a method of determining the effect of the new highway on land values, the land sales data were divided into the time periods mentioned earlier. The periods are: Before Construction — 1941-48; During Construction — 1949-53; First After Period — 1954-57; and Second After Period — 1958-61. In addition, the whole after period, 1954-61, is often used in the analysis.

Due to the lack of sufficient numbers, improved sales in both the study or control areas were left out of the analyses which follow. A meaningful before and after analysis could not be made on such sales because of the few sales and the variation in the quality of the improvements in each area.

The acreage and subdivision sales are analyzed separately in the main body of the report, using tables which present adjusted average price per acre (not area weighted) comparisons between the respective study and control areas. To supplement this analysis, tables showing

actual average price per acre comparisons are presented in the appendix. Also, tables showing adjusted area weighted price per acre comparisons are presented in the appendix. In general, the data presented in these tables support the conclusions drawn from the tables in the text.

### Acreage Land

Table 3 shows the changes in the average adjusted price per acre of unimproved acreage tracts selling in the study and control areas. This table has data which are not area weighted; that is, with means derived from arrays of sale prices per acre.

The difference between the time period means of the study and control areas was tested for significance by using the appropriate T test for large and small samples. (See the appendix for formulas used.) Unfortunately, there is a significant difference between the average or mean prices of land during the before period. (See footnote 2.) This indicates that the two areas were not entirely comparable from a value standpoint during the base period. With the lack of complete com-

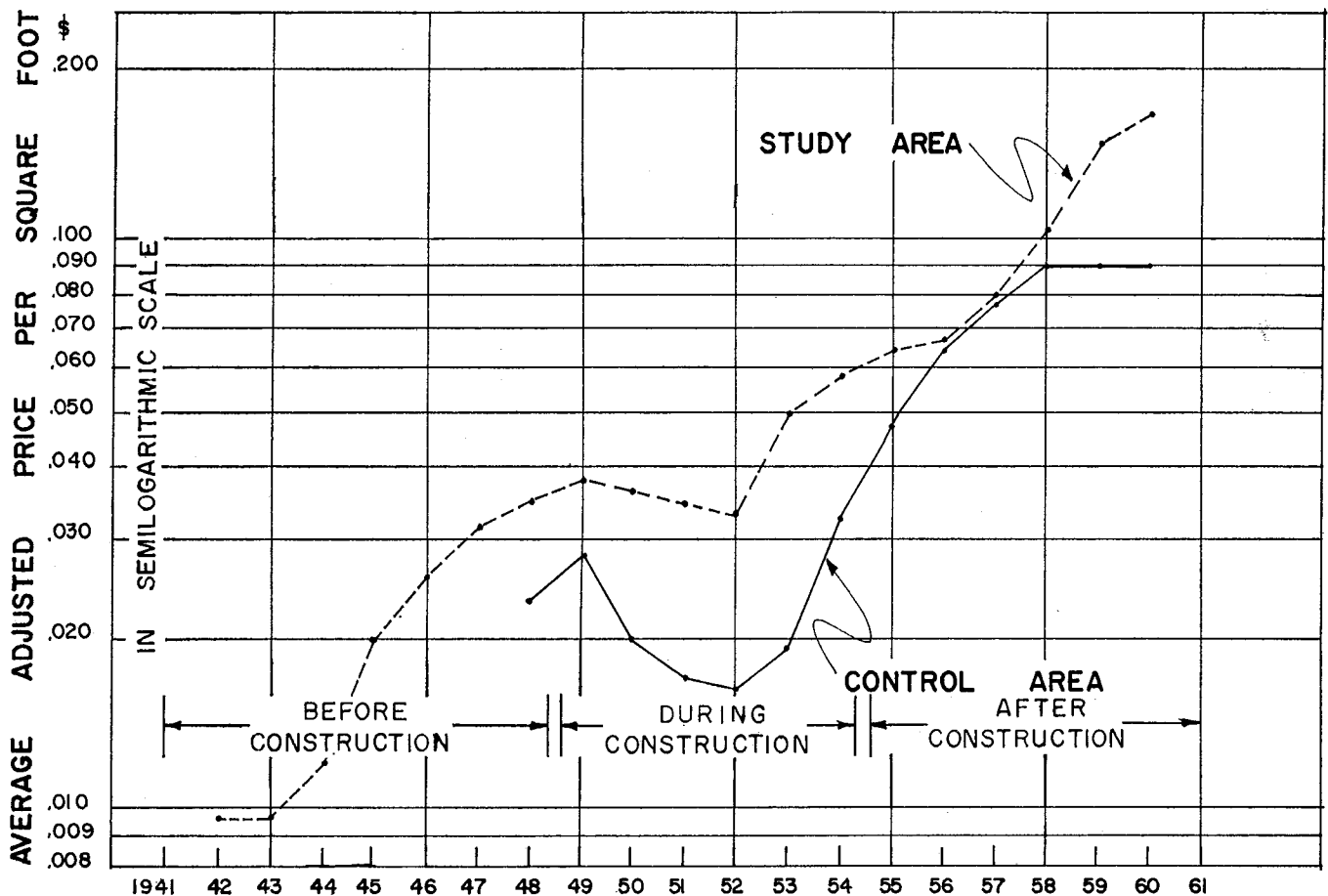


Figure 6. A three-year moving average of the average adjusted price per square foot of unimproved subdivided land in the study and control areas, 1941-1961.

parability, the exact amount of highway influence on land values in the study area is more difficult to accurately determine than if the two areas could be shown to have belonged to a homogeneous universe. However, by using a combination of two measurements explained in the footnotes of Table 3, a fairly realistic answer can be obtained as to the probable highway influence on land values in the study area. For unimproved acreage, the probable highway influence was \$856 per acre or 163 percent. These figures were derived from comparing the before and total after mean dollar and percentage differences between areas. The same type of comparison will be made for other influences.

#### Subdivided Land

The shortage of before period control area sales somewhat limits the conclusions which can be drawn from the subdivision land value analysis. However, the sale prices presented give some indication of the trend in vacant lot values for each area. The construction period is used as a base with both areas showing a sufficient number of sales for comparison with the whole after period.

Table 4 shows that there is a significant difference between the study and control area construction period mean values, indicating the means lack the desired comparability for a base. But according to other measurements discussed earlier, the probable highway influence

was negative by \$.0045 per square foot or 13 percent. This simply means that the prices in the control area increased more percentage-wise versus dollar-wise between these periods than did those in the study area. However, it is reasonable to assume that if the before period figures could have been used there would have been a positive highway influence on this type of property within the study area.

#### Changes in Land Values in Sections 1 and 2 of Study Area

In an effort to determine if distance from the central business district had any influence on land values, the Austin study area was divided into the two sections mentioned earlier. (See Figure 2.) Rundberg Lane was considered the dividing line in separating the land sales according to section. Section 1 is nearest to the central business district, and a large portion lies within the city limits. None of Section 2 lies within the city limits.

Section 1 experienced a slightly higher rate of turnover of all land sales than Section 2. The rate of unimproved acreage sales was particularly high in this section prior to the completion of the facility. After the facility was completed, activity moved out further into Section 2, and during the final study period, the rate of sales was much greater in the more distant section.

Table 3

ADJUSTED LAND PRICES OF UNIMPROVED ACREAGE TRACTS IN THE STUDY AND CONTROL AREAS,  
AUSTIN, TEXAS  
IN CONSTANT DOLLARS (1947-49=100)

Item	Price Per Acre <sup>1</sup>		Difference Between Areas	Percent of Study Area Before Period Price
	Study Area	Control Area		
Before Period (1941-48)	\$ 525 (96)	\$130 (152)	\$ 395 <sup>2</sup>	
Construction Period (1949-53)	1,085 (42)	297 (139)	788	
First After Period (1954-57)	2,388 (64)	535 (81)	1,853	
Second After Period (1958-61)	3,114 (33)	707 (96)	2,407	
Whole After Period (1954-61)	2,635 (97)	628 (177)	2,007 <sup>3</sup>	
Increase Between Periods				
Before and Construction				
Dollars	\$ 560	\$167	\$ 393	75% <sup>4</sup>
Percent	107%	128%	-21% <sup>5</sup>	
Construction and Whole After				
Dollars	\$1,550	\$331	\$1,219	
Percent	143%	111%	32% <sup>5</sup>	
Before and Whole After				
Dollars	\$2,110	\$498	\$1,612	307% <sup>4</sup>
Percent	402%	383%	19% <sup>5</sup>	
Probable Highway Influence				
Percent <sup>6</sup>	163%			
Dollars <sup>7</sup>	\$ 856			

<sup>1</sup>Number of transactions is shown in parentheses.

<sup>2</sup>The standard error (S.E.) is \$90. This is significant at a confidence level of 99 percent. T is equal to 4.40.

<sup>3</sup>The S.E. is \$237. This is significant at a confidence level of 99 percent. T is equal to 8.47.

<sup>4</sup>One way of measuring the amount of highway influence is to assume that the study and control areas would have increased in value by the same dollar value in the absence of the new road improvement. That is, both would have increased in value by \$167, \$331, or \$498, depending on the periods compared. Following this assumption, if the control area had had a new highway, its gain would have been greater percentage-wise by this type of measurement than that of the study area due to a much lower control area before period price. But study area prices increased more than the above amounts, in fact \$393 more between the before and construction period. This value is 75 percent of the study area before period price.

<sup>5</sup>Another way of measuring the amount of highway influence is to assume that such percentage increases would have been the same in the absence of a new highway. That is, both would have increased in value by 128, 111, or 383 percent, depending on the periods compared. Dollar-wise, this would have resulted in a smaller increase for the control area than for the study area due to a much higher study area before period price. Using the control area between period percentage increases as bases, the study area percentage increases were minus 21 percent, plus 32 percent, and plus 19 percent.

<sup>6</sup>This measure of highway influence is the average of the above percentages, plus 307 percent (based on dollar increases) and plus 19 percent (based on percentage decreases or increases).

<sup>7</sup>This is the average (163) percentage increase due to the new highway times the before period study area price per acre. Using the above assumptions, this is a reasonable measure of highway influence.

Table 4

CHANGES IN ADJUSTED LAND PRICES OF UNIMPROVED SUBDIVISION LOTS IN THE STUDY AND CONTROL AREAS, AUSTIN, TEXAS  
IN CONSTANT DOLLARS (1947-49=100)

Item	Price Per Square Foot <sup>1</sup>		Difference Between Areas	Percent of Study Area Construction Period Price
	Study Area	Control Area		
Before Period (1941-48)	\$.0165 (266)	\$.0233 (3)	\$.0068	
Construction Period (1949-53)	.0348 (160)	.0173 (84)	.0175 <sup>2</sup>	
First After Period (1954-57)	.0629 (409)	.0550 (166)	.0079	
Second After Period (1958-61)	.1453 (353)	.0845 (78)	.0608	
Whole After Period (1954-61)	.1011 (762)	.0644 (244)	.0367 <sup>3</sup>	
Increase Between Periods				
Construction and Whole After				
Dollars	\$.0663	\$.0471	\$.0192	55% <sup>4</sup>
Percent	191%	272%	-81% <sup>5</sup>	
Probable Highway Influence				
Percent <sup>6</sup>	-13%			
Dollars <sup>7</sup>	-\$ .0045			

<sup>1</sup>Number of transactions are shown in parentheses.

<sup>2</sup>The S. E. is \$.00227. This is significant at a confidence level of 99 percent. T is equal to 7.71. The S.E. of the difference between the before period means is \$.00894. This is significant at a confidence level of 55 percent. t is equal to .761. Due to the small number of observations in the control area, the before period was not used for comparative purposes.

<sup>3</sup>The S.E. is \$.00778. This is significant at a confidence level of 99 percent. T is equal to 4.72.

<sup>4</sup>See Footnote 4 of Table 3 for explanation of this type of measurement.

<sup>5</sup>See Footnote 5 of Table 3 for explanation of this type of measurement.

<sup>6</sup>See Footnote 6 of Table 3 for explanation of this type of measurement.

<sup>7</sup>See Footnote 7 of Table 3 for explanation of this type of measurement. However, the construction period study area price is used instead of the before period price.



### Acreage Land

Table 5 shows that the base price in Section 1 was considerably higher than in Section 2, \$620 per acre to \$337 per acre, respectively. Part of this difference can be explained by the fact that Section 1 property was within the city limits during this period. Also, property in this section had better highway access to the downtown area than Section 2 property. Still another factor was that some 345 acres of land had already been subdivided in Section 1, while no subdivision activity had yet begun in Section 2. The proximity to the developments undoubtedly enhanced the value of the remaining acreage tracts. Section 2 land was still in agricultural use, and travel time to the central business district, by way of the old highway, was greater.

When construction began on the new highway, the locational potentials for Section 2 lands began to be realized, and prices of land in that section began to increase rapidly. And, while the actual values in the area away from the downtown area did not climb so high as those of the closer area, the proportionate increase was considerably greater due to the lower base price in Section 2. From this it is obvious that Section 2 lands benefited greatly from the placement of the new facility in the study area. One of the prime benefits was the reduction of travel time to the central business district. By greatly

speeding up all traffic, it tended to equalize the two sections in this respect.

Using the control area land values as a basis for comparison, Table 5 shows that probable highway influence on land values was greater in Section 2 than in Section 1, being \$1,230 per acre or 365 percent versus \$806 per acre or 130 percent, respectively. This supports the conclusions drawn in the above discussion.

### Subdivided Land

As in the time period analysis, the sectional analysis is limited to a comparison of land value changes between the construction period and the whole after period due to the scarcity of sales in the before period. Section 2 of the study area had no subdivision sales in the before period and the control area had only three.

Table 6 indicates that land values in Section 2 increased much more rapidly than those in Section 1. This can be explained in part by the fact that most of the subdivisions developed in Section 2 are of a much higher quality than those of Section 1. The terrain was ideal for home sites, having shade trees on rolling hills overlooking a creek. Also, with the time differential between the two sections practically nullified, prices in Section 2 started increasing rapidly.

Table 5  
CHANGES IN ADJUSTED LAND PRICES OF UNIMPROVED ACREAGE TRACTS IN SECTIONS 1 AND 2 OF THE STUDY AREA AS COMPARED TO THE CONTROL AREA, AUSTIN, TEXAS  
IN CONSTANT DOLLARS (1947-49=100)

Item	Price Per Acre <sup>1</sup>			Difference Between Areas			Percent of Study Area Section's Before Period Price	
	Study Area Section 1	Study Area Section 2	Control Area	Section 1 Vs Section 2	Section 1 Vs Control Area	Section 2 Vs Control Area	Section 1	Section 2
Before Period (1941-48) <sup>2</sup>	\$ 620(64)	\$ 337(32)	\$130(152)	\$ 283	\$ 490	\$ 207		
Construction Period (1949-53)	1,220(27)	\$ 841(15)	297(139)	\$ 371	\$ 923	\$ 544		
First After Period (1954-57)	2,311(25)	2,411(39)	535(81)	100	1,776	1,876		
Second After Period (1958-61)	3,672(17)	2,521(16)	707(96)	1,151	2,965	1,814		
Whole After Period (1954-61) <sup>3</sup>	2,862(42)	2,461(55)	628(177)	401	2,234	1,833		
Increase Between Periods								
Before and Construction								
Dollars	\$ 600	\$ 504	\$167	\$ 96	\$ 433	\$ 337	70% <sup>4</sup>	100% <sup>4</sup>
Percent	97%	150%	128%	-53%	-31% <sup>5</sup>	22% <sup>5</sup>		
Construction and Whole After								
Dollars	\$1,640	\$1,620	\$331	\$ 20	\$1,309	\$1,289		
Percent	134%	193%	111%	-59%	23% <sup>5</sup>	82% <sup>5</sup>		
Before and Whole After								
Dollars	\$2,242	\$2,124	\$498	\$ 118	\$1,744	\$1,626	281% <sup>4</sup>	482% <sup>4</sup>
Percent	362%	630%	383%	-268%	-21% <sup>5</sup>	247% <sup>5</sup>		
Probable Highway Influence								
Percent <sup>6</sup>	130%	365%						
Dollars <sup>7</sup>	\$ 806	\$1,230						

<sup>1</sup>Number of transactions is shown in parentheses.

<sup>2</sup>The S.E. of the difference between the means of Section 1 and 2 of the study area is \$152. This is significant at a confidence level of 93 percent. T is equal to 1.87. The S.E. of the difference between the means of the study area (Section 2) and the control area is \$90. This is significant at a confidence level of 98 percent. T is equal to 2.30. The S.E. of the difference between the means of the study area (Section 1) and the control area is \$125. This is significant at a confidence level of 99 percent. T is equal to 3.932.

<sup>3</sup>The S.E. of the difference between the means of Sections 1 and 2 of the study area is \$466. This is significant at a confidence level of 62 percent. T is equal to .87. The S.E. of the difference between the means of the study area (Section 1) and the control area is \$368. This is significant at a confidence level of 99 percent. T is equal to 3.93. The S.E. of the difference between the means of the study area (Section 2) and the control area is \$299. This is significant at a confidence level of 99 percent. T is equal to 6.13.

<sup>4</sup>See Footnote 4 of Table 3 for explanation of this type of measurement. However, the study area is divided into Sections 1 and 2 in this table.

<sup>5</sup>See Footnote 5 of Table 3 for explanation of this type of measurement. However, the study area is divided into Sections 1 and 2 in this table.

<sup>6</sup>See Footnote 6 of Table 3 for an explanation of this type of measurement.

<sup>7</sup>See Footnote 7 of Table 3 for an explanation of this type of measurement.

Table 6

CHANGES IN THE ADJUSTED LAND PRICES OF UNIMPROVED SUBDIVISION LOTS IN SECTIONS 1 & 2 OF THE STUDY AREA AS COMPARED TO THE CONTROL AREA, AUSTIN, TEXAS  
IN CONSTANT DOLLARS (1947-49=100)

Item	Price Per Sq. Foot <sup>1</sup>			Difference Between Areas			Percent of Study Area Section's Construction Period Price	
	Study Area Section 1	Study Area Section 2	Control Area	Section 1	Section 1	Section 2	Section 1	Section 2
				vs Section 2	vs Control Area	vs Control Area		
Before Period (1941-48)	\$.0165(266)	\$	\$.0233(3)	\$	\$.0068	\$		
Construction Period (1949-53) <sup>2</sup>	.0372(112)	.0291(48)	.0173(84)	.0081	.0199	.0118		
First After Period (1954-57)	.0394(96)	.0700(313)	.0550(166)	.0306	.0156	.0150		
Second After Period (1958-61)	.0664(91)	.1731(262)	.0845(78)	.1067	.0181	.0886		
Whole After Period (1954-61) <sup>3</sup>	.0526(187)	.1170(575)	.0644(244)	.0644	.0118	.0526		
Increase Between Periods Construction and Whole After								
Dollars	\$.0154	\$.0879	\$.0471	-\$0.0725	-\$0.0317	\$.0408	-85% <sup>4</sup>	140% <sup>4</sup>
Percent	41%	302%	272%	-261%	-231% <sup>5</sup>	30% <sup>5</sup>		
Probable Highway Influence								
Percent <sup>6</sup>	-158%	85%						
Dollars <sup>7</sup>	-\$0.0588	\$.0247						

<sup>1</sup>Number of transactions is shown in parentheses.

<sup>2</sup>The S.E. of the difference between the means of Sections 1 and 2 of the study area is \$.005; this is significant at a confidence level of 89%. T is equal to 1.63. The S.E. of the difference between the means of the study area (Section 2) and the control area is \$.0046. This is significant at a confidence level of 98%. T is equal to 2.55. The S.E. of the difference between the means of the study area (Section 1) and the control area is \$.0024. This is significant at a confidence level of 99%. T is equal to 8.40. The Construction Period was used here because of inconclusive data on Section 2 of the study area of the Before Period.

<sup>3</sup>The S.E. of the difference between the means of the study area (Section 1) and the control area is \$.0067. This is significant at a confidence level of 92%. T is equal to 1.76. The S.E. of the difference between the means of Sections 1 and 2 of the study area is \$.01; this is significant at a confidence level of 99%; T is equal to 6.74. The S.E. of the difference between the means of the study area (Section 2) and the control area is \$.0099. This is significant at a confidence level of 99%. T is equal to 5.31.

<sup>4</sup>See footnote 4 of Table 3 for an explanation of this type of measurement. However, the study area is divided into two sections in this table.

<sup>5</sup>See footnote 5 of Table 3 for an explanation of this type of measurement.

<sup>6</sup>See footnote 6 of Table 3 for an explanation of this type of measurement.

<sup>7</sup>See footnote 7 of Table 3 for an explanation of this type of measurement.

When comparing the changes in land values of each section with those of the control area, the probable highway influence was apparently greater on Section 2 land than those of Section 1. Land values in Section 2 increased more than those in the control area, while Section 1 land values increased less than those in the control area.

### Changes In Abutting and Nonabutting Land Values

The land sales in the study area were divided again to determine the influence of the new highway on the land values of abutting versus nonabutting property. The acreage and subdivision analyses follow in that order.

#### Acreage Land

Table 7 indicates that it was only between the before and construction periods that the dollar increases in land prices were greater for nonabutting land than for abutting land. After the new highway was opened to traffic, abutting land values increased rapidly and to a considerably higher level than nonabutting land values. This is further confirmed by the statistical tests which show that the difference between the before period means

is not nearly so high as that between the whole after period means.

When compared to control area values, the probable highway influence on abutting land values is clearly positive by \$1,652 or 363 percent. But it is negative as far as nonabutting land values are concerned, which partly stems from a very high before period value compared to that of the control area. Although the negative values resulted in the above comparison, this does not mean that nonabutting land failed to benefit from the presence of the new facility. Even with a higher before period value, the land value of such land increased more dollar-wise than that of the control area land between the before and whole after periods. However, the extent of the influence is open to question.

#### Subdivided Land

Table 8 gives the changes in values of abutting and nonabutting subdivided land. In the before, construction, and first after periods, the abutting lot values were higher than those of nonabutting lots. But in the second after period, nonabutting lot values were above those of the abutting lots. Among other things, the presence of the new highway may have caused the rapid increase in nonabutting lot values, tending to equalize the difference between abutting and nonabutting values. (Statistical

tests of the means reveal less variation between the construction period means than the whole after period means. Due to the few number of abutting study area and control area sales, the control and study area comparisons were made between the construction and whole after periods.)

Neither the abutting nor the nonabutting values increased as much percentage-wise as the control area values. However, the control area dollar increases were lower than the abutting and nonabutting values, but not enough to offset the percentage figures. Thus, the probable highway influence for both comparisons show negative values, with the nonabutting comparison having a smaller negative value than that of abutting. These figures do not necessarily mean that the new highway depressed study values, but indicate that control area prices did not perform those of the study area. It is probable that the highway influence on abutting and nonabutting lot values was about the same, tending to be more on the latter.

### Changes in Abutting Land Values in Sections 1 and 2

A further division was made in the abutting land sales according to section so that differences between sections could be analyzed. Since so few abutting subdivi-

vision land sales were recorded, this section discusses only acreage land sales.

Table 9 shows the changes in prices of abutting land in the study area. In every period, except the first after period, the value of Section 1 land was higher than that of Section 2. Also, Section 1 increases between periods were more than those of Section 2. However, Section 2 land values increased more percentage-wise between periods than did Section 1 land values.

Since Section 1 land values increased only \$292 more than Section 2 land values between the before and whole after periods (representing 50 percent of section 1's before period price), the 346 percent difference between the section's before and whole after prices was given more weight. This means that Section 2's abutting land prices increased more than those of Section 1, being based on percentage changes from the before period prices. The new highway helped equalize the abutting values between the sections through reduction of the access and traveling time differential to the Austin business district.

### Changes in Nonabutting Land Values in Sections 1 and 2

The nonabutting land sales were further divided according to section to determine the influence of distance

Table 7

CHANGES IN ADJUSTED LAND PRICES OF ABUTTING AND NONABUTTING UNIMPROVED TRACTS IN THE STUDY AREA AS COMPARED TO THE CONTROL AREA, AUSTIN, TEXAS IN CONSTANT DOLLARS (1947-49=100)

Item	Price Per Acre <sup>1</sup>			Difference Between Areas			Percent of Respective Parts of Study Area's Before Period Price	
	Study Area Abutting	Study Area Non-abutting	Control Area	Abutting Versus Non-abutting	Abutting Versus Control Area	Non-abutting Versus Control Area	Abutting	Non-abutting
Before Period (1941-48) <sup>2</sup>	\$ 455(47)	\$ 592(49)	\$130(152)	\$ 137	\$ 325	\$ 462		
Construction Period (1949-53)	982(26)	1340(16)	297(139)	412	631	1043		
First After Period (1954-57)	2804(49)	1028(15)	535(81)	1776	2269	493		
Second After Period (1958-61)	4369(18)	1609(15)	707(96)	2760	3662	902		
Whole After Period (1954-61) <sup>3</sup>	3224(67)	1318(30)	628(177)	1906	2596	690		
Increase Between Periods								
Before and Construction								
Dollars	\$ 473	\$ 748	\$167	-\$ 275	\$ 306	\$ 581	67% <sup>4</sup>	98% <sup>4</sup>
Percent	104%	126%	128%	-22%	-24% <sup>5</sup>	-2% <sup>5</sup>		
Construction and Whole After								
Dollars	\$2296	-\$ 22	\$331	\$2318	\$1965	-\$ 353		
Percent	247%	-2%	111%	249%	136% <sup>5</sup>	113% <sup>5</sup>		
Before and Whole After								
Dollars	\$2769	\$ 726	\$498	\$2043	\$2271	\$ 228	499% <sup>4</sup>	39% <sup>4</sup>
Percent	609%	123%	383%	486%	226% <sup>5</sup>	-260% <sup>5</sup>		
Probable Highway Influence								
Percent <sup>6</sup>	363%	-111%						
Dollars <sup>7</sup>	\$1652	-\$ 657						

<sup>1</sup>Number of transactions is shown in parentheses.

<sup>2</sup>The S.E. of the difference between the means of the study area (abutting) and the study area (nonabutting) is \$174. This is significant at a confidence level of 56 percent. T is equal to .79. The S.E. of the difference between the means of the study area (nonabutting) and the control area is \$160. This is significant at a confidence level of 99 percent. T is equal to 2.89. The S.E. of the difference between the means of the study area (abutting) and the control area is \$73. This is significant at a confidence level of 99 percent. T is equal to 4.44.

<sup>3</sup>The S.E. of the difference between the means of the study area (abutting) and the study area (nonabutting) is \$327. This is significant at a confidence level of 99 percent. T is equal to 5.83. The S.E. of the difference between the means of the study area (nonabutting) and the control area is \$148. This is significant at a confidence level of 99 percent. T is equal to 4.65. The S.E. of the difference between the means of the study area (abutting) and the control area is \$305. This is significant at a confidence level of 99 percent. T is equal to 8.51.

<sup>4</sup>See Footnote 4 of Table 3 for an explanation of this type of measurement. However, the study area is divided into abutting and nonabutting land in this table.

<sup>5</sup>See Footnote 5 of Table 3 for an explanation of this type of measurement.

<sup>6</sup>See Footnote 6 of Table 3 for an explanation of this type of measurement.

<sup>7</sup>See Footnote 7 of Table 3 for an explanation of this type of measurement.

Table 8

CHANGES IN ADJUSTED LAND PRICE OF ABUTTING AND NONABUTTING UNIMPROVED SUBDIVIDED LOTS IN THE STUDY AREA AS COMPARED TO THE CONTROL AREA, AUSTIN, TEXAS, IN CONSTANT DOLLARS (1947-49=100)

Item	Price Per Square Foot <sup>1</sup>			Difference Between Areas			Percent of Respective Parts of Study Area's Construction Period Price	
	Study Area Abutting	Study Area Non-abutting	Control Area	Abutting Versus Non-abutting	Abutting Versus Control Area	Non-abutting Versus Control Area	Abutting	Non-abutting
Before Period (1941-48)	\$.0350(3)	\$.0162(263)	\$.0233(3)	\$.0188	\$.0117	\$.0071		
Construction Period (1949-53) <sup>2</sup>	.0466(7)	.0342(153)	.0173(84)	.0104	.0293	.0169		
First After Period (1954-57)	.0969(23)	.0608(386)	.0550(166)	.0361	.0419	.0058		
Second After Period (1958-61)	.1013(19)	.1478(334)	.0845(78)	.0465	.0168	.0633		
Whole After Period (1954-61) <sup>3</sup>	.0989(42)	.1012(720)	.0644(244)	.0023	.0345	.0368		
Increase Between Periods Before and Construction								
Dollars	\$.0116	\$.0180	-\$0.0060	-\$0.0064	\$.0176	\$.0240		
Percent	33%	111%	-26%	-78%	59%	137%		
Construction and Whole After								
Dollars	\$.0523	\$.0670	\$.0471	-\$0.0147	\$.0052	\$.0199	11% <sup>4</sup>	58% <sup>5</sup>
Percent	112%	196%	272%	-84%	-160% <sup>6</sup>	-76% <sup>6</sup>		
Before and Whole After								
Dollars	\$.0639	\$.0850	\$.0411	-\$0.0211	\$.0228	\$.0439		
Percent	183%	525%	176%	-342%	7%	349%		
Probable Highway Influence								
Percent <sup>7</sup>	-75%	-9%						
Dollars <sup>8</sup>	-\$0.035	-\$0.00308						

<sup>1</sup>Number of transactions is shown in parentheses.

<sup>2</sup>Due to the small number of observations in two areas, the before period was not used for comparative purposes in this table. The S.E. of the difference between the means of the study area (abutting) and the study area (nonabutting) is \$.0098. This is significant at a confidence level of 71 percent. T is equal to 1.06. The S.E. of the difference between the means of the study area (nonabutting) and the control area is \$.0023. This is significant at a confidence level of 99 percent. T is equal to 7.48. The S.E. of the difference between the means of the study area (abutting) and the control area is \$.0017. This is significant at a confidence level of 99 percent. T is equal to 17.65.

<sup>3</sup>The S.E. of the difference between the means of the study area (abutting) and the study area (nonabutting) is \$.0099. This is significant at a confidence level of 18 percent. T is equal to .23. The S.E. of the difference between the means of the study area (abutting) and the control area is \$.0082. This is significant at a confidence level of 99 percent. T is equal to 4.21. The S.E. of the difference between the means of the study area (nonabutting) and the control area is \$.0081. This is significant at a confidence level of 99 percent. T is equal to 4.54.

<sup>4,5</sup> See Footnote 4 of Table 3 for an explanation of this type of measurement. However, the study area is divided into abutting and nonabutting land in this table.

<sup>6</sup>See Footnote 5 of Table 3 for an explanation of this type of measurement.

<sup>7</sup>See Footnote 6 of Table 3 for an explanation of this type of measurement.

<sup>8</sup>See Footnote 7 of Table 3 for an explanation of this type of measurement.

Table 9

CHANGES IN ADJUSTED LAND PRICES OF ABUTTING UNIMPROVED ACREAGE TRACTS IN SECTIONS 1 AND 2 OF THE STUDY AREA, AUSTIN, TEXAS IN CONSTANT DOLLARS (1947-49=100)

Item	Price Per Acre <sup>1</sup>		Difference Between Sections
	Section 1	Section 2	
Before Period (1941-48) <sup>2</sup>	\$ 590(24)	\$ 315(23)	\$ 275.
Construction Period (1949-53)	1,055(15)	756(11)	299.
First After Period (1954-57)	2,576(20)	2,961(29)	385.
Second After Period (1958-61)	5,998( 8)	3,065(10)	2,933.
Whole After Period (1954-61) <sup>3</sup>	3,554(28)	2,987(39)	567.
Increase Between Periods Before and Construction			
Dollars	\$ 465.	\$ 441.	\$ 24.
Percent	79%	140%	-61%
Construction and Whole After			
Dollars	\$2,499.	\$2,231.	\$ 268.
Percent	237%	295%	-58%
Before and Whole After			
Dollars	\$2,964.	\$2,672.	\$ 292.
Percent	502%	848%	-346%

<sup>1</sup>Number of transactions is shown in parentheses.

<sup>2</sup>The S.E. of the difference between the means of Sections 1 and 2 of the study area is \$28. This is significant at a confidence level of 99 percent. t is equal to 9.89.

<sup>3</sup>The S.E. of the difference between the means of Sections 1 and 2 of the study area is \$107. This is significant at a confidence level of 99 percent. t is equal to 5.30.

Table 10

CHANGES IN ADJUSTED LAND PRICES OF NONABUTTING UNIMPROVED ACREAGE TRACTS IN SECTIONS  
1 AND 2 OF THE STUDY AREA, AUSTIN, TEXAS  
IN CONSTANT DOLLARS (1947-49=100)

Item	Price Per Acre <sup>1</sup>		Difference Between Sections
	Section 1	Section 2	
Before Period (1941-48) <sup>2</sup>	\$ 637(40)	\$ 393(9)	\$ 244.
Construction Period (1949-53)	1,428(12)	1,075(4)	353.
First After Period (1954-57)	1,249(5)	918(10)	331.
Second After Period (1957-61)	1,604(9)	1,615(6)	11.
Whole After Period (1954-61) <sup>3</sup>	1,477(14)	1,179(16)	298.
Increase Between Periods			
Before and Construction			
Dollars	\$ 791.	\$ 682.	\$ 109.
Percent	124%	174%	-50%
Construction and Whole After			
Dollars	\$ 49.	\$ 104.	\$ -55.
Percent	3%	10%	-7%
Before and Whole After			
Dollars	\$ 840.	\$ 786.	\$ 54.
Percent	132%	200%	-68%

<sup>1</sup>Number of transactions is shown in parentheses.

<sup>2</sup>The S.E. of the difference between the means of Sections 1 and 2 of the study area is \$73. This is significant at a confidence level of 99 percent. *t* is equal to 3.35.

<sup>3</sup>The S.E. of the difference between the means of Sections 1 and 2 of the study area is \$71. This is significant at a confidence level of 99 percent. *t* is equal to 4.20.

from the central city. This comparison pertains only to changes in acreage land values.

Table 10 shows the changes in nonabutting land prices. Except for the second after period, land prices were higher in Section 1 than Section 2. After the before period, land prices in neither section increased very rapidly. Section 1 experienced slightly greater dollar increases between periods, but Section 2 had the larger percentage increases.

The data indicate that both sections received about the same influence from the new highway, with perhaps Section 2 land receiving the most benefit. It made the nonabutting land in Section 1 more desirable than before construction, but it also made land of this type in Section 2 even more desirable than before the construction. Much of the nonabutting land in Section 2 was very attractive for residential subdivisions.

*Changes in Values of Study and Control Area Land by Size of Area Sold*

It was thought desirable to explore the relationships which may exist between land value and the size of tracts sold in the study and control area to determine any differences in land value which may be attributed to size of tract. It is generally expected that an inverse relationship exists, the extent of which could vary from area to area and period to period. Generally, the smaller the tract the higher value it commands. Theoretically, if two areas have the same proportionate distribution of each sized tract selling in the periods selected, as well as being comparable in other respects, the mean value of all sales in the area would show little or no difference in land value. An uneven distribution of size tracts, however, could cause a significant difference in values, due primarily to the distribution of sales by tract sizes. For

Table 11

ACTUAL LAND PRICES OF UNIMPROVED ACREAGE PROPERTIES IN STUDY AND CONTROL AREAS ACCORDING TO SIZE OF AREA SOLD, AUSTIN, TEXAS

Periods	Area Size Group <sup>1</sup>				Combined Groups Price Per Acre
	Group 1 Price Per Acre	Group 2 Price Per Acre	Group 3 Price Per Acre	Group 4 Price Per Acre	
	STUDY AREA				
Before Period (1941-48)	\$ 523(71) <sup>2</sup>	\$ 611(8)	\$ 125(1)	\$ 147(16)	\$ 464(96)
Construction Period (1949-53)	1,336(33)	1,245(3)		499(6)	1,210(42)
First After Period (1954-57)	3,261(40)	2,275(11)	1,002(7)	1,334(6)	2,664(64)
Second After Period (1958-61)	3,661(28)	1,182(1)	2,036(2)	1,011(2)	3,327(33)
	CONTROL AREA				
Before Period (1941-48)	\$ 372(26)	\$ 165(10)	\$ 39(6)	\$ 53(110)	\$ 114(152)
Construction Period (1949-53)	704(41)	329(21)	148(8)	119(69)	325(139)
First After Period (1954-57)	1,020(38)	571(6)	457(4)	194(33)	624(81)
Second After Period (1958-61)	1,252(50)	565(8)	309(2)	214(36)	786(96)

<sup>1</sup>Each group has the following size limits; Group 1, 5 acres and less; Group 2, 5.1 through 10 acres; Group 3, 10.1 through 20 acres; and Group 4, 20.1 acres and over.

<sup>2</sup>The number of sales transactions is shown in parentheses.

this reason it was felt that the size of tracts sold should be included in the analysis.

To perform this analysis, the unimproved acreage and subdivided land sales were divided into four area size groups (see footnote Table 11). These sales by size groups were further subdivided into the time periods used in the land value analysis to determine if the same relationship existed between the before and after periods. Actual land values which are not area weighted were used in the tables and graphs.

*Acreage Land*

Table 11 shows the land values of acreage sales by area size groups. Generally, an inverse relationship between area size and price per acre existed in both areas; however, this relationship was more pronounced in the control area. Within the study area, there was very little change in the proportionate number of different sized tracts between the before and after periods; whereas, the control area showed a significant change from larger to smaller tracts selling. Of course, for the combined periods, the average sized study area tract sold was much smaller than that of the control area.

Figures 7 and 8 show graphically the data in Table 23 and readily reaffirm the above relationships. It can be seen in Figure 7 that values for the combined groups in the study area are strongly affected by Group 1 values which have a far greater number of sales than all other groups combined. Figure 8 shows that the combined value of the control area is not so strongly influenced by values of any one area group, but it still lies between Group 1 and 2 values through most of the whole period. In the before period, the combined value line for the study and control areas was in the center with two groups on either side. However, the influence of the small tract sales began to be felt during the construction period, and this group was of increasing importance throughout the remainder of the study.

It is possible, then, that a slight bias due to area size may have been introduced through the difference in division of tracts between the study and control areas. Since tract size is not entirely casual in effect, any bias introduced is not considered enough to change the conclusions reached in the preceding land value analyses.

Another significant fact which Figure 7 shows is that of the almost continuous straight line increase in

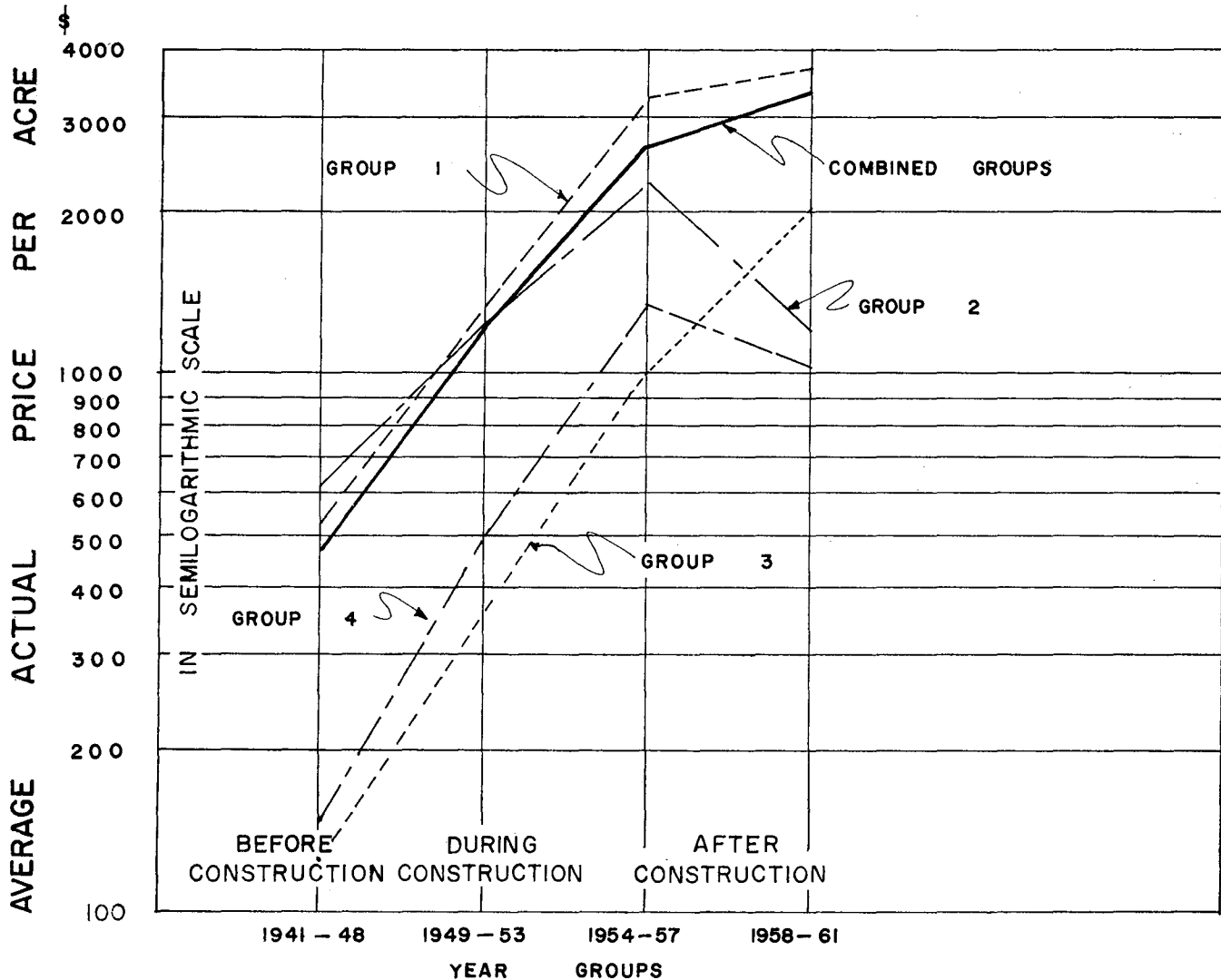


Figure 7. Trends in actual land prices of unimproved acreage tracts in the study area according to area size groups.

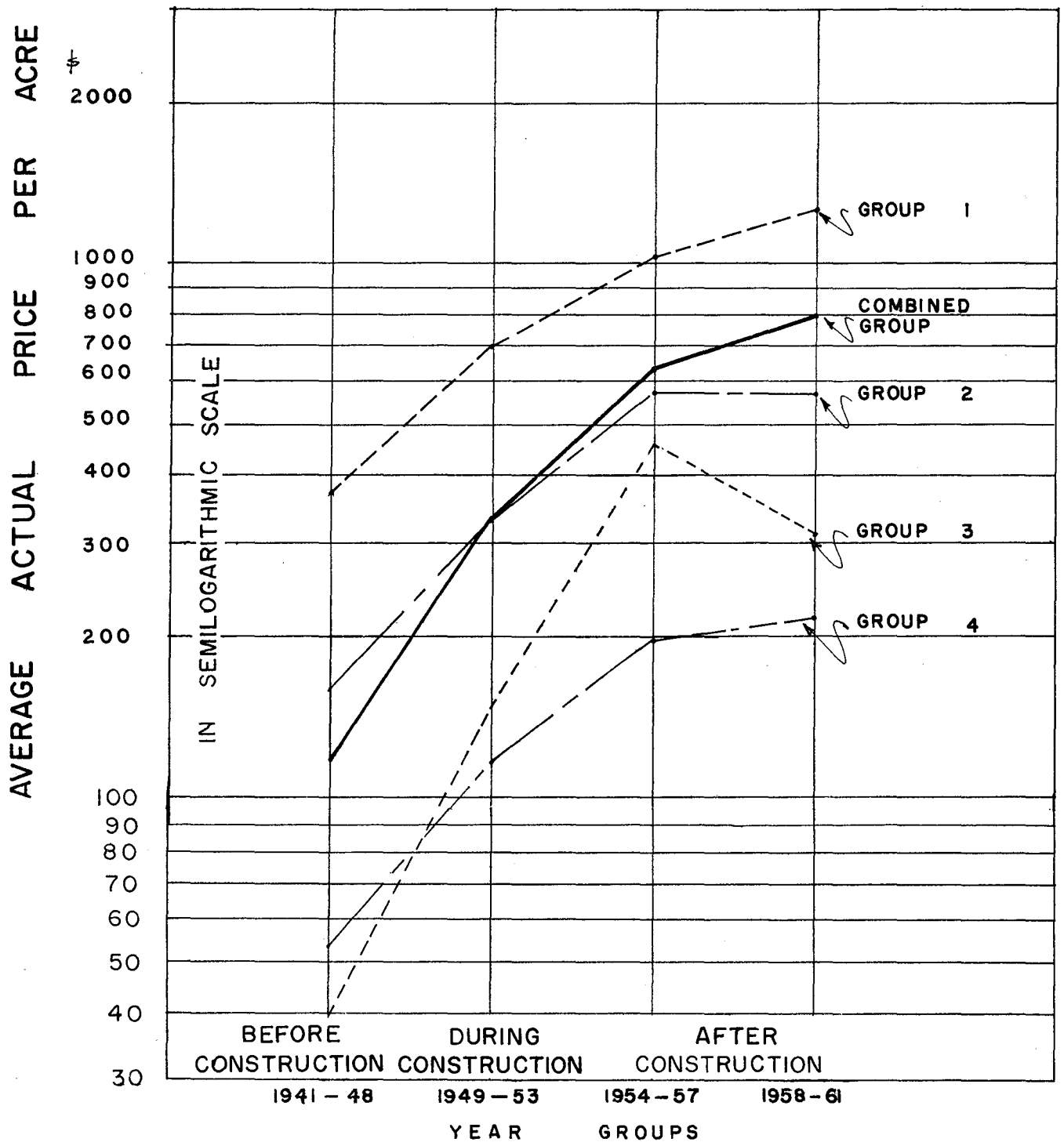


Figure 8. Trends in actual land prices of unimproved acreage tracts in the control area according to area size groups.

land prices from the base period through the first after period regardless of the size of tract. The construction of the new facility was partly responsible for such a sustained increase.

*Subdivided Land*

Table 12 shows the land value of subdivision sales by area size groups. The inverse relationship is not so clearly indicated in the subdivision sales as was the case in acreage sales. This is as was expected. Acreage

tracts may range upward in size well above any usable level. Smaller acreages normally have more varied potential demand — less capital needed, etc. On the other hand, subdivided lots are by definition already restricted in size and use. Large lots may actually be worth the same per unit area as smaller ones. According to Figures 9 and 10, the size group values of both areas switched places several times between before and after periods, which was more than those of the acreage groups. The inverse relationship is more clearly discern-

Table 12  
ACTUAL LAND PRICES OF UNIMPROVED SUBDIVIDED LOTS IN STUDY AND CONTROL AREAS ACCORDING TO SIZE OF AREA SOLD, AUSTIN, TEXAS

Periods	Area Size Group <sup>1</sup>				Combined Groups Price Per Sq. Ft.
	Group 1 Price Per Sq. Ft.	Group 2 Price Per Sq. Ft.	Group 3 Price Per Sq. Ft.	Group 4 Price Per Sq. Ft.	
<b>STUDY AREA</b>					
Before Period (1941-48)	\$.0333(3) <sup>2</sup>	\$.0112(181)	\$.0170(57)	\$.0221(25)	\$.0165(266)
Construction Period (1949-53)	.0693(4)	.0435(48)	.0457(45)	.0271(63)	.0348(160)
First After Period (1954-57)	.1554(5)	.0721(64)	.0835(245)	.0441(95)	.0629(409)
Second After Period (1958-61)		.0990(70)	.2215(247)	.0823(36)	.1453(353)
<b>CONTROL AREA</b>					
Before Period (1941-48)	\$	\$	\$	\$.0233(3)	\$.0233(3)
Construction Period (1949-53)		.0149(34)	.0223(27)	.0226(23)	.0173(84)
First After Period (1954-57)		.0441(38)	.1050(57)	.0427(71)	.0550(166)
Second After Period (1958-61)		.1679(12)	.1181(39)	.0598(27)	.0845(78)

<sup>1</sup>Each group has the following size limits; Group 1, 5000 sq. ft. and less; Group 2, 5001 through 10,000 sq. ft.; Group 3, 10,001 through 20,000 sq. ft., and Group 4, 20,001 sq. ft. and over.

<sup>2</sup>The number of sales transactions is shown in parentheses.

ible in the after period than the before period, especially in the control area.

It was thought that the lack of Group 1 control area sales would have helped the combined value line to represent larger sized tracts than in the case of the combined

value line of the study area. But in spite of this, the combined value line of each area represent about the same size tract, especially in the first two periods. In the whole after period, the combined value line of the study area was influenced upwards by the smaller size

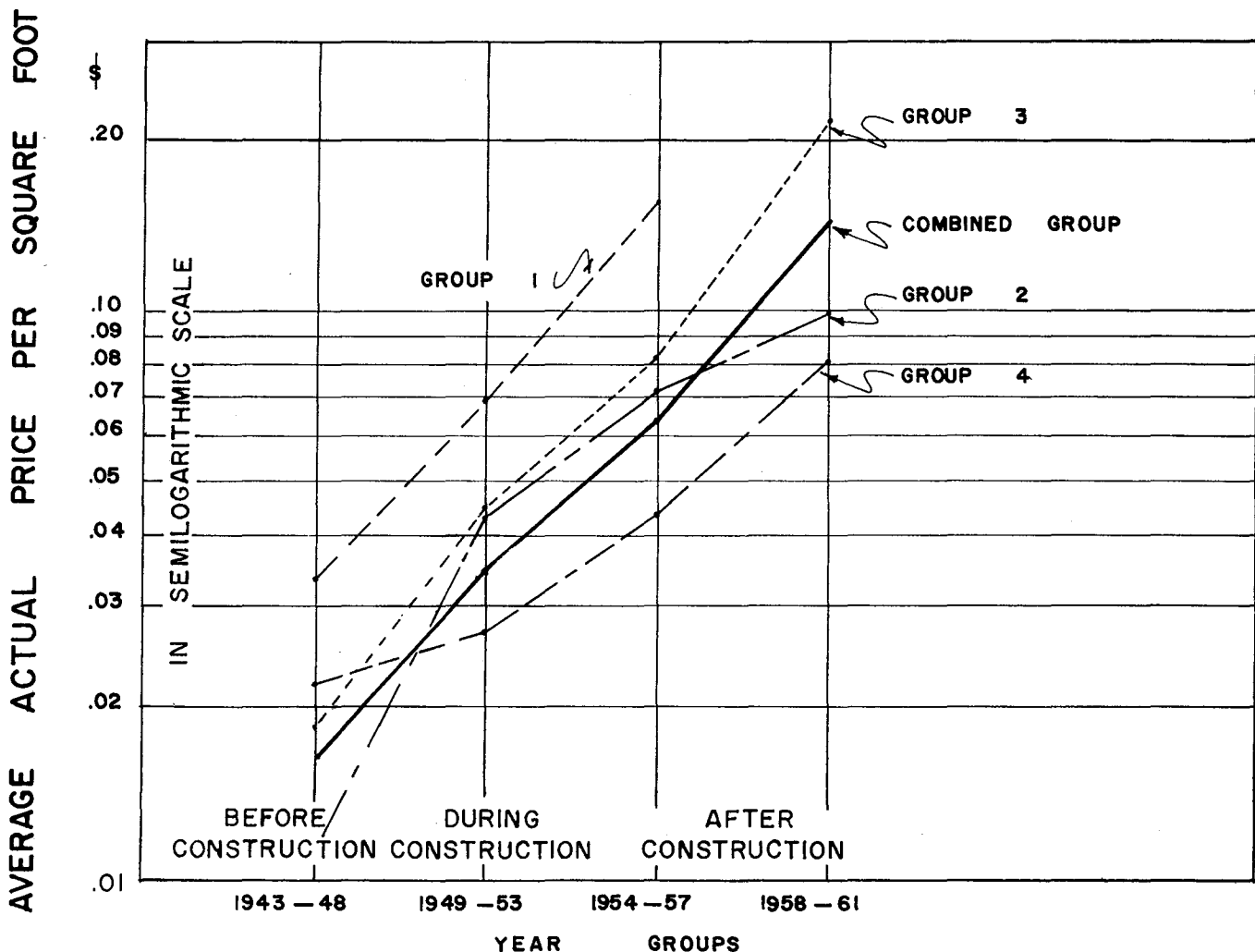


Figure 9. Trends in the actual land prices of unimproved subdivided lots in study area according to area size groups.



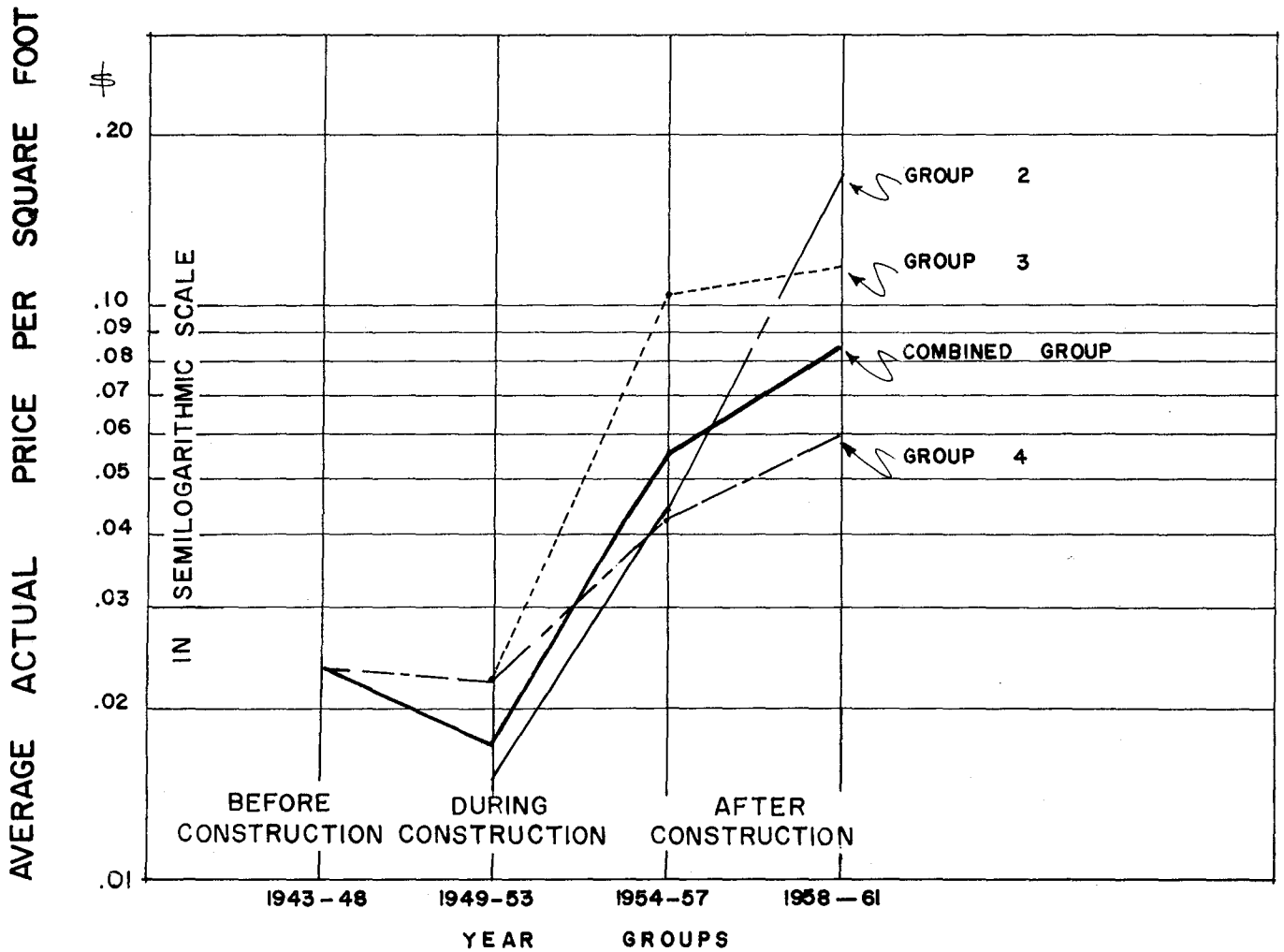


Figure 10. Trends in actual land prices of unimproved subdivided lots in control area according to area size groups.

groups, and the control area combined values line was influenced downward by the larger size groups. Thus, more bias may have been injected into the preceding subdivision land value tables than in the case of the acreage tables; but it is not considered too great to change the conclusions.

### *Changes in Land Values in Study and Control Areas as Reflected by Repeat Sales*

Generally, it is assumed that more speculative activity occurred in the study area than in the control area. The deed records revealed large numbers of acreage and subdivided tracts purchased by realtors and builders. Part of this speculative buying and selling can be attributed to the new highway. The number of repeat sales is considered a measure of speculative activity.

In the analysis of properties which sold more than once, it was found that repeat sales activity was about 16 percent greater in the study area than in the control area. This is considering all vacant and improved sales which neither added nor removed improvements before selling again. Repeat selling of acreage tracts in the study area was 35 percent greater than the repeat selling of such tracts in the control area. For subdivided tracts,

the study area surpassed the control area by 11 percent. Of the unimproved acreage tracts, repeat selling was 22 percent greater in the study area than in the control area. For unimproved subdivided tracts, repeat sale activity was virtually the same for both the study and control areas.

A high ratio of repeat sales to total sales of property in the same period could have an influence on the averages of sales prices. But, since both the study and control areas had a fairly large number of total sales in relation to repeat sales in each period, it is believed that very little bias was injected into the derived average unit prices.

Table 13 presents the comparison of the land values of unimproved acreage tracts selling only one time and those selling more than once. Using only those tracts selling one time, study area prices increased 19 percent more than those of the control area. Using all sales transactions, selling one or more times, study area prices increased 28 percent over control area prices between the before and whole after period. The net difference is only nine percent. The dollar difference is even smaller, only five percent, when considering dollar increase over before period prices. The results show that answers based on all sales yielded slightly larger differences between

**Table 13**  
**CHANGES IN ACTUAL LAND PRICES OF UNIMPROVED ACREAGE TRACTS SELLING ONLY ONE TIME**  
**VERSUS ALL TRACTS SELLING ONE OR MORE TIMES IN THE STUDY AND CONTROL AREAS**

Periods	Price Per Acre <sup>1</sup> of Tracts Selling One Time		Price per Acre of Tracts Selling One or More Times	
	Study Area	Control Area	Study Area	Control Area
Before Period (1941-48)	\$ 538 (50)	\$133 (112)	\$ 464 (96)	\$114 (152)
Construction Period (1949-53)	1,058 (16)	330 (96)	1,210 (42)	325 (139)
First After Period (1954-57)	2,621 (33)	624 (64)	2,664 (64)	624 (81)
Second After Period (1958-61)	3,131 (25)	749 (80)	3,327 (33)	786 (96)
Change Between Periods Before and Second After				
Dollars	\$2,593	\$616	\$2,863	\$672
Percent	482%	463%	617%	589%

<sup>1</sup>Number of transactions is shown in parentheses.

the prices of the two areas than yielded by those selling once.

Table 14 shows the unimproved subdivided land comparisons. Based on percentage changes between the construction and whole after periods, there is a 46 percent difference between the two ways of measuring land value changes. But the dollar difference is virtually zero, when based on the dollar increase over the before period price. The results show that answers based on the tracts selling only once yielded larger differences between the prices of the two areas than in the case of all

sales. This is the opposite of that observed in the case of unimproved acreage sales.

Therefore, it does seem that those properties that sold more than once increased in price somewhat faster than the average for the area. However, this probably was not enough to change the conclusions concerning over-all highway influence.

Other repeat sales analyses were made, but none yielded any new insights concerning the extent of changes in land values in the study and control areas. Therefore, they were not incorporated in this report.

**Table 14**  
**CHANGES IN ACTUAL LAND PRICES OF UNIMPROVED SUBDIVIDED LOTS SELLING ONLY ONE TIME**  
**VERSUS ALL TRACTS SELLING ONE OR MORE TIMES IN THE STUDY AND CONTROL AREAS**

Periods	Price per Sq. Ft. <sup>1</sup> Of Tracts Selling One Time		Price per Sq. Ft. of Tracts Selling One or More Times	
	Study Area	Control Area	Study Area	Control Area
Before Period (1941-48)	\$.0125 (170)	\$.0233 (3)	\$.0165 (266)	\$.0233 (3)
Construction Period (1949-53)	.0408 (91)	.0196 (50)	.0348 (160)	.0173 (84)
First After Period (1954-57)	.0754 (270)	.0753 (111)	.0629 (409)	.0550 (166)
Second After Period (1958-61)	.2119 (255)	.1244 (53)	.1453 (353)	.0845 (78)
Changes Between Periods Before and Second After				
Dollars	\$.1994	\$.1011	\$.1288	\$.0612
Percent	1595%	434%	781%	263%
Construction and Second After				
Dollars	\$.1711	\$.1048	\$.1105	\$.0672
Percent	419%	535%	318%	388%

<sup>1</sup>Number of transactions is shown in parentheses.

# Changes In Land Use

As other reports have suggested, one of the principal indicators of a new highway's economic impact on a certain area is the change in use of land abutting or near such a facility. If the land follows the natural succession of land use changes, it will usually change from a lower use to a higher and better use; that is, from a less intensive and relatively valued use to a more intensive higher valued one. When the change in land use occurs at a greater rate than before the new facility was constructed, this is further proof that such a highway has made an economic impact on the land in an area.

The restudy of the Austin area adds four years to the previous study period, and is helpful in determining a new highway improvement's impact on land and the rate of use change. Since 1948, the last year before construction began on the new facility, a total of 13 years has lapsed in which land use changes have been recorded. Eight of these years occurred after construction was completed.

For analytical purposes, the last year of the base period (1948) was chosen as the date for determining land use of the before period. The year used for the first after period was 1957, and an analysis of interim changes was covered in the previous report. This report uses 1961 as the year of the second after period. Land use maps were prepared to facilitate the presentation of the land use analysis.

A base map (Figure 11C) records the land use in the study area as of 1948. The first overlay to the base map (Figure 11B) shows the changes in land use which had occurred by 1957, nine years later. The second overlay to the base map (Figure 11A) shows the changes in land use which occurred by 1961, four years later.

Information relating to land use in 1948 was obtained from several sources, the primary source being interviews with realtors, local residents, other individuals who were familiar with the study area at that time, and aerial photographs made in 1951. Figures 12a and 12b are aerial views of the area taken during 1951 and 1964, respectively.

## *Land Use in 1948*

During 1948, most of the land in the study was used for agricultural purposes (See Figures 11C, the base map). Such land was used primarily for pasturage instead of more intensive agricultural purposes.

The next most prevalent use was that designated as urban residential; that is, subdivision and other dwelling units (maximum size of 5 acres) located within the city limits. There were five subdivisions located in the area, all in Section 1. Three of these were relatively low-priced areas, with graded streets which lacked surface treatment of any type. The improvements were of low quality and value. The other two subdivisions were medium-priced areas, with hard-surfaced streets. Most of the improved lots sold in the price range of \$6,000 to \$9,000.

Another prevalent land use type was that designated as land held for future use. Most of this land was located within the city limits along Middle Fiskville Road and

near a subdivision. The majority of such land was located within Section 1 of the study area.

Three tracts were being used for institutional-municipal purposes. One tract, containing more than 360 acres, was owned by the St. John's Orphans Home. The other two were small tracts, one a cemetery and the other owned by the State Department of Public Safety.

The fifth land use in the area was that of rural residences. This category is defined as a small (10 acres or less) tract of land being used primarily for a place of dwelling and located outside the city limits. All such tracts were found in Section 2 of the area.

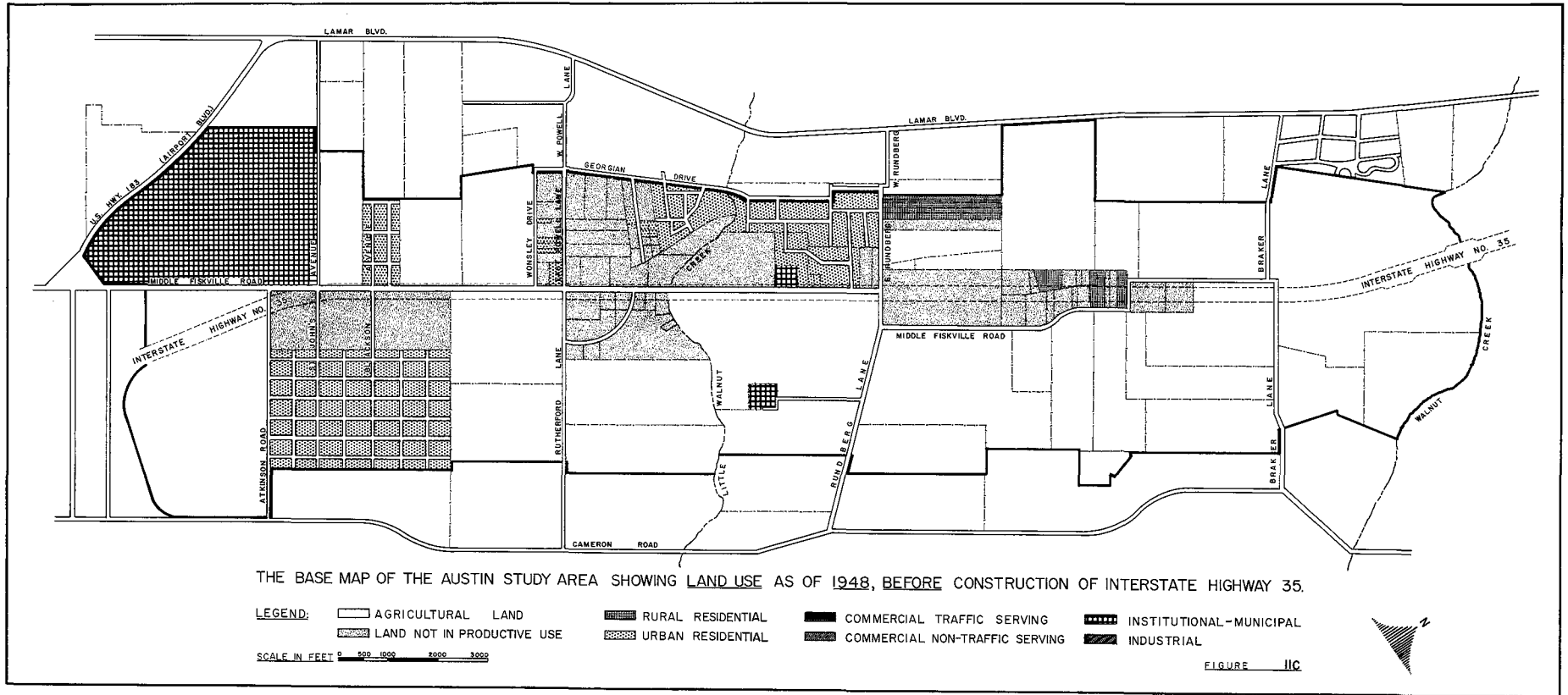
There was no land being used for commercial or industrial purposes before construction began on the new highway.

## *Land Use Changes During 1949-57 Period*

The first overlay to the base map (Figure 11B) shows the changes in land use which had occurred after the new facility had been constructed for four years. As can be seen, extensive changes took place throughout the study area, especially in the vicinity of the new routes. During this period, there were eight land use classifications observed compared to only five uses on the base map. The most noticeable change was the extensive reduction in land formerly classified as agricultural, as the area began to be devoted to more intensive uses. It can be assumed that the agricultural land was converted into other uses which had a higher utility value or price potential. Otherwise, it would not have been retired from productive use in the various agricultural enterprises.

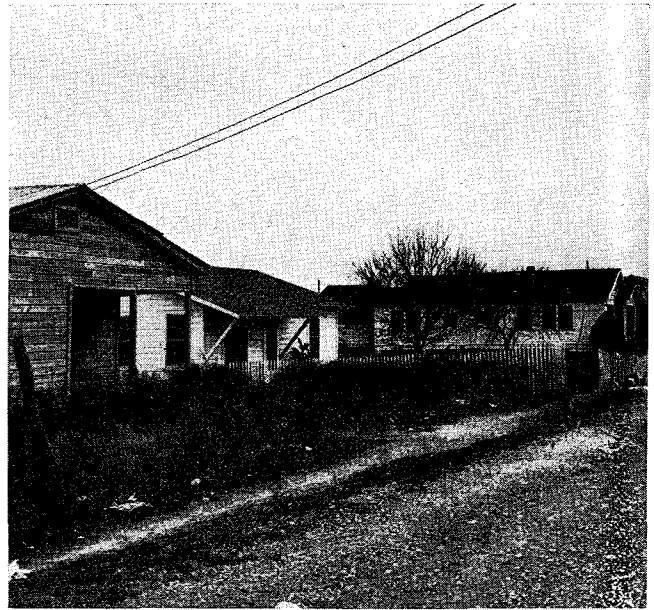
Some of the agricultural land which changed use during this period was simply lying vacant and idle. The owners were riding the upswing in land values, waiting until they thought the time was right to sell their properties. Other owners were holding for future use, even though they continued to make some use of the land for agricultural purposes during the interim period. Thus, most of the land which changed use during the 1949-57 period was classified as land held for future use, whether in limited agricultural production in the interim or lying vacant and idle. Since this land had not changed to a higher productive use, it was assumed that many of the owners felt that land values had not reached their peaks during this period. Many of the new owners were realtors and home builders who were waiting for more residential, commercial, and industrial development to occur in the area before selling their land.

Another large portion of the land which was in agricultural use during 1948 changed to urban residential. A total of 12 subdivision plats were recorded in the court house records. In addition, there was another unrecorded subdivision started. Of these 13 subdivisions, six came into existence during 1949-53, the construction period of the new highway. The other seven were recorded during the four years immediately following construction. Because of the greater availability of open land and lower land values, Section 2 was the most logical place for land to be subdivided; consequently, a total of eight new subdivisions were located there. The other

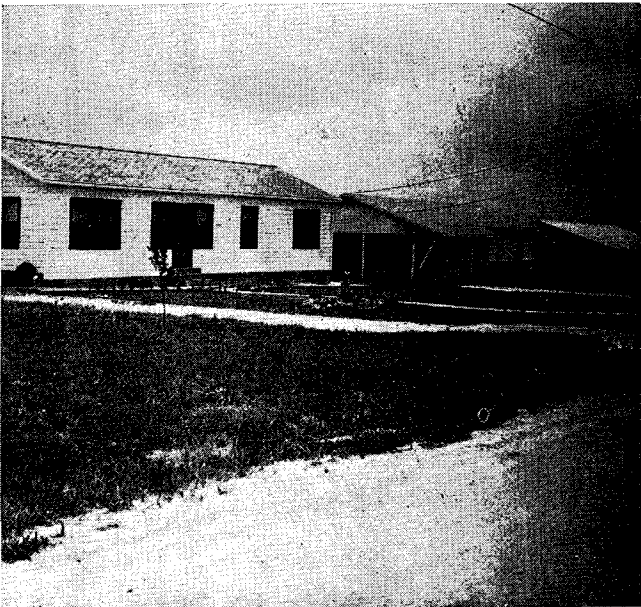




St. John's Home



St. John's College



Georgian Acres



Ludwig

Typical homes, some abutting IH 35, in the old subdivisions located in the study area during the before period.

five new subdivisions were located in Section 1, with all but one being relatively small.

Only one of the above 13 subdivisions is substandard in appearance and improvements. The others can be broadly classed in the middle to upper-middle price range. Prices of unimproved lots in this group varied between \$12 to \$27.50 per front foot at building back-set line.

After the new highway was built many attractive rural homesites were created. There were 18 new rural residential improvements built during the 1949-57 period, most of them bordering the new highway. Fourteen of these were located in Section 2 and four in Section 1.

As was expected, numerous (18) businesses were located in the area during this period. Twelve of these

were commercial businesses, three industrial businesses, two office buildings, and a nursing home.

Of the twelve commercial businesses, 10 were abutting the new highway. Also, the office building, one of the industrial businesses, and the nursing home were located on the new route. The presence of the new facility was a principal reason cited by the owners of the above businesses for locating where they did.

Ten of the 18 businesses were located in Section 1 of the study area. The other eight were located in Section 2. See Table 15 for a list of the specific types and numbers of abutting and nonabutting businesses in the study area. Most of these businesses were opened for business after construction was completed on the new facility.

A total of four institutional tracts were located in the study area during this period, two in each section. A school facility was built on one tract and the Texas Highway Department purchased a site for a district office. The other two tracts are occupied by church buildings. The large institutional tract which was shown on the base map has been changed to land held for future use after further investigation revealed that this was its logical use.

There was an increased amount of land ownership division occurring during this period, as evidenced by the first overlay map. Some of this parceling occurred

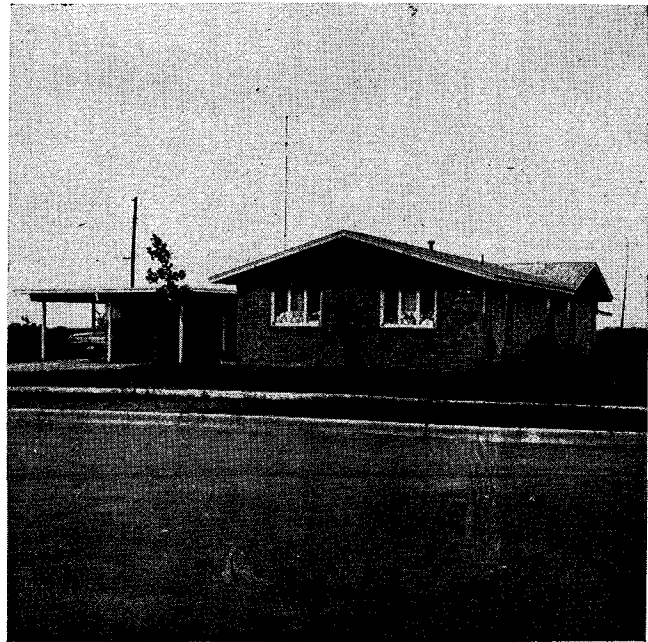
in the land held for future use which still has not changed use.

***Land Use Changes During 1958-61 Period***

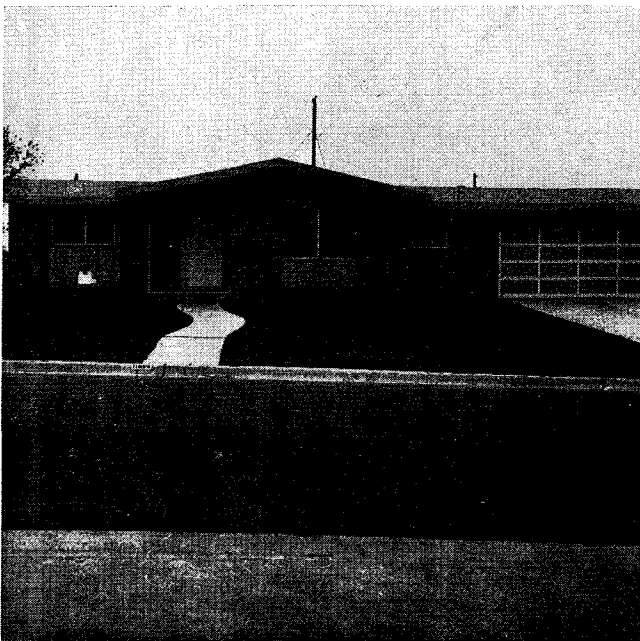
Land use changes in the study area during the 1958-61 period occurred at a somewhat slower rate than in the prior period. (See Figure 11A). Of course, there were somewhat fewer tracts available for higher uses. Also, it was evident that a large number of owners of land being held for future use were still holding for higher land prices. However, the greatest land area to change from one use to another involved land previously



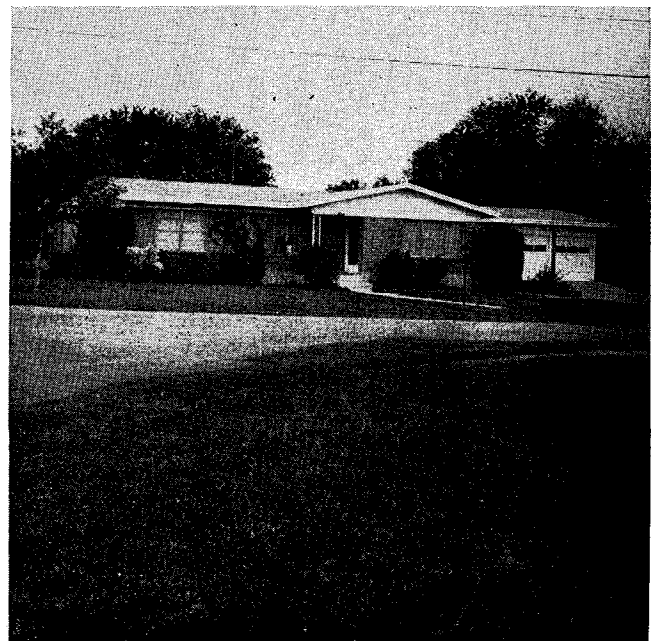
**St. Anthony Oaks**



**North Oaks**



**Huntland Heights**



**Eubanks**

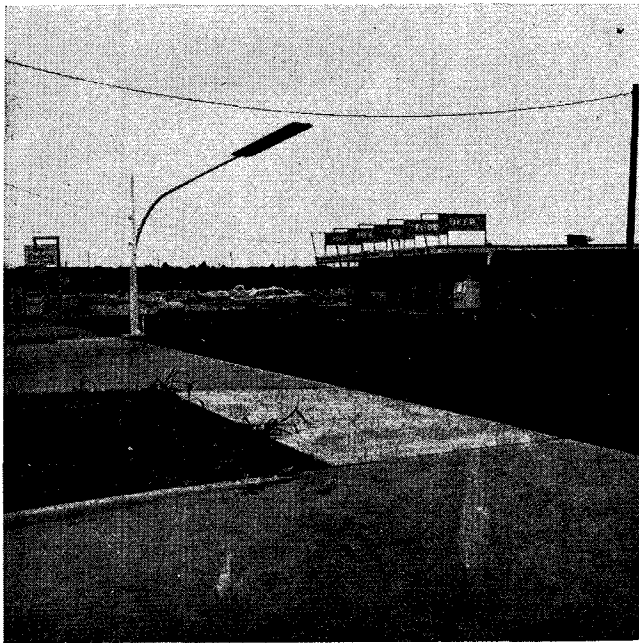
**Typical homes, some abutting IH 35, in new subdivisions located in the study area during the after period.**



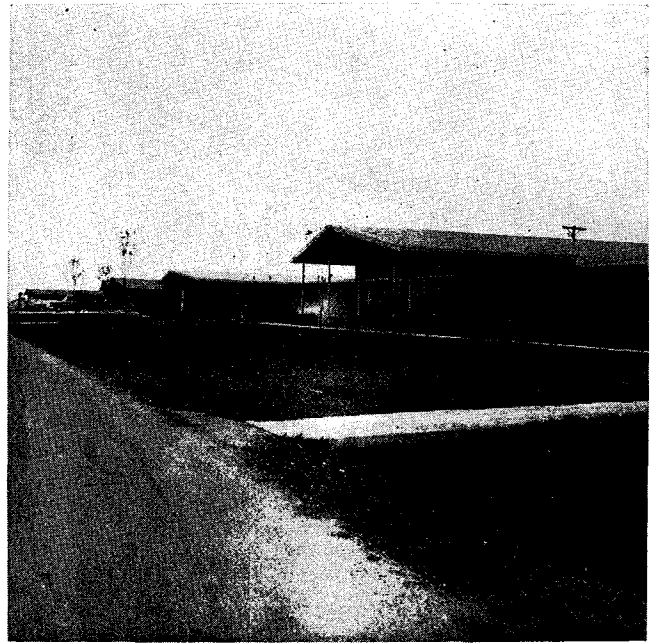
**Industrial Firm**



**Cleaning Firm**



**Drive-In Grocery**



**Retirement Village**

**Some of the businesses which have located in the study area near the route after its construction.**

held for future use. Most of this land changed to urban residential. Some changed to rural residential, commercial and industrial uses.

A total of eight more subdivisions were platted in the study area during this last period, six in Section 1 and two in Section 2. Two fairly large upper-middle priced subdivisions were located in each section. The other four, all in Section 1, were very small but in the middle price range.

Several agricultural tracts went out of production and were changed to land held for future use, principally

in Section 2. The most prevalent land use at the end of the study period was land being held for future use contrasted with that of agricultural at the beginning of the study. Actually, by 1961, there was more land already subdivided than remained in agricultural use.

A total of 14 businesses were located in the study area during this period, 11 in Section 2 and three in Section 1. Twelve of these were commercial businesses, one an office building, and one a retirement village for elderly people. (Again, see Table 15 for information on specific types and numbers of abutting and nonabutting businesses.)

Table 15  
BUSINESSES LOCATING WITHIN THE AUSTIN STUDY AREA BETWEEN 1953-61

ABUTTING EXPRESSWAY			NON ABUTTING EXPRESSWAY		
Type Business	Number	Status	Type Business	Number	Status
Traffic Serving			Non-traffic Serving		
Service Stations	3	1 opened after 1957	Electric Shop	1	Open
Food Service	2	Both Open	Discount House	1	Opened after 1957
Motels	2	Both Open	Drive-In Grocery	1	Opened after 1957
Non-traffic Serving			Retirement Village for Aged	1	Opened after 1957
Small Office Building	3	1 opened after 1957	Heavy Equipment Welding	1	Open
Motor Freight Line	1	Open	Rug Cleaners	1	Opened after 1957
Moving and Transfer Company	1	Opened after 1957	Used Tire Yard	1	Open
Truck and Machinery Sales and Service	1	Open	Sheet Metal Shop	1	Open
Heavy Equipment Sales and Rentals	1	Opened after 1957	House Movers and Sales	1	Opened after 1957
Automobile Parts	4	3 Opened after 1957			
Light Manufacturing	1	Burned after 1957			
Sign Company	1	Opened after 1957			
Model House Sales	1	Opened after 1957			
Rest Home for Aged	1	Open			
Lawn and Garden Shop	1	Closed after 1957			

Of the 12 commercial businesses, nine were located on the new route. The other three are on crossroads near the new highway. The new office building is also located on the new route.

About half of the commercial businesses are the type which are not necessarily dependent on the immediate local area. Their sales area includes all of Austin and the surrounding area. The owners feel that the new highway affords them an excellent route for their customers and service personnel to commute back and forth to their businesses.

Some of the commercial establishments located on the highway are very unsightly in appearance, especially used automobile parts yards.

Several other tracts were classified as being in institutional-municipal use. Two churches were located in Section 1 and one in Section 2. Another tract in Section 1 is improved with a school building. In Section 2, the city of Austin has a power station and the State

of Texas purchased a narrow strip between Middle Fiskville Road and the new highway right of way for possibly a roadside park.

One of the industrial businesses burned during this period, reducing the number of firms to two in the study area. This was the one that abutted the new route. As of investigation, this tract was still in no productive use.

Several more rural residences were located on land formerly in agricultural use or land for future use. All of these were in Section 2.

Some additional parceling occurred in the land held for future use. There were several other property divisions evidenced by land changing to other uses.

In conclusion, the land use maps indicate that changes in land use of land abutting or near the new highway have been extensive and have occurred at a fairly rapid rate. It appears quite evident that the new highway played an important role in encouraging this type of change.



# Relationship Between Changes In Land Use and Land Values

The purpose of this section will be to identify the relationships that exist between changes in land uses and land values.

As was stated before, many factors can influence the value and use of property. Location of a property in relation to urban areas, major traffic arteries, etc., is considered to be one of the primary factors which influence the value of property and help determine its highest and best use. As it is assumed that land value changes can be measured through the market price, it also can be assumed that the changes in land use are influenced by market price. Usually the higher the land use, the higher the land value; conversely, price itself will affect the alternative uses to which land may be put. Land in residential use is considered as having a higher use than agricultural land, thus establishing a higher land value (price).

Land in a lower use, such as agricultural or idle land, tends to sell (change owners) before changing to a higher use. The buyer is usually either one who has the capital to develop such land into higher use or is a speculator who is aware of the higher use potential of the land and is willing to assume the holding risk involved. Both of these types of buyers seem to have been very active in the study area.

Thus, to show the degree of direct relationship that existed between changes in land value and land use, data are presented on a time period basis in three different ways. First, the sales were grouped according to their use before selling to show the differences in price between time periods for the various original uses. Secondly, the sales were grouped according to their use after selling to show the difference in price between time periods for various after uses. Thirdly, the sales were grouped according to specific uses to show the differences in sales price when the properties changed from a specific use to another specific use. The time periods are the same as those used in the two previous sections: Period 1 is the before period; Period 2 is the construction period; Period 3 is the first after period; and Period 4 is the second after period.

Only land sold as acreage is included in this analysis. Table 16 shows that 275 acreage sales were classified according to their before and after sale uses. It shows the number of sales changing from one specific use to another specific use throughout the 21-year study period. Also, the number of acres and percent of total acreage for each land use group are presented. The figures represent tracts selling one or more times during the study period. As related earlier, 49 percent of the 275 sales are repeat sales. Thus, a tract which shows in the Class 1 to Class 1 land use group may also show in one or more of the other groups

## Land Use Before Sold

Sales from specific use classes, that is, grouped according to land use before sold, are shown graphically in Figure 13. This semilogarithmic graph shows the average adjusted price per acre, not area weighted, paid for property in each class.

With only two exceptions, land prices of each class in Figure 13 increased in a uniform direction from time period to time period. The sales from Classes 1 and 2 (agricultural and land held for future use) land increased significantly in price from the first through the fourth periods. Sales from Class 3 (rural residential) land increased constantly until the fourth period, in which a small decline occurred between the last two periods. Sales from Class 4 (urban residential) land declined slightly in price between the first and second period, and experienced a sharp increase between succeeding periods. Temporary drops in price in the above periods could have been due to several things. Location, quality of improvements, and area size differences between periods seem to be the principal causes in the above two exceptions. However, these declines in price represent only those few properties that sold. It is unlikely that all properties in these classes declined in value.

With only one exception, the prices paid for land in the higher uses were more than that paid for land in lower and less intensive uses. This held true regardless of the period in which a comparison was made. Also, for successively higher uses, generally a longer period of time was required for the greatest rate of price increase to occur. Class 1 land experienced its greatest rate of increase in Period 2. Classes 2, 3, and 4 land had their greatest increases in Period 3. Therefore, the first relationship analyzed indicates that a higher land use commands a higher price than a lower use.

Table 16  
CHANGES IN LAND USE OF ACREAGE PROPERTIES  
SELLING IN THE STUDY AREA DURING THE  
WHOLE STUDY PERIOD, 1941-61

Land Use Changes <sup>1</sup>	Number of Sales	Number of Acres	Percent of Total Acreage
1 to 1	9	1034.6	30.41%
1 to 2	23	929.6	27.22
1 to 3	2	12.0	0.35
1 to 4	4	109.7	3.23
1 to 5	1	.8	0.02
1 to 8	2	7.0	0.21
2 to 2	139	887.7	26.10
2 to 3	16	33.4	0.98
2 to 4	20	232.9	6.90
2 to 5	1	8.1	0.24
2 to 6	8	51.7	1.52
2 to 7	4	3.4	0.10
2 to 8	2	29.1	0.86
3 to 2	4	3.9	0.11
3 to 3	23	38.2	1.12
3 to 6	1	1.7	0.05
4 to 4	15	16.3	0.48
6 to 6	1	1.7	0.05
TOTAL	275	3401.8	100.00

<sup>1</sup>The numbers represent the following land uses: (1) agricultural, (2) land held for future use, (3) rural residential, (4) urban residential, (5) commercial traffic serving, (6) commercial nontraffic serving, (7) industrial (manufacturing), and (8) institutional - municipal. Each of the above land uses are defined in the appendix.

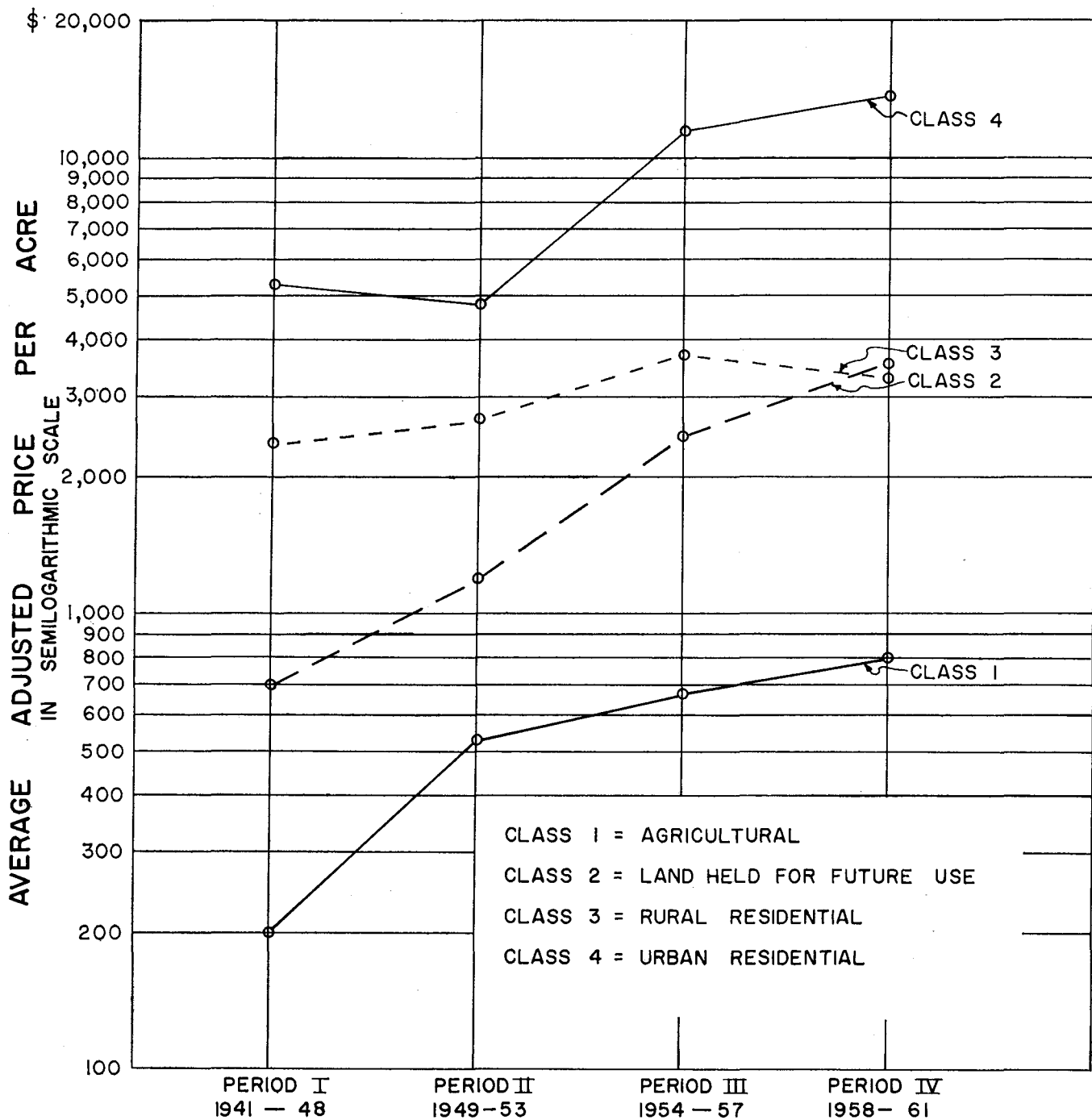


Figure 13. Trends in land value of properties grouped according to land use before sold and time periods.

### Land Use After Sold

Sales to specific use classes, that is, grouped according to land use after sold, are shown in Figure 14. It could be expected that in a rapidly developing area, changes to higher uses would continually reduce the amount of agricultural land remaining in that use and that this category of use would eventually be eliminated. This is exactly what happened in the Austin study area. After the second period, Figure 14 shows no sales of this use occurring. The buyers of agricultural land retired it from that use and put it to other uses. Even

so, Period 2 land prices were higher than Period 1, showing that agricultural land experienced an increase in price even within the same use. The sale of properties to Class 2 shows that the prices of such land increased significantly and at an almost constant rate from Periods 1 through 4. Class 3 land values increased through Period 3, and then declined during the last period. Class 4 land values decreased between Periods 1 and 2, but steadily increased through Periods 3 and 4. As was indicated earlier, the temporary drop in price in one period was probably due to locational, quality of improvements, and area size differences between periods.

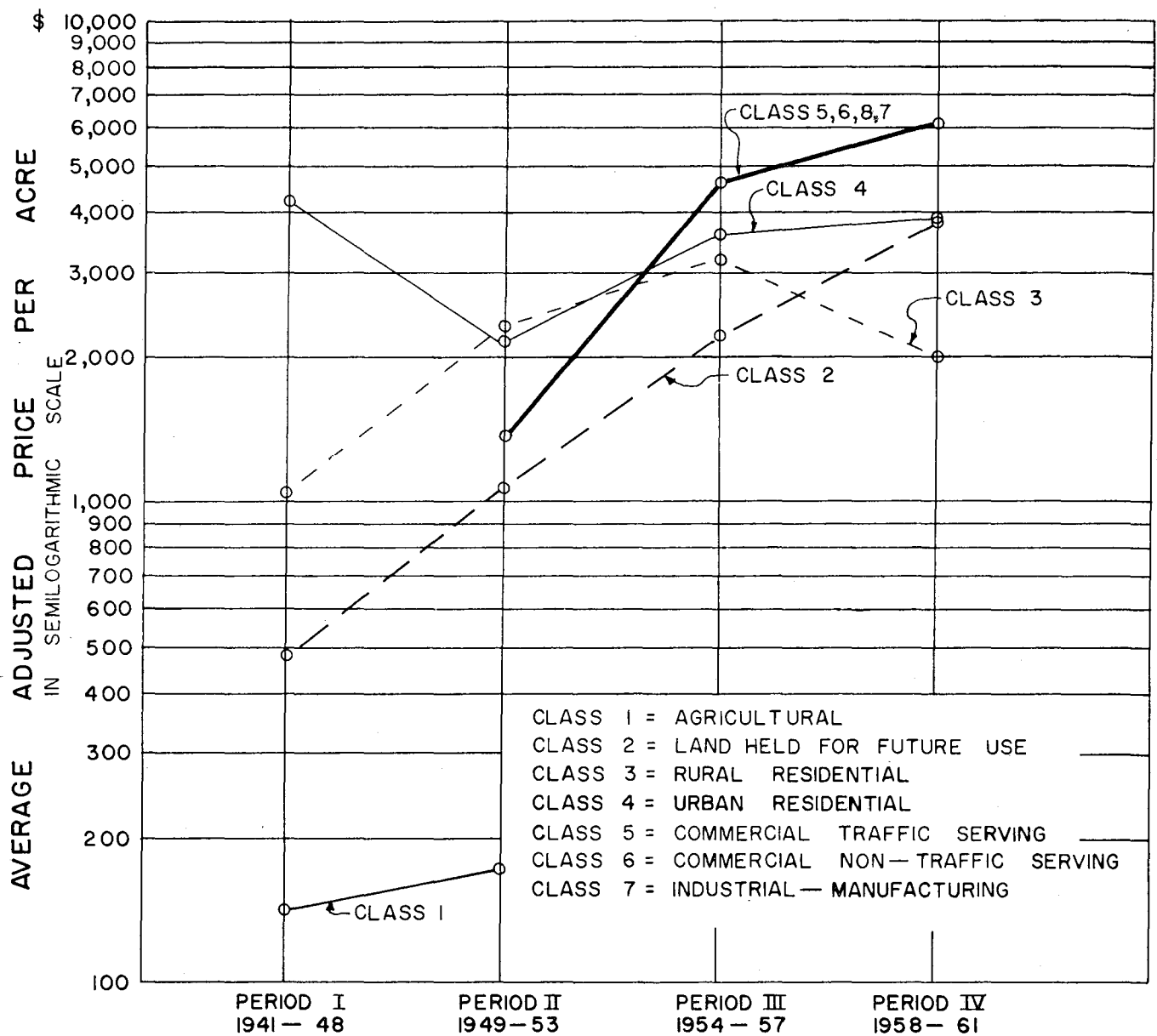


Figure 14. Trends in land value of properties grouped according to land use after sold and time periods.

Due to so few sales in Classes 5, 6, and 7 (Commercial traffic serving, commercial nontraffic serving, and industrial uses respectively) for each period, these three were combined. There were no sales of land to these uses in Period 1, which was expected since there was no facility to serve the area at that time. Also, only one sale took place during construction. However, after opening of the new highway, eight and seven sales occurred in Periods 3 and 4, respectively. The land values of these classes increased between each period, and were well above those reached by the lower classes. The relationship between price and successively higher uses is well illustrated by these comparisons.

#### Land Use Before and After Sold

Figures 15, 16, and 17 show the breakdown of sales from one specific use to another specific use. Here a good picture is ascertained of the changes in land values

with respect to the before and after sale uses. There are several periods with no sales for specific use changes which leaves some gaps in the analysis. But, there are sufficient data presented to indicate the general relationship which existed between land value and land use.

Figure 15 shows that land values as reflected by Class 1 property sales were greater as land moved into successively higher use. This chart also shows that the land values of all the use groups (1 to 1, 1 to 2, etc.) increased continuously from one period to the other.

Figure 16 presents the use changes from Class 2. It tells about the same story as told in the case of Class 1 land values; however, Period 1 properties changing to Class 4 sold for a much higher value than those in the other periods. The Period 1 price is represented by only two sales, one selling for a much higher price than the other. The combined Classes 6 and 7 of Period 4 had a higher value than the combined Classes 5, 6, and 7

SALE OF PROPERTIES FROM CLASS 1 TO SPECIFIC  
USES BY PERIODS

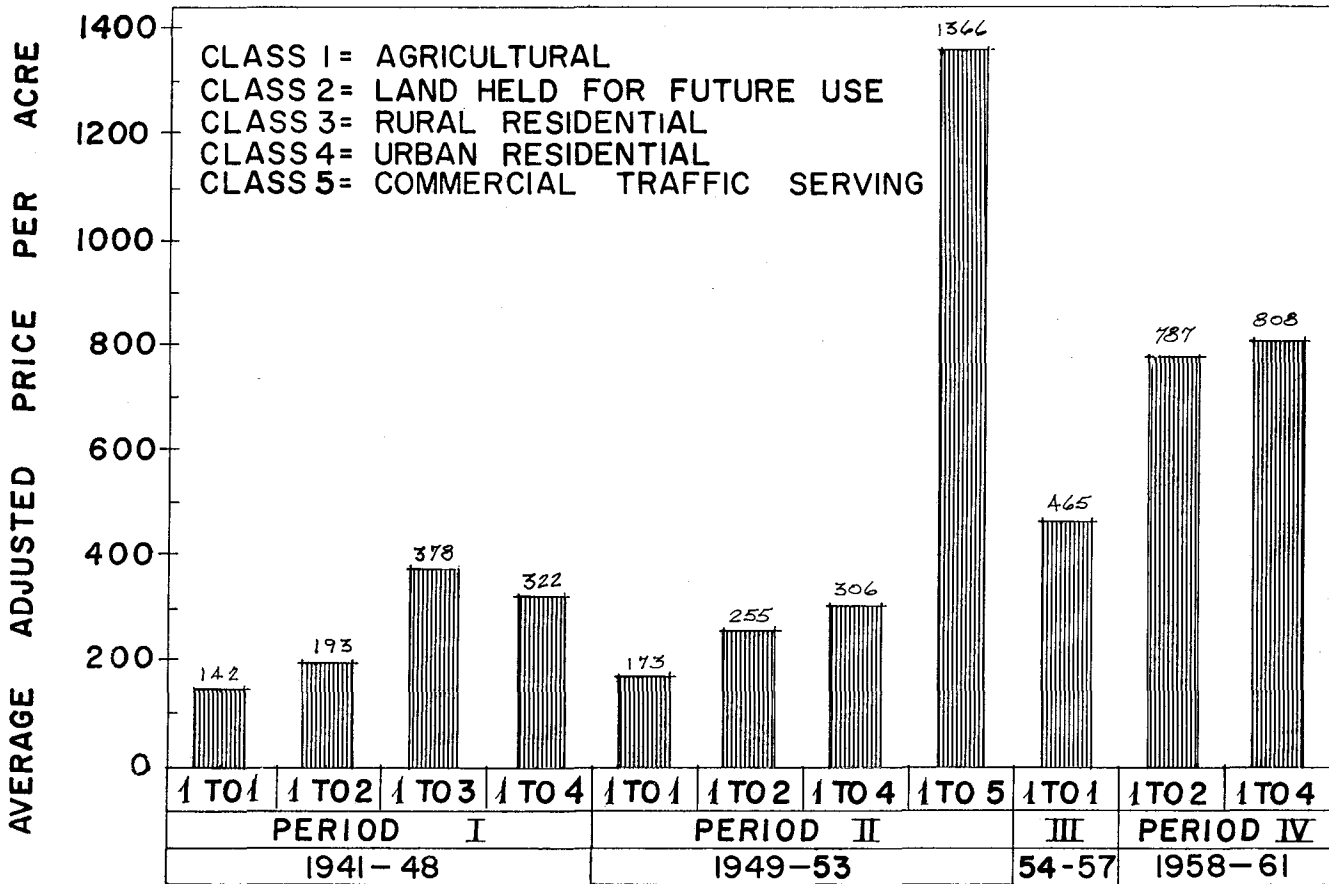


Figure 15.

of period 3. With only one exception, Figure 16 shows that the land values of all these groups (2 to 2, 2 to 3, etc.) increased continuously from one period to the other.

Figure 17 has very few use groupings for comparative purposes. Four property sales that were in Class 3 before sale changed to Class 2. These were the only properties in the study area where the use moved down the land use ladder. These properties had old improvements and after the sale the houses were removed in preparation for an even higher use in the immediate future. Class 3 land selling to other uses increased in value between each period. Since none of the Class 4 land changed to other uses after selling, no comparisons can be made of that group. This suggests that when properties are improved with a residence, they are slow to change to another use. However, this area received such a strong stimulus from the new highway that changes were promoted in land use of five properties in Class 3 with resultant increases in value.

In summary then, it can be said that all three relationships analyzed indicate that a higher land use commands a greater price than a less intensive one. Most of the land in the study area moved to a higher use, and consequently, to a higher value. A large part of the land

first moved to Class 2, a holding or speculative class, where the new owners made it available for movement — at a higher price — into a higher use. Some realtors and speculators are willing to assume the higher costs and risks incidental to this ripening period because they are aware of the potential appreciation in values of such land. Competition between these realtors and speculators did cause land values to rise in the study area. The earlier statement that 49 percent of the 275 sales were repeat sales indicates the extent of the competition which occurred among various buyers and sellers of land.

After the new highway was opened to traffic, demand for higher uses mounted, especially at intersections and for properties abutting the facility. Land in Classes 1, 2, and 3 uses changed to Classes 5, 6, and 7. Some 15 sales were involved. Also, large blocks of Classes 1 and 2 land changed to Classes 3 and 4. However, even at the end of the study there were relatively large blocks of Class 1 and 2 land available for future development. Some of this will probably continue to be held until the supply of land at more strategic locations is further depleted. Even after the close of this study period, several tracts of land in Class 2 have continued to be sold as sites for service stations, drive-in groceries, light manufacturing concerns, and home sales.

### SALE OF PROPERTIES FROM CLASS 2 TO SPECIFIC USES BY PERIODS

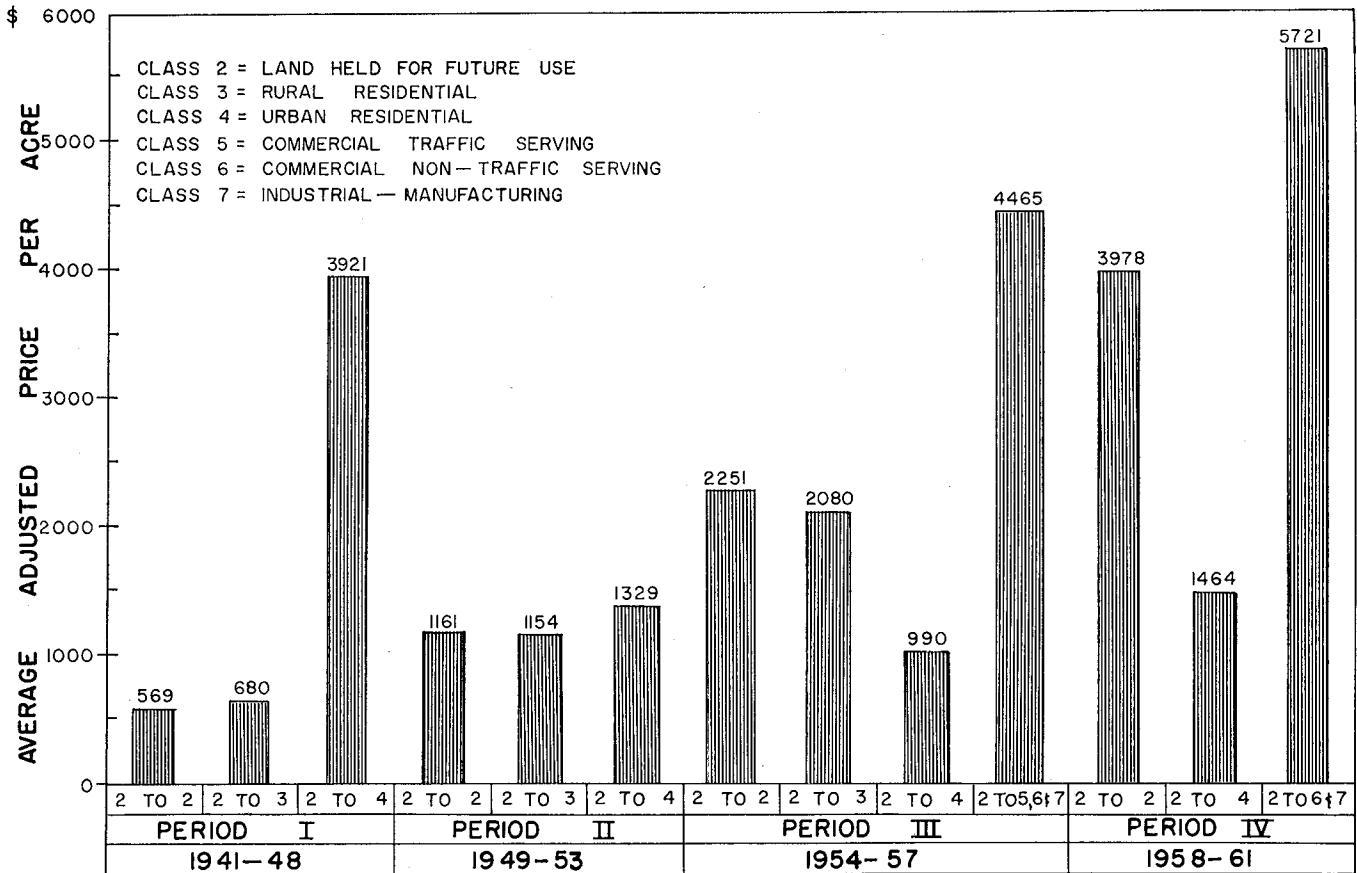


Figure 16.

SALE OF PROPERTIES FROM CLASS 3 TO SPECIFIC USES  
BY PERIODS

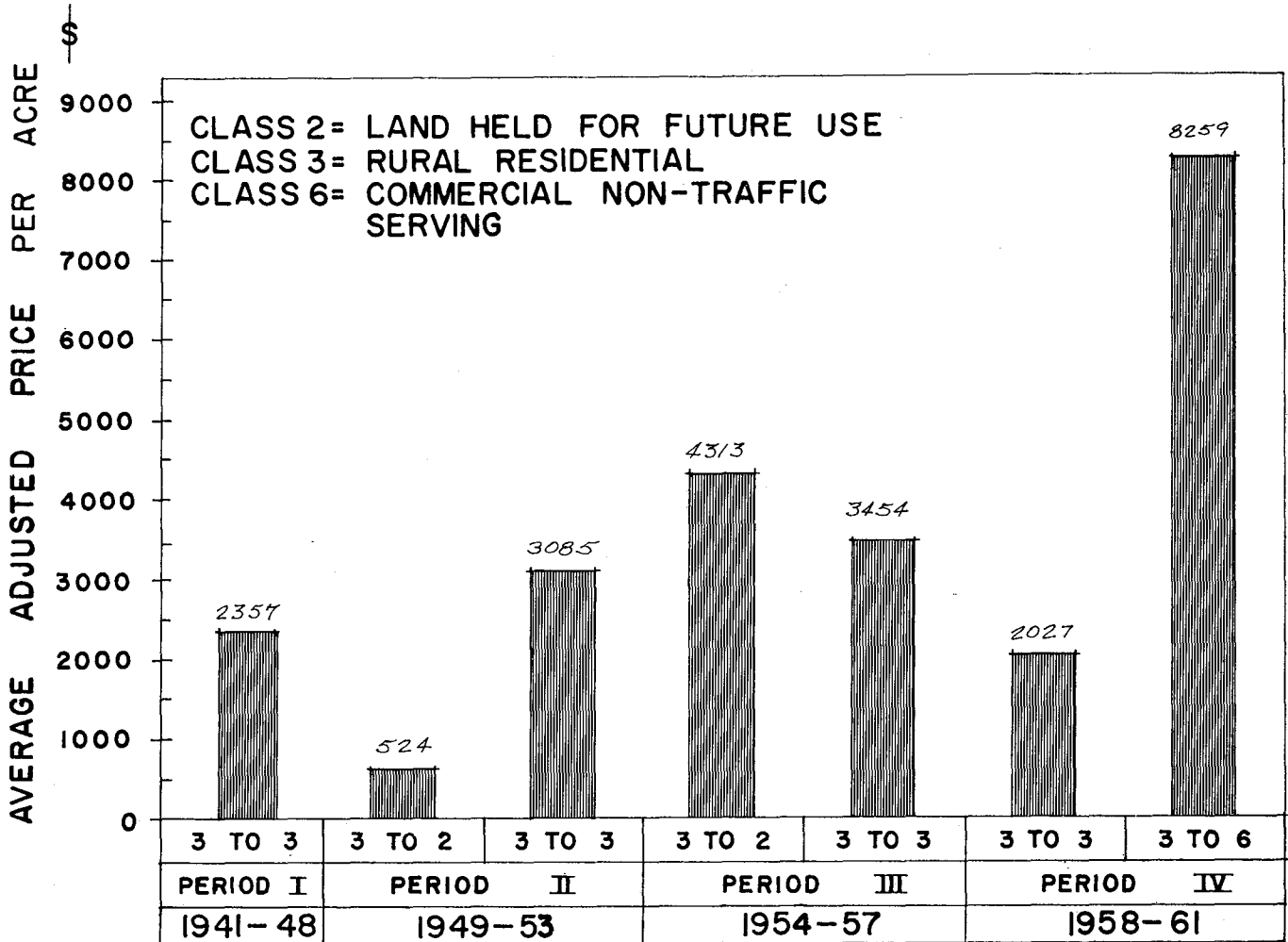


Figure 17.

# Changes In Business Activity

## Introduction

In the original Austin study, an attempt was made to carefully analyze the new highway's economic impact on business activity along the old route, which it parallels, and also its effects on the location and change in such activity along the new route. It was pointed out in the first report that either benefits or disbenefits to businesses may accrue to an area, and that they may be short-term or longer-term in nature. Short-term benefits result from expenditures of funds for construction, labor, materials, and other local purchases created as a result of the construction. However, no attempt was made to isolate and analyze the amount of such benefits accruing to the businesses on old U. S. Highway 81. Short-term disbenefits usually result from disrupting normal business operations by the construction process itself; however, since no portion of the old U. S. Highway 81 was affected by the construction of the new highway, such disbenefits should not have been a factor in this instance. Because short run effects are so diffused and transitory in nature, they do not lend themselves to measurement by the analytical tools and processes available to this

study. Consequently, while they are recognized as being an important consequence of the highway program, they will not be treated in detail. This report, then, concentrates its attention on isolating and analyzing the longer run effects.

Longer run benefits may include such things as the encouragement of local trade at old route businesses through reducing the amount of transient traffic and thereby improving both shopping convenience and safety, the stimulation of total business activity along both the old and new routes due to the creation of new sites along the new route, increasing population growth in the area through the opening of additional areas to housing developments, forcing modernization of business houses to compete with new ones, etc. The longer run disbenefits could be considered as the loss of sales volume by businesses along the old route due to the removal of some transient trade, the reduction of property values of old route business houses (especially traffic serving), the initial overinvestment costs from purchasing new property along the new route in an attempt to recapture transient trade, etc.

## BUSINESS STUDY AREAS

### OLD & NEW ROUTES OF U.S. 81

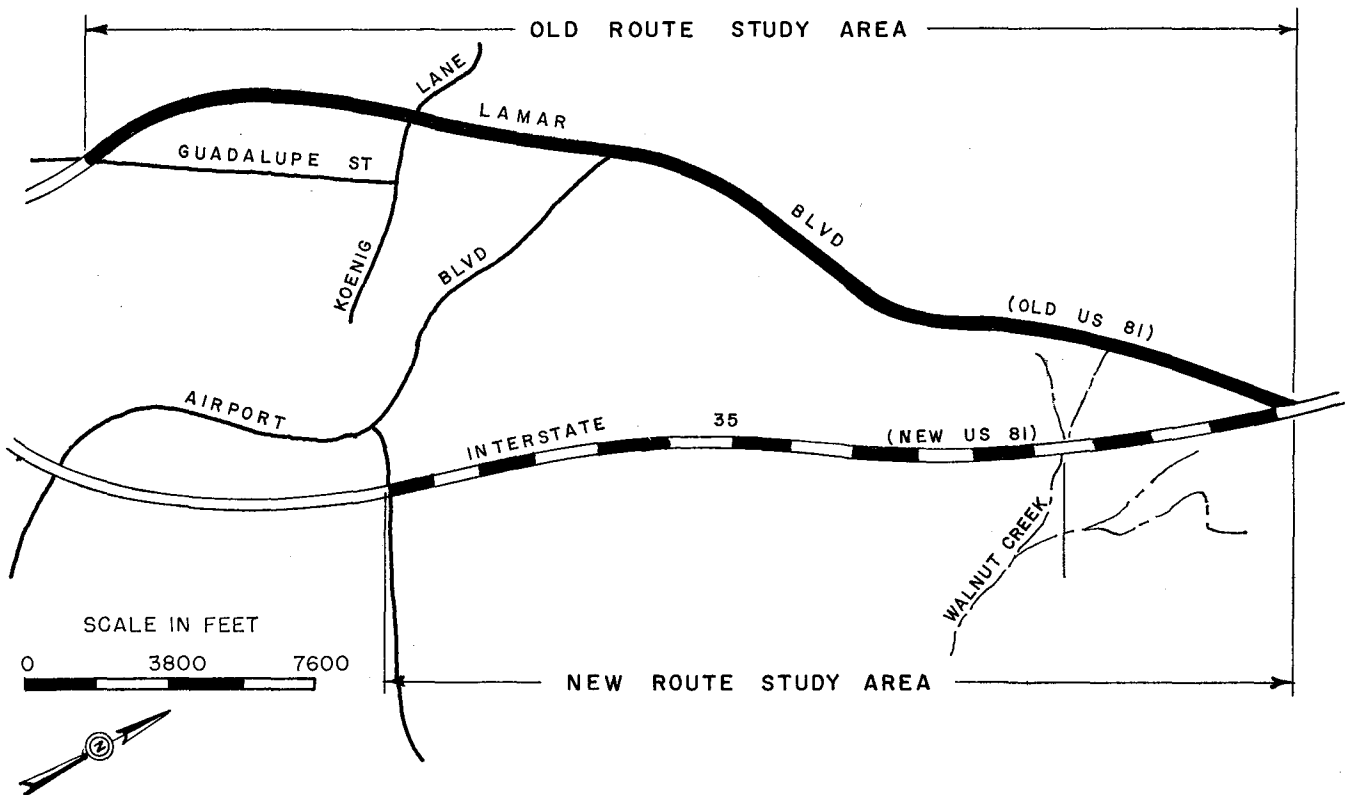


Figure 18.

The longer run effects are considered to begin immediately after construction of the new facility when the traffic is diverted from the old route. The first effects are usually disbenefits. They are more severe during the early period before any adjustments, such as relocation of business on the new route, modernization of present businesses, or changing to a new type of business, can be made. Usually, it can be expected that the longer the period before proper adjustments are made, the more severe the disbenefits may be to the old route businesses.

The longer-term effects can be considered from several viewpoints. The most limited view would be to consider only the effects that the new highway had on a particular business located on the old route. A broader view would be to consider the effects on all business of this and other types located on the old route. An expansion of this view to include all businesses of each type located on both the old and new routes in the area would be even more logical and reasonable to consider. The analysis becomes more complicated as the scope is broadened, but in terms of over-all influence is more realistic. The management of each business will adjust differently to the changed conditions. The result is that conclusions must be drawn only after a thorough and careful analysis has been made.

Businesses located on the new and old routes were considered in the current analysis. Figure 18 shows those portions of these routes which were included in the study. The most southernly point of the business study area is approximately three and one-half miles from the central business district of Austin. Slightly over half of this area is within the city limits, on either route.

The before and after approach was again used in this analysis. Business gross sales volumes, vehicle traffic volumes, business mortality, change in character of businesses, and new business establishments were studied to determine the effects of the new route after it was opened for traffic. Since the new route opened during 1954, it was necessary to use 1953 as the base year from which subsequent changes were measured. The first Austin study used 1957 as the after year for comparison of business data. This report uses an additional after year, 1961, in the same type of analysis. This doubles the period of the study and permits a more realistic evaluation of longer run effects.

Since some businesses obtain more sales volumes from the traveling public than others, it was thought wise to group the businesses studied into two major groupings; traffic serving, such as service stations, cafes, and motels; and nontraffic serving, which included all others. Each of these groupings are further divided into specific types in the analyses to follow.

### *Changes in Traffic Volumes on Both Routes*

Because traffic serving businesses are affected by fluctuations in the amount of traffic volumes on their routes, average daily traffic volume data were obtained for specific locations on both routes. Figures for each route are shown by years in Table 17. The volume of traffic on the old route dropped 48.4 percent immediately after the new route was opened for traffic in 1954. However, the combined figure for both routes was 20.1 percent higher than was originally recorded on the old route alone. Between 1954 and 1957, the volume of traffic on the old route declined slightly then recovered to about the old level. During the same period, the new

Table 17  
CHANGES IN THE AVERAGE DAILY TRAFFIC VOLUMES ON OLD U.S. HIGHWAY 81 AND NEW INTER-STATE HIGHWAY 35, 1953-61

Year	Old Route U. S. 81 ADT	Percent Change	New Route IH 35 ADT	Percent Change	Total ADT	Percent Change
	(Number)	(Percent)	(Number) Under Construction	(Percent)	(Number)	(Percent)
1953	10,110			NA	10,110	
1954	5,220	-48.4	6,920	3.2%	12,140	20.1
1955	5,100	- 2.3	7,140		12,240	.8
1956	4,900	- 3.9	7,190	0.7	12,090	-1.2
1957	5,170	5.5	7,240	0.7	12,410	2.6
1958	5,310	2.7	7,890	9.0	13,200	6.4
1959	5,310	0.0	8,410	6.6	13,720	3.9
1960	5,880	10.7	9,440	12.2	15,320	11.7
1961	6,240	6.1	10,240	8.5	16,480	7.6
Between 1953 & 57		-48.9		4.6 <sup>1</sup>		22.7
Between 1957 & 61		20.7		41.4		32.8
Between 1953 & 61		-38.3		48.0 <sup>2</sup>		63.0

<sup>1</sup>Based on 1954.  
Source: Texas Highway Department.



route experienced a 4.6 percent increase in volume of traffic. Thus, between 1953, the year before the new route was opened, and 1957, the time of the first after study, the traffic volume within the area (both routes) increased by 22.7 percent.

Between 1957 and 1961, the volume of traffic increased by 20.7 percent on the old route and 41.4 percent on the new route to give a combined increase of 32.8 percent for the area as a whole. Thus, the increase during the last four years has been quite significant.

Looking at the whole period, 1953 through 1961, the counts show that a portion of the drop in traffic volume on the old route was recovered as the area developed, although the removal of through traffic kept volumes 38 percent below its 1953 level. On the new route, the volume increased 48 percent from its first full year of operation. For both routes combined, the volume increased 63 percent, which is an extensive increase. It is reasonable then, to anticipate that some businesses, and especially those along the new route would profit by the increase in traffic volumes.

### Businesses Interviewed

All businesses on the old and new routes within the study area were interviewed in order to obtain information concerning the date of establishment and reasons for locating where they did. However, complete interviews were taken from only those businesses which were considered to have legitimate retail sales operations.

A total of 134 businesses were located on both routes by the end of 1957 (See Table 18.) Of these, 105 had been in operation along the old route during 1953. There were 30 new businesses established between the time the expressway opened in 1953 and the end of the first study in 1957. Sixteen of these were lo-

cated on the old route and 14 on the new facility. One business on the old route closed before 1957.

By the end of 1961, a total of 162 businesses were located on either the old or new route. This was a 21 percent increase over 1957 and a 54 percent gain from 1953. A total of 56 new businesses were established after 1957, 46 on the old route and 10 on the new route. During this same time, however, 28 businesses closed, and all but two were located on the old route.

The above figures show that an extensive amount of new business activity has occurred on each route. Also, the number of business failures indicates that significant adjustments as to types of business operation, number of businesses of each type, etc., were made on both routes. It should be pointed out however, that not all of this readjustment can be attributed solely to the new highway. Many businesses had reached the point where inadequacies of plant would have caused them to either undergo extensive remodeling, rebuilding or closing.

Of the 105 businesses in operation in 1953 on the old route, 80 were retail firms and 25 were nonretail. Of the 134 businesses on both routes which were in operation in 1957, 104 were retail and 30 nonretail. This shows a 30 percent increase in the retail group versus 20 percent for the nonretail group. The old route had 95 of the 104 retail businesses and the new route had nine. Of the 30 nonretail, 25 were on the old route and five on the new route. Of the 162 businesses in operation in 1961, 119 were retail and 43 nonretail. The old route had 104 of the 119 retail businesses and 15 were on the new route. Of the 43 nonretail businesses, 36 were on the old route and seven on the new route. Table 18 gives the between period percentage changes of the several groups.

Table 18  
CHANGES IN THE NUMBER OF BUSINESSES IN OPERATION WITHIN THE AUSTIN STUDY AREA BETWEEN SELECTED YEARS—1953, 1957, AND 1961

Type of Business	Number of Businesses							Percent Change Between Periods		
	Open at end of 1953 (No.)	New Before end of 1957 (No.)	Closed by end of 1957 (No.)	Open at end of 1957 (No.)	New After 1957 (No.)	Closed After 1957 (No.)	Open at end of 1961 (No.)	1953-57 (Percent)	1957-61 (Percent)	1953-61 (Percent)
<b>Old Route</b>										
<b>Retail</b>										
Traffic Serving	41	3	1	43	2	4	41	4.9%	4.7%	0.0%
Nontraffic Serving	39	13	0	52	24	13	63	33.3	21.2	61.5
<b>Total Traffic and Nontraffic Serving</b>	<b>80</b>	<b>16</b>	<b>1</b>	<b>95</b>	<b>26</b>	<b>17</b>	<b>104</b>	<b>18.8</b>	<b>9.5</b>	<b>30.0</b>
<b>Nonretail</b>										
	25	0	0	25	20	9	36	0.0	44.0	44.0
<b>Total Old Route</b>	<b>105</b>	<b>16</b>	<b>1</b>	<b>120</b>	<b>46</b>	<b>26</b>	<b>140</b>	<b>14.3</b>	<b>16.7</b>	<b>33.3</b>
<b>New Route</b>										
<b>Retail</b>										
Traffic Serving	NA	6	0	6	1	0	7	NA	16.7	NA
Nontraffic Serving	NA	3	0	3	6	1	8	NA	166.7	NA
<b>Total Traffic and Nontraffic Serving</b>	<b>NA</b>	<b>9</b>	<b>0</b>	<b>9</b>	<b>7</b>	<b>1</b>	<b>15</b>	<b>NA</b>	<b>66.7</b>	<b>NA</b>
<b>Nonretail</b>										
	NA	5	0	5	3	1	7	NA	40.0	NA
<b>Total New Route</b>	<b>NA</b>	<b>14</b>	<b>0</b>	<b>14</b>	<b>10</b>	<b>2</b>	<b>22</b>	<b>NA</b>	<b>57.1</b>	<b>NA</b>
<b>Grand Total Both Routes</b>										
<b>Retail</b>										
	80	25	1	104	33	18	119	30.0	14.4	48.8
<b>Nonretail</b>										
	25	5	0	30	23	10	43	20.0	43.3	72.0
<b>Total Retail and Nonretail</b>	<b>105</b>	<b>30</b>	<b>1</b>	<b>134</b>	<b>56</b>	<b>28</b>	<b>162</b>	<b>27.6%</b>	<b>20.9%</b>	<b>54.3%</b>

The nonretail businesses, 30 in 1957 and 43 in 1961, on both routes consisted of architectural firms, construction companies, ventilating contractors, stone works, storage warehouses, light manufacturing, etc. These businesses were not considered critical to the study and were only contacted for reasons stated above.

Of the retail businesses located on both routes, complete interviews (with reliable records of gross dollar sales) were obtained from 51 of the 104 in operation during 1957. Complete interviews were not obtained from the other 53 businesses for various reasons (change in management, poor bookkeeping methods, unwillingness to cooperate, etc.). Ten of these businesses were taverns, dance halls, drive-in theaters, etc., which kept irregular hours. The value of these businesses to the study were considered of a marginal nature. However, all information which was available on these businesses has been used to some extent in the analysis. In addition, it was considered necessary to estimate the gross dollar volumes of those firms which would not cooperate on the basis of the performance of like businesses for which actual dollar sales data were available. This was done in order to estimate the total gross sales on both routes for the years studied.

In 1961, 54 of the 119 retail businesses on both routes gave full information. Complete interviews were not obtained from the other 65 businesses for the reasons stated above.

### Traffic Serving Businesses

In this analysis, traffic serving businesses were considered to be service stations, motels, and food service establishments. It is believed that this group of businesses is most responsive to changes in traffic volumes and patterns. For this reason, a comparison of gross sales and other changes experienced by these businesses is a valuable indicator of the effects of the new highway facility upon the highway-oriented business of the area. As mentioned earlier, the first study showed changes over a four-year period. This study adds four additional years to the first, allowing more time for further adjustments to be made.

Of the 104 retail businesses in operation on both routes during 1957, 49 were of the traffic serving type.

Of the 119 retail businesses in operation in 1961, 48 were of the traffic service type. Actually, there were a total of 54 businesses of that type in operation at some time between 1953 and 1961.

### Service Stations on Old Route

A total of 22 old route service stations, 19 major and 3 independent ones, were involved in the study between 1953 and 1961. Seventeen of these stations were in operation during 1953, 15 in 1957 and 17 in 1961. The other five of the 22 stations were put into operation after 1953, three before 1957 and two after 1957.

### Gross Dollar Volume Changes

Gross dollar sales information was obtained from 17 of the 22 stations; however, only eight stations on the old route furnished data for all three study years. Refusal to cooperate, new businesses and closed out businesses accounted for the others not reporting gross sales one or more of the years studied.

Table 19 shows that the eight old stations experienced a 11.7 percent decline in gross sales between 1953 and 1957, and a further decline of less than one percent between 1957 and 1961. Thus, for the whole period between 1953 and 1961, gross sales declined a total of 12.4 percent. These figures indicate that after the stations experienced the initial drop in the first period, they managed to hold their own during the last period. However, as a group these firms were unable to regain the business they had lost in the first period. Actually, as the table shows, only three of the eight stations experienced a significant drop in gross sales during any one of the periods studied.

Table 20 shows the actual and calculated gross sales for all 22 stations on the old route. These stations are grouped according to whether they were old or new stations and also whether they furnished actual sales data or not. The gross sales of stations for which dollar sales were not available were estimated on the basis of the average price per gallon sold by all old stations reporting both gross dollar and gallonage volumes for the respective years. Between 1953 and 1957, the total actual and calculated gross sales of the seventeen old stations declined 19.3 percent, and between 1957 and

Table 19  
CHANGES IN DOLLAR VOLUME OF EIGHT SERVICE STATIONS LOCATED ALONG OLD U.S. 81 BETWEEN  
SELECTED YEARS—1953, 1957, AND 1961

Station Number	Gross Dollar Volume			Percent Change Between		
	1953	1957	1961	1953-57	1957-61	1953-61
	(Dollars)	(Dollars)	(Dollars)	(Percent)	(Percent)	(Percent)
1	\$117,000	\$ 86,400	\$ 47,300	-26.2%	-45.3%	-59.6%
2	36,000	63,000	88,228	75.0	40.0	145.1
3	54,000	58,000	74,432	7.4	28.3	37.8
4	84,000	84,000	83,950	0.0	Nil	Nil
5	84,000	36,500	30,027	-56.5	-17.7	-64.3
6 <sup>1</sup>	12,000	14,000	25,000	16.7	85.7	108.3
7 <sup>1</sup>	16,000	24,000	19,760	50.0	-17.7	23.5
8 <sup>1</sup>	66,000	48,000	42,000	-27.3	-12.5	-36.4
Total Stations	\$469,000	\$413,900	\$410,697	-11.7%	- 0.8%	-12.4%
Average	\$ 58,625	\$ 51,738	\$ 51,337			
Standard Deviation	\$ 36,398	\$ 26,317	\$ 27,272			

<sup>1</sup>These stations also had a small grocery business which accounted for a small percentage of their gross dollar volume. The gross volume for each type of business was not kept separated, thus the above volume figures reflect both that of the service station and the grocery operation.

Table 20

## CHANGES IN ACTUAL AND CALCULATED DOLLAR VOLUMES OF ALL STATIONS LOCATED ALONG BOTH ROUTES BETWEEN SELECTED YEARS—1953, 1957 AND 1961

Item	Gross Dollar Volume			Percent Change Between		
	1953	1957	1961	1953-57	1957-61	1953-61
	(Dollars)	(Dollars)	(Dollars)	(Percent)	(Percent)	(Percent)
<b>Old Route</b>						
8 Old Stations Reporting						
Actual Data All Years	\$ 469,000	413,900	\$ 410,697	-11.7%	- 0.8%	-12.4%
6 Old Stations Reporting						
Actual Data One or More Years <sup>1</sup>	369,510	414,144	402,764	12.1	- 2.7	9.0
3 Old Stations Not Reporting						
Any Actual Data—Calculated <sup>2</sup>	292,370	84,344	27,787	-71.2	-67.1	-90.5
Total 17 Old Stations	1,130,880	912,388	841,248	-19.3	- 7.8	-25.6
5 New Stations Reporting Some						
Actual Data <sup>3</sup>	NA	208,410	346,891	NA	66.4	NA
Total 22 Old Route Stations	\$1,130,880	\$1,120,798	\$1,188,139	- 0.9%	6.0%	5.1%
<b>New Route</b>						
3 New Route Stations <sup>4</sup>	NA	141,000	382,860	NA	171.5	NA
Total 25 Stations Within Study Area	\$1,130,880	\$1,261,798	\$1,570,999	11.6%	24.5%	38.9%

<sup>1</sup>Estimated gross dollar volume of businesses not reporting some years was on the basis of the average price per gallon of gasoline sold by all old stations reporting both gross dollar and gallonage volumes. The average price per gallon for the respective years was multiplied by each of these station's reported gallonage volumes.

<sup>2</sup>Only one of these stations reported gallonage volume and its gross dollar sales were estimated on the same basis as those in footnote 1. The dollar volumes of the other two stations which closed before 1961 were assumed to be equal to the average dollar volume of all old reporting stations for 1953 and 1957, respectively.

<sup>3</sup>In 1957 two of the three stations in operation reported actual gross dollar sales. In 1961 three of five reported dollar volume. The dollar volumes for the nonreporting stations for each year were estimated on the same basis as explained under footnote 1, except for being based on the new stations.

<sup>4</sup>Only two stations were open during 1957. The 1961 dollar volume for one of the stations is estimated on the basis of the average price per gallon received by the other two stations multiplied by the nonreporting station's gallonage.

1961, they declined an additional 7.8 percent. For the whole period, 1953 through 1961, these businesses experienced a 25.6 percent decline. Thus, the decline for the last period was less than half of that which occurred during the first period. Part of the old stations' decline in the last period was due to two old businesses closing and part was due to competition from the two new stations.

When the total dollar volume of five newly established firms was added to the volume of the old businesses, the results show less than one percent decline between 1953 and 1957 and a six percent increase between 1957 and 1961. For the whole period, 1953 through 1961, all the businesses showed an increase of 5.1 percent. Therefore, it is obvious that the new stations gained enough extra volume to more than offset the loss in sales experienced by the old businesses. The traffic on the old route increased more than 3,000 vehicles a day between 1954 and 1961. This represents the whole after construction period and supports the contention that more local customers were gained by these stations as a group to offset the through traffic loss due to opening the new facility.

Five of the above old stations had a small grocery business, but the portion of total gross sales attributable to this type of business was negligible in each case. Also, the operators said such volume had changed very little between 1953 and 1961.

There were fewer owner-operated service stations in 1961 than 1957. All of the new stations were owned by the parent oil companies. On the other hand, there were fewer management changes between 1957 and 1961 than in the earlier period. This was expected, since it is reasonable to assume that more severe adjustments would occur in the first period when sales were hardest hit than

in the last. Part of this adjustment was probably due to the sharp reduction in transient business at the beginning of the first period.

The average age of all the service station buildings on the old route (including the new firms) was 17.5 years. Very little modernization of the old buildings was evident between 1957 and 1961. Thus, it appears that little effort was made by the management of the majority of old stations to retain business through this means. Of the rented stations, the monthly rent was increased on only one. The rent was reduced on most of the others.

Therefore, it appears that the service station business was affected to some extent by the removal of through traffic from the old route, but not in the magnitude expected by some people, including the operators involved. Other factors, such as increased competition and higher population in the area entered the picture on both sides and made it difficult to draw a definite conclusion as to what the impact would have been under static conditions.

#### Gallonage Volume Changes

In studying the changes in the gallonage sales of the above service stations, about the same story is told as indicated by the changes in gross sales. It was easier to collect actual gallonage sales on more stations because most jobbers keep a complete set of records of the gallons of gasoline pumped by each station. Therefore, jobber records were used as the basic source for this information to give a somewhat more representative picture than that of gross dollar sales.

Tables in the appendix show the detailed results of the gallonage volume analysis. In short, the old stations experienced a somewhat greater decline in gallonage volume than dollar volume over the whole period. How-

ever, when the volume of the new stations is added, all old route stations experienced an over-all increase in gallonage volume which is slightly higher than that experienced gross dollar-wise. An explanation for the reason why the gallonage volume of the old stations declined more than their dollar volume is that the character of many of these stations changed. As gasoline volumes declined, many station operators concentrated on developing their local trade and emphasized service business, such as grease and wash jobs, after the new highway bypassed them. This extra service business offset some of their loss in gasoline sales. So a premium was placed on management practices which catered to the local clientele.

#### *Service Stations on New Route*

A total of three new stations were located on the new route between 1953 and 1961, two before 1957 and one after 1957. These stations were included in the study in order to complete the picture of area-wide influences. All of these stations sell major brand products, and are located adjacent to or near food service and motel businesses.

By 1961, these three stations alone had captured a gross dollar volume equal to almost one-half of that gleaned by the 17 old stations on the old route. (See Table 20.) They also grossed more than five new stations on the old route, even though there was no significant differences in the appearances and facilities of the two groups. Each operator indicated that the primary reason for locating on the new facility was the anticipation of good traffic volumes and the prospect of eventual residential development in the area.

Similar performances in gallonage sales were experienced by the three new route stations. In 1961, they pumped almost as many gallons of gasoline as the 17 old stations on the old route, and more than the five new stations on the old route.

#### *Service Stations on Old and New Routes*

Table 20 shows the consolidated dollar volume figures for all service stations along both routes for the years under study. Of primary significance is the fact that the over-all figures indicate net increases of 11.6 percent between 1953 and 1957, 24.5 percent between 1957 and 1961, and 38.9 percent between 1953 and 1961, in total business done.

The data reflect the conclusion that although some operators along the old route may have been adversely affected by the divergence of traffic to the new highway, the service station business of the combined areas has shown a solid growth between each of the years studied. The results also show that the operators of stations along the old route have been forced to utilize more efficient and aggressive management practices, to concentrate on the development of a local clientele, and to rely upon the build-up of near-by residential areas to compensate for the loss of transient traffic to the new facility. The performance of new stations along the old route also points up the importance of modernizing facilities to keep pace with competitive changes in an area undergoing rapid changes. Since 1957, residential development had speeded up in the area with a resulting stimulus to businesses on both routes. Remarks by service station operators during interviews in 1957 and 1961 support these beliefs.

#### *Motels on the Old Route*

Like service stations, motels are considered a type of traffic serving establishment which is very sensitive to changes in traffic volumes and patterns. Therefore, changes in gross dollar sales volume, property values, percentage of occupancy, and percentage of local versus transient customers are considered to be the most reliable measures of the effect of the new highway facility upon this class of businesses.

A total of 13 old route motels were involved in the study between 1953 and 1961. All were in operation as motels during 1953, 12 during 1957, and 10 during 1961. Eight supplied gross dollar volumes and other data for all three years, two gave 1953 and 1957 volumes, and three gave no volume figures for any year they remained in operation. The nonreporting motels' volumes were computed by first determining the total number of units operated by the eight reporting motels and arriving at the dollar volume per unit. This per unit value was multiplied by the number of units operated by the non-reporting motels. One of the nonreporting motels closed before 1957, one closed before 1961, and the other one was converted into a rest home.

#### *Dollar Volume Changes*

The eight motels which remained in continuous operation through the three years showed a decrease in gross sales of 31.5 percent between 1953 and 1957, 8.2

Table 21  
CHANGES IN DOLLAR VOLUME OF EIGHT MOTELS LOCATED ALONG OLD U. S. 81 BETWEEN SELECTED YEARS 1953, 1957, AND 1961

Motel Number	Dollar Volume			Percent Change Between		
	1953	1957	1961	1953-57	1957-61	1953-61
	(Dollars)	(Dollars)	(Dollars)	(Percent)	(Percent)	(Percent)
1	\$ 38,000	\$ 27,000	\$12,700	-28.9%	-53.0%	-66.6%
2	21,600	9,000	7,500	-58.3	-16.7	-65.3
3	16,881	19,461	20,091	15.3	3.2	19.0
4	22,000	14,000	27,000	-36.4	92.9	22.7
5	9,000	5,760	5,800	-36.0	00.7	-35.6
6	14,500	13,000	11,000	-10.3	-15.3	24.1
7	20,400	8,000	3,875	-60.8	-51.6	-81.0
8	4,000	4,000	4,000	00.0	00.0	00.0
Total	\$146,381	\$100,221	\$91,966	-31.5%	- 8.2%	-37.2%
Average	\$ 18,298	\$ 12,528	\$11,496			
Standard Deviation	\$ 10,174	\$ 7,666	\$ 8,264			

percent between 1957 and 1961 and 37.2 percent between 1957 and 1961. (See Table 21.) Six of the eight showed decreases between 1953 and 1957, and four of these decreased throughout the study.

The above figures indicate that the motels did show a considerable loss in gross sales between 1953 and 1957, and continued to decline between 1957 and 1961, but at a reduced rate. Exceptions were noted, of course; the newest motel, after experiencing a 36.4 percent decline, showed a 92.9 percent gain in the last period to give it a net 22.7 percent gain in the whole period. All of the eight motels were over 11 years old with one being 43 years old.

The average age of the ten old motels still in operation in 1961 was 18.6 years. Considering the age and condition of the businesses, the rate of turnover in management has been very low since the new highway was built. Only two firms had managerial changes. However, this is probably due to the socio-economic status of the owners. Most of the owner-operators live on the premises and are mainly elderly couples who have retired from other work. They have a low social mobility and a small measure of economic independence from retirement programs or Social Security. Consequently, they have continued to operate their businesses even at very low volumes.

Table 22 shows the actual and calculated dollar volume changes of all 13 old route motels which operated some time during the 1953-61 period. Two were converted to rest homes; one closed before 1961. With two of the old motels successfully converted into rest homes, it seems that others will likely change to such use in the not too distant future. The owners of both of the converted facilities were pleased with the performance of their businesses.

None of the old route motels are in the luxury class. In fact, most of them are classed below the average for the city as a whole. Present room rental rates for a single room range from \$3.00 to \$4.00 per night, with the rate structure changing very little since 1957. Prior to 1957, three of the motel operators indicated that they

had lowered both rates and standards in order to stay in business.

Only one of the old motels had swimming pool accommodations and had a fairly modern appearance. As of the time of the last interviews, only one had undertaken even a modest remodeling program in an attempt to improve its competitive position. Whether remodeling of the physical plant to a more luxurious type would have counteracted the negative effects of traffic loss due to the new highway is open to question. It is entirely possible that, without major remodeling, the motels in question would have experienced a decline in volume even without the new highway. This is indicated by the fact that the modern motels on the south side of Austin, also by-passed, continue to attract large volumes of customers as they did before the new facility opened. This also conforms to the national trend of upgrading motel accommodations.

#### *Property Value Changes*

Three of the motel owners supplied an estimate of value of their motel property for the three years studied. The three owners estimated that the value of their property had declined 33.8 percent between 1953 and 1957. Between 1957 and 1961 they showed an increase of 41.9 percent. Thus for the whole period (1953-61) the estimated value of their property decreased only 6.2 percent.

The extent to which these owner estimates reflect true market conditions for these facilities is not known. It would appear logical, however, that the owner estimates would be pessimistic in view of their losses in sales, since they tend to relate property value directly to income generation in present use without regard to possible alternative uses for the property.

#### *Occupancy Rate Changes*

Seven of the old route motels supplied occupancy data for all three years studied. Both normal capacity and average nightly occupancy rate were used in the analysis of occupancy changes. All seven motels experienced a decline in their occupancy rate in the amount of 36.7 percent between 1953 and 1957, and 42.9 percent

Table 22  
COMPARISON OF ACTUAL AND CALCULATED DOLLAR VOLUMES FOR ALL MOTELS LOCATED IN AUSTIN STUDY AREA BETWEEN SELECTED YEARS—1953, 1957, AND 1961

Item	Dollar Volume			Percent Change Between		
	1953	1957	1961	1953-57	1957-61	1953-61
	(Dollars)	(Dollars)	(Dollars)	(Percent)	(Percent)	(Percent)
<b>Old Route</b>						
8 Motels Reporting Actual Data all Years	\$146,381	\$100,221	\$ 91,966	-31.5%	- 8.2%	-37.2%
2 Motels Reporting Actual Data During 1953 and 1957	54,000	45,000	29,164 <sup>1</sup>	-16.7	-35.2	-46.0
3 Motels Not Reporting Any Actual Data—Calculated	29,403 <sup>2</sup>	14,991 <sup>2</sup>	<sup>3</sup>	-15.0	NA	NA
Total 13 Old Route Motels	\$229,784	\$160,212	\$121,130	-30.3%	-24.4%	-47.3%
<b>New Route</b>						
2 Motels		\$162,200	\$223,700		37.9%	NA
Total 15 Motels						
Within Study Area	\$229,784	\$322,412	\$344,830	40.3%	7.0%	50.0%

<sup>1</sup>Computed by determining the total number of units operated by the eight motels reporting actual data and arriving at a dollar volume per unit. The volume per unit was assumed to be equal to that averaged by the eight motels.

<sup>2</sup>Computed on same basis as those in footnote 1 except there were 10 motels reporting actual data in 1953 and 1957. Since one motel closed before 1957, this figure represents only two motels.

<sup>3</sup>Of the two remaining motels, one closed and one was converted to a rest home before 1961.

between 1953 and 1961. (See the appendix for detail information.) These figures compliment those of gross dollar volume. All but one of the motels lost occupants between 1953 and 1957, and three of these continued to lose customers on into 1961. Again the age and condition of the unit were considered to be strongly related to the loss in customers. Some of this loss in trade would undoubtedly have occurred merely because of the obsolescence of plant. Of course, the changed conditions accompanying the opening of the new highway did cause a sharply accelerated effectual obsolescence as evidenced by the severe drop in the occupancy rate during the initial period. However, in the absence of extensive remodeling or rebuilding, some decline was to have been expected.

Motels on the old route have lost most of the tourist trade since the new highway was constructed. The bulk of their customers now are salesmen, agency representatives and construction workers who require inexpensive housing for several days or weeks at a time and some semi-permanent residents.

#### *Motels on the New Route*

Two new motels were located on the new route in the bounds of the study area before 1957. One of these motels, while new and modern with respect to facilities, is in the "good" but not "luxury" class. The other motel is in the "luxury" class, and the operator holds the Austin area franchise of a nationally known motel chain. This motel is much larger than any other within the study area and had the largest dollar volume of business reported by any of the motels in the study.

These two motels are about three miles apart, on opposite sides of Interstate 35. Both are within one block of service station and food service accommodations. In 1957 the operator of the smaller motel said the performance of his business was not quite up to his expectations, but the other operator was pleased. By 1961, the operators of both felt that their respective business volumes had equaled original expectations. Both together experienced a 37.9 percent gain in gross dollar volume between 1957 and 1961. As an indication of optimism, the larger motel added 102 more units to its capacity during the middle of 1961. By 1961, the combined valuation of both motels was estimated at over a million dollars by the managements.

#### *Motels on the Old and New Routes*

The old and new routes had a total of 15 motels in operation during the study period. The only two motels to open during this period were located on the new route, while the three that went out of business were on the old route.

Table 22 shows that the new route motels out performed all of those on the old route in the volumes of business obtained during 1957 and 1961. Thus, when their volumes are added to the totals of those on the old route, the motel industry within the study area shows an increase in gross sales of 40.3 percent between 1953 and 1957, 7.0 percent between 1957 and 1961 and 50 percent between 1953 and 1957.

The above figures indicate that new and modern motel facilities located on the new route, where the transient traffic has been diverted, were able to recapture more business, by far, than was lost by the old route motels. This implies strongly that modern facilities coupled with favorable location on a transient traffic highway are necessary ingredients to a successful motel business in most any area. Comments by motel operators on both routes bear out this observation. Old route operators felt that they could gain some trade if the northern intersection of the old route with the new were better marked so that it would not be overlooked by traffic originally intending to follow the old route. It was felt that signing the old route as the business route and the most direct approach to the Department of Public Safety and the State Hospitals would secure more business for the motels and other traffic serving businesses.

#### *Food Service Establishments on Old Route*

The third group of traffic serving businesses studied was the food service establishments (cafes, restaurants, etc.). This group was also expected to be sensitive to changes in traffic volumes and patterns.

A total of 11 such businesses which operated during principally daylight hours were located on the old route and in operation throughout the study period. Four of these businesses were primarily restaurants, two were drive-in restaurants, four were drive-in taverns, and one was primarily a tavern.

Six of these businesses supplied gross dollar volumes for all years studied, three supplied data for at

Table 23

#### CHANGES IN DOLLAR VOLUME OF SIX FOOD SERVICE ESTABLISHMENTS LOCATED ALONG OLD U.S. 81 BETWEEN SELECTED YEARS—1953, 1957, AND 1961

Business Number	Dollar Volume			Percent Change Between		
	1953	1957	1961	1953-57	1957-61	1953-61
	(Dollars)	(Dollars)	(Dollars)	(Percent)	(Percent)	(Percent)
1	*	*	*	-30.4%	4.2%	-27.5%
2	*	*	*	-45.7	-8.9	-50.5
3	*	*	*	-42.9	250.0	100.0
4	*	*	*	-8.2	16.7	7.1
5	*	*	*	-14.9	-9.7	-23.2
6	*	*	*	56.7	1.8	59.5
Total	\$615,324	\$424,643	\$447,583	-31.0%	5.4%	-27.3%
Average	\$102,554	\$ 70,774	\$ 74,597			
Standard Deviation	\$125,479	\$ 65,296	\$ 55,793			

\*Individual volumes are not shown in order to preserve the anonymity of individual firms.

least one of the three years, and two reported no data. In addition, attempts were made to get each operator's estimate of changes in his clientele (classified as local or transient) served in his business.

#### Dollar Volume Changes

Table 23 shows the changes in the dollar volume of the six food service businesses which reported sales for all years studied. They experienced a decrease in dollar volume of 31 percent between 1953 and 1957, and an increase of 5.4 percent between 1957 and 1961, for a net decrease of 27.3 percent between 1953 and 1961. All but one of these businesses showed declines between 1953 and 1957, and only two showed declines between 1957 and 1961. This group of businesses was able to show a net increase in dollar volume between 1957 and 1961, in contrast to other types of old traffic service businesses on the old route.

Table 24 shows the actual and calculated dollar volume changes for all 11 food service establishments. The estimated volumes of the nonreporting business were determined on the basis of the percent change in the total volumes of the six businesses reporting between 1953 and 1957, or 1957 and 1961. Business volume declined 35.9 percent between 1953 and 1957, and increased 0.6 percent between 1957 and 1961, for a net decline of 35.5 percent between 1953 and 1961.

The physical appearance of the buildings of four of these businesses rated "good", four rated "fair" and three rated "poor". The owner of one business had spent a considerable sum of money renovating the building inside and out after the new highway was constructed. The others had not done much of anything to make their business houses more attractive through the study period. Nine of these business houses are at least 12 years of age and some are considerably older. Therefore, it is not surprising that the older firms continued their sales decline through the last period. On the whole, considering the condition and age of these facilities as well as the loss of highway oriented customers, these businesses appear to have recovered fairly well after the

initial loss of traffic. It also appears reasonable to assume that some of the older businesses would have experienced declines regardless of the presence of the new highway.

#### Clientele Changes

The operators of the food service establishments were asked to estimate the approximate number of customers served per week on the average through the years involved. Only five could supply an accurate estimate. In addition, they were asked to estimate the percentage of these customers which were "local" and "transient". With this information, the customer analysis was made and presented in Figure 19. The total number of customers dropped from 10,450 in 1953 to 7,200 in 1957, but increased back up to 7,970 by 1961.

Of the above totals, the percentage of local customers increased from 70.9 percent in 1953 to 90.1 percent by 1961. The percentage of transient customers, correspondingly decreased from 29.2 percent in 1953 to 8.9 percent in 1957 and further decreased to only 2.8 percent by 1961. It is not known why the number of transient customers declined further in 1961. It was probably caused by the establishment of new facilities outside the study area but within the same side of Austin on IH 35 that further attracted transient trade. The increase in the the total number of customers between 1957 and 1961 corresponds to the increase in gross sales.

In summary, then, it appears that after evaluating all the data, food service businesses along the old route did experience a substantial negative influence from the reduction of transient traffic which was diverted to the new facility.

#### Food Service Establishments on New Route

Only two food service businesses had opened for business on the new route by the end of 1957, and one of these had been in operation only four months. Both were restaurants, one attached to the "luxury" type motel previously described and one located near a truck stop. Table 24 shows that these two businesses grossed \$106,-

Table 24  
COMPARISON OF ACTUAL AND CALCULATED DOLLAR VOLUMES FOR ALL FOOD SERVICE ESTABLISHMENTS LOCATED IN THE AUSTIN STUDY AREA BETWEEN SELECTED YEARS—1953, 1957, AND 1961

Item	Dollar Volume			Percent Change Between		
	1953	1957	1961	1953-57	1957-61	1953-61
	(Dollars)	(Dollars)	(Dollars)	(Percent)	(Percent)	(Percent)
<b>Old Route</b>						
6 Businesses Reporting Actual Data all Years	\$ 615,324 <sup>1</sup>	\$424,643	\$447,583	- 31.0%	5.4%	- 27.3%
3 Businesses Reporting Actual Data One or More Years	206,962 <sup>2</sup>	91,864 <sup>2</sup>	65,396 <sup>2</sup>	- 55.6	- 28.8	- 68.4
2 Businesses not Reporting Any Actual Data—Calculated	205,108	141,548	149,194	- 31.0	5.4	- 27.3
Total 11 Old Route Businesses	1,027,394	658,055	662,173	- 35.9	0.6	- 35.5
<b>New Route</b>						
2 New Businesses		106,401 <sup>4</sup>	173,880	NA	63.4	NA
Total 13 Businesses Within Study Area	\$1,027,394	\$764,456	\$836,053	- 25.6%	9.4%	- 18.6%

<sup>1</sup>One business reported a volume of \$126,000. The estimated volumes of the two nonreporting businesses were determined on the basis of the percent change in the total volumes of the six businesses reporting between 1953 and 1957.

<sup>2</sup>Two businesses reported a volume of \$100,000. The volume was estimated for the other one on the same basis as stated in footnote 1.

<sup>3</sup>Two businesses reported a volume of \$27,452. The volume was estimated for the other on the same basis as stated in footnote 1.

<sup>4</sup>One of these businesses was open only four months during 1957.

401 in 1957 compared to \$173,880 in 1961, the latter representing a full year for both firms. The above figures represent an increase in monthly volume of approximately \$1,330 between 1957 and 1961.

The new route businesses have out-performed the old route businesses on a monthly basis by a considerable amount between 1957 and 1961. However, these are

both new and modern business houses with a capacity and potential for even greater sales than they have had thus far. One of the firms has operated well below anticipated levels which may be the reason it has experienced a change in management five times since 1957. The other has had only one change during the same period.

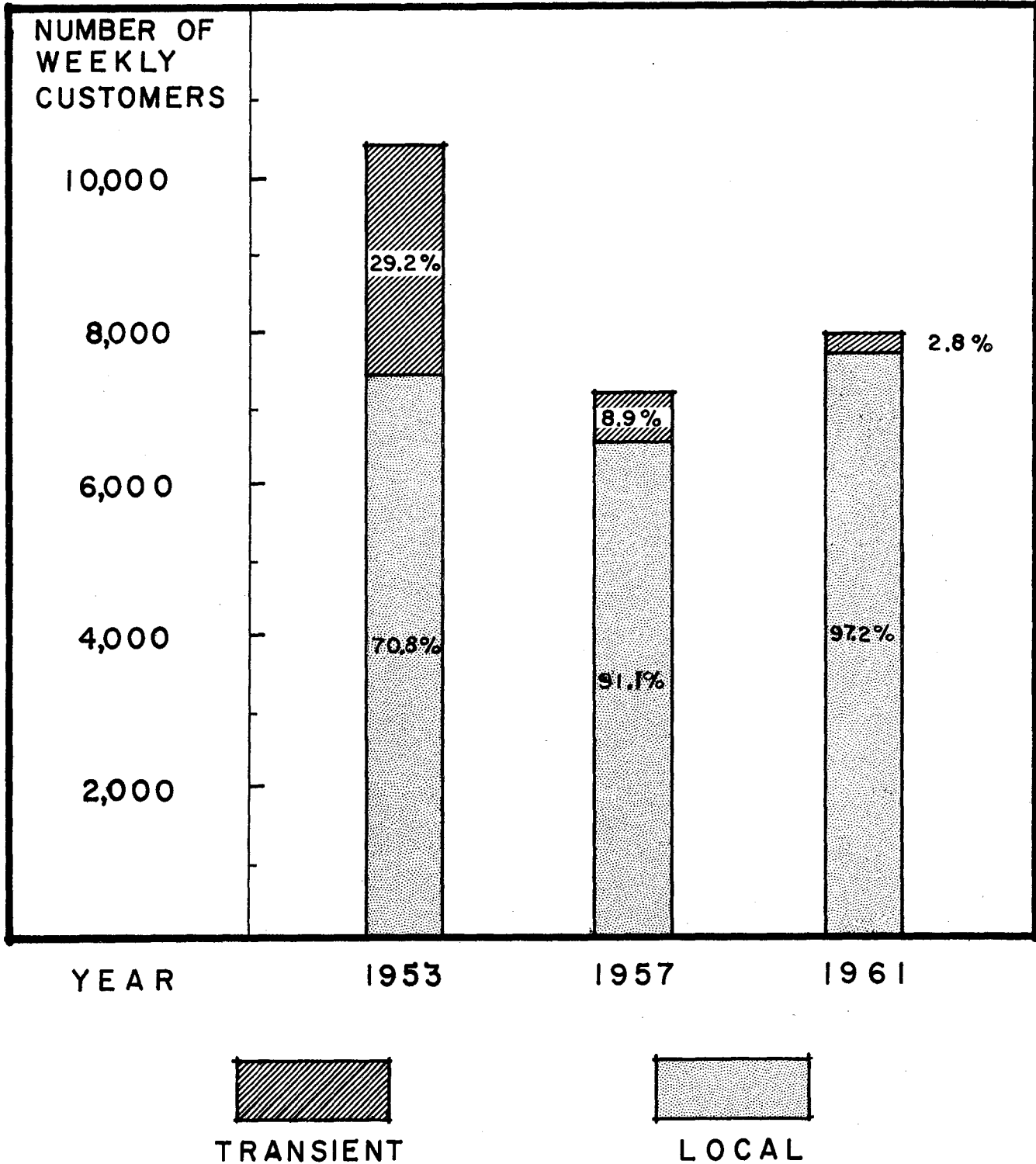


Figure 19. Changes in proportion of local and transient customers served by five food establishments located on old U. S. 81, between selected years—1953, 1957, and 1961.



### Food Service Businesses on Old and New Routes

A total of 13 food service businesses were in operation at some time during the period between 1953 and 1961 on both the old and new routes in the study area. Table 24 presents the consolidated actual and estimated dollar volume figures for these businesses. As a group they experienced a 25.6 percent decrease between 1953 and 1957, a 9.4 percent increase between 1957 and 1961, and an 18.6 percent decrease between 1953 and 1961. As can be observed, the new route businesses reduced the losses between 1953 and 1957 by about 10 percent and was responsible for almost all of the 9.4 percent increase which occurred after that time. For the whole period, aggregate losses were reduced by about 17 percent, practically all due to the two new route businesses.

The general comments of the operators in 1961 were similar to those made in 1957. Most of them felt that the removal of transient trade had hurt their business, but didn't think all of the loss was due to this factor alone. Stiffer competition from outside the area, poor management and facilities, and other economic conditions were noted. The owner of one restaurant which suffered a very substantial decrease in dollar volume between 1953 and 1957 attributed only one-fourth of his losses to the route change while another attributed only one-fifth of his losses to this factor. Since 1957, poor management, inadequate facilities, and stiffer competition have prevented many of these businesses from participating in general local business gains. Those who have improved their businesses felt their gains came entirely from increased regular customer trade.

### Traffic Serving Businesses on Old and New Route

It is important to view total traffic serving businesses which are located on both routes in the aggregate. In addition to gross sale data, certain additional group statistics are presented here to help summarize the changes which have affected all traffic serving businesses.

The changes in total dollar volume (both actual and calculated) of all traffic serving businesses located in the study area are presented in Table 25. Of the three

groups, one, the food service group, experienced a decline between 1953 and 1957. The other two groups showed fair gains, mostly attributed to the new businesses on both routes. Between 1957 and 1961, all three groups showed gains. This increase is due to both new businesses and the greater number of local customers on the old route. For the over-all period, then, substantial increases were registered by two of the three groups.

Totals for the three traffic serving groups show that the 46 old route businesses had a loss in gross sales of 18.8 percent between 1953 and 1957, a gain of 1.7 percent between 1957 and 1961, to give a net loss of 17.4 percent for the over-all period between 1953 and 1957. The decrease between 1953 and 1957 must be largely attributed to the change in traffic volume and traffic patterns brought about by the route change. To offset part of these losses, the seven new route businesses had a substantial business volume in 1957 and then registered a 90.5 percent increase by 1961.

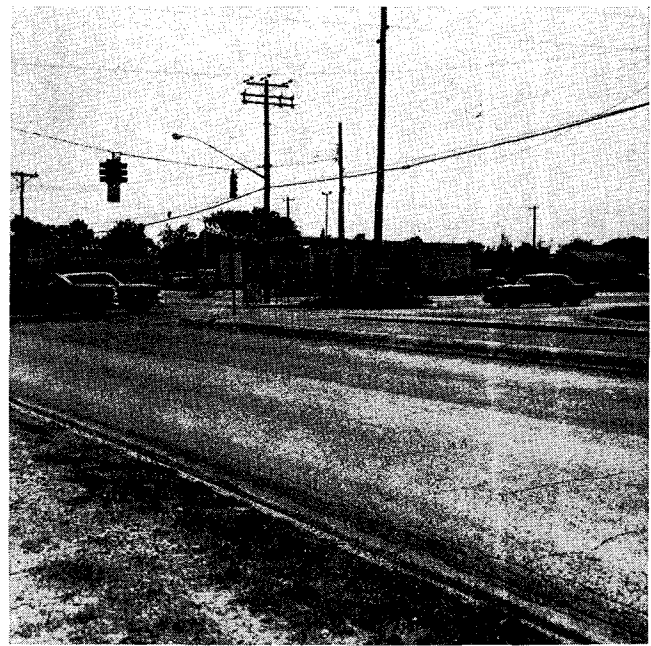
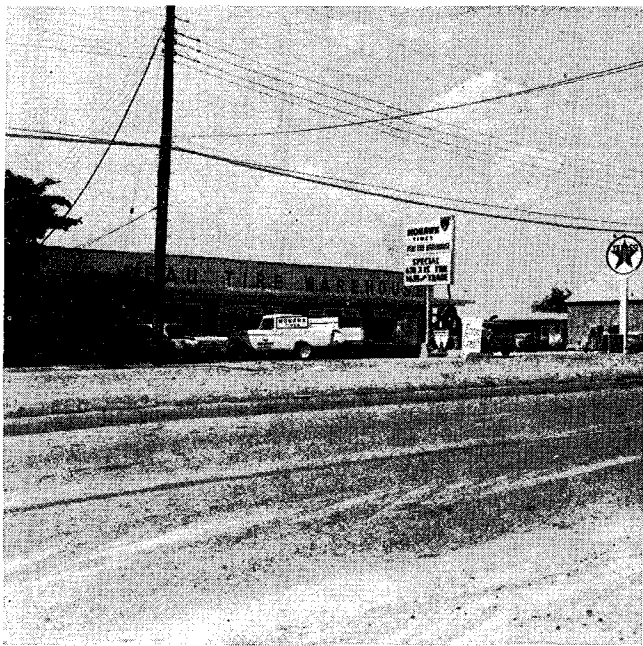
Thus, the grand total for traffic serving businesses on the old route shows a slight decrease in gross sales of 1.6 percent between 1953 and 1957, and a fair increase of 17.2 percent between 1957 and 1961. Over-all, then there was a net increase of 15.2 percent for the period between 1953 and 1961. It is obvious, however, from the relative performance of the two groups, that the net difference would have been considerably different had there not been new firms locating along the new route to offset losses sustained by old route firms.

In addition to economic data, considerable other data were obtained from each business. Questions were asked concerning the age and type of buildings, type of ownership, lease arrangements, location with respect to downtown Austin, distance to nearest competitor, and turnover rate in management. In addition certain subjective evaluations were made at each interview. Forty-six of the traffic serving businesses are represented in the following statistics.

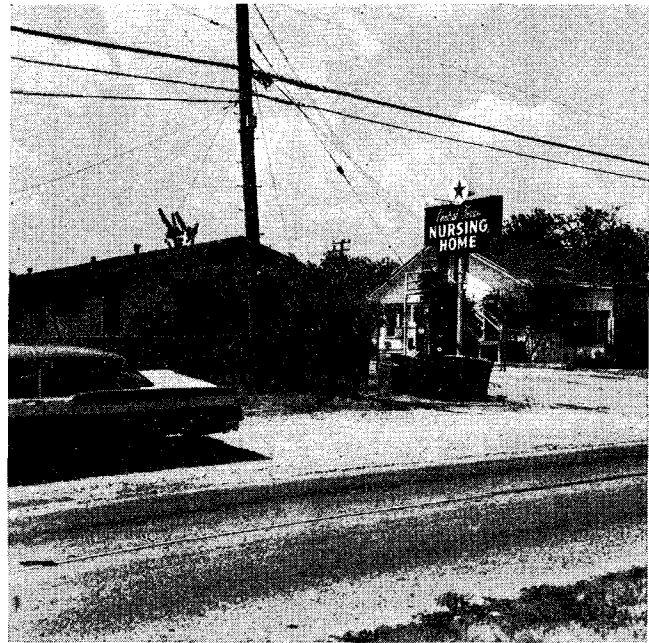
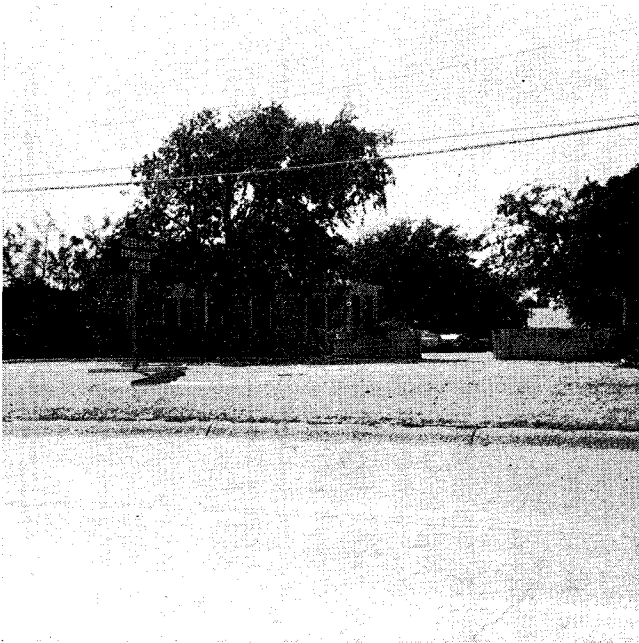
From a locational standpoint it was found that 12 of these businesses were located within four miles of the central business district of Austin. Thirteen were between 4 and 5 miles away, 10 were between five and six

Table 25  
CHANGES IN TOTAL DOLLAR VOLUME OF ALL TRAFFIC SERVING BUSINESSES LOCATED IN THE AUSTIN STUDY AREA BETWEEN SELECTED YEARS—1953, 1957, AND 1961

Businesses	Dollar Volume			Percent Change Between		
	1953	1957	1961	1953-57	1957-61	1953-61
	(Dollars)	(Dollars)	(Dollars)	(Percent)	(Percent)	(Percent)
<b>Service Stations</b>						
22 Old Route	\$1,130,880	\$1,120,798	\$1,188,139	- 0.9%	6.0%	5.1%
3 New Route	NA	141,000	382,860	NA	171.5	NA
<b>Total</b>	<b>1,130,880</b>	<b>1,261,798</b>	<b>1,570,999</b>	<b>11.6</b>	<b>24.5</b>	<b>38.9</b>
<b>Motels</b>						
13 Old Route	229,784	160,212	121,130	-30.3	-24.4	-47.3
2 New Route	NA	162,200	223,700	NA	37.9	NA
<b>Total</b>	<b>229,784</b>	<b>322,412</b>	<b>344,830</b>	<b>40.3</b>	<b>7.0</b>	<b>50.0</b>
<b>Food Service</b>						
11 Old Route	1,027,394	658,055	662,173	-35.9	0.6	-35.5
2 New Route	NA	106,401	173,880	NA	63.4	NA
<b>Total</b>	<b>1,027,394</b>	<b>764,456</b>	<b>836,053</b>	<b>-25.6</b>	<b>9.4</b>	<b>-18.6</b>
<b>Total Traffic Serving Businesses</b>						
46 Old Route	2,388,058	1,939,065	1,971,442	-18.8	1.7	-17.4
7 New Route	NA	409,601	780,440	NA	90.5	NA
<b>GRAND TOTAL</b>	<b>\$2,388,058</b>	<b>\$2,348,666</b>	<b>\$2,751,882</b>	<b>- 1.6%</b>	<b>17.2%</b>	<b>15.2%</b>



New traffic serving firms have opened for business on the old route during the after period.



Old route traffic serving motels have been converted successfully to nontraffic serving nursing homes during the after period.

miles, and 11 were between six and 10 miles. This means they were fairly evenly spread within the first section and somewhat more widely dispersed in Section 2. The distance from each business' nearest competitor was reduced somewhat between 1957 and 1961 as new businesses were built both within the study area and in nearby sections of the city. Some evidence of upgrading was indicated by changes in types of building. There were three more brick or masonry buildings, one less part brick or masonry, and the same number of frame (or other material) buildings housing the businesses in 1961. The over-all physical condition of the buildings deteriorated between 1957 and 1961, even con-

sidering the new buildings. There was one more classed as being in excellent condition, one less classed as good, one less as fair, and three more as being in poorer condition in 1961 than in 1957. The age of these buildings were as follows: one under four years; nine between four and eight years; four between eight and 12 years; 15 between 12 and 16 years; and 17 over 16 years of age.

In 1957, 25 of the buildings were owned and 18 were rented by the operators of the businesses. Also, almost half (20) of the businesses were under the same management six or more years, three between three and six years, 12 between one and three years, and 10 under one year.

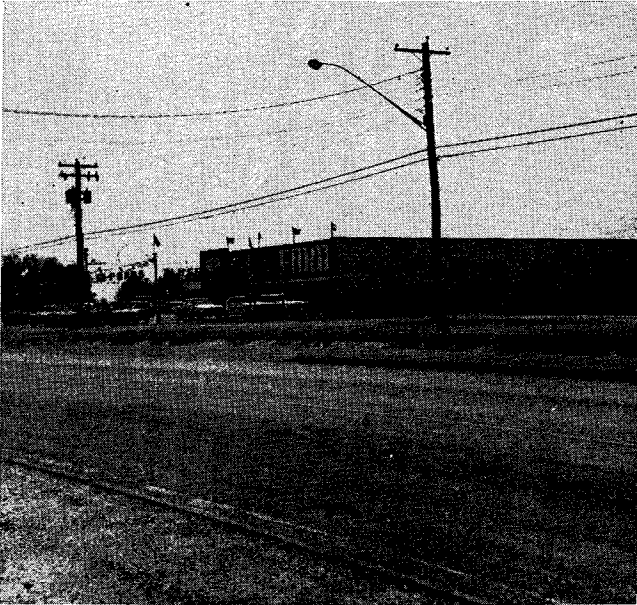
### ***Nontraffic Serving Businesses***

Along both routes, there were 55 nontraffic retail businesses in operation during 1957. By 1961, there were 71 such businesses in operation. Actually there were 85 businesses of the nontraffic serving type in operation during all or part of the time between 1953 and 1961, with the number fluctuating from year to year. These businesses were interviewed with only limited success. Gross dollar sales were obtained from 13 or 23.6 percent in 1957 and 20 or 28.2 percent in 1961. As indicated earlier, some refused to cooperate, and some were not in operation at the time of interview.

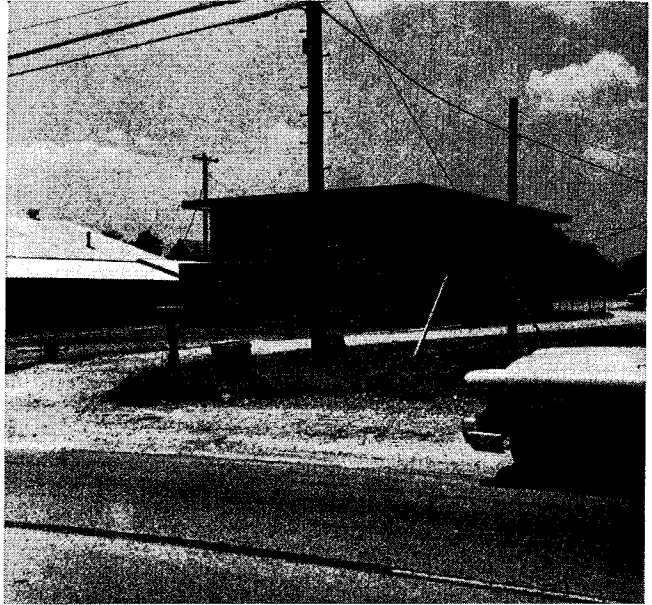
It was considered desirable to attempt to estimate the approximate gross dollar sales realized by the nontraffic type businesses even though such estimates will be based upon a smaller percentage of those businesses than is desirable. However, this sample should be sufficient to point up general conditions and trends.

#### ***On Old Route***

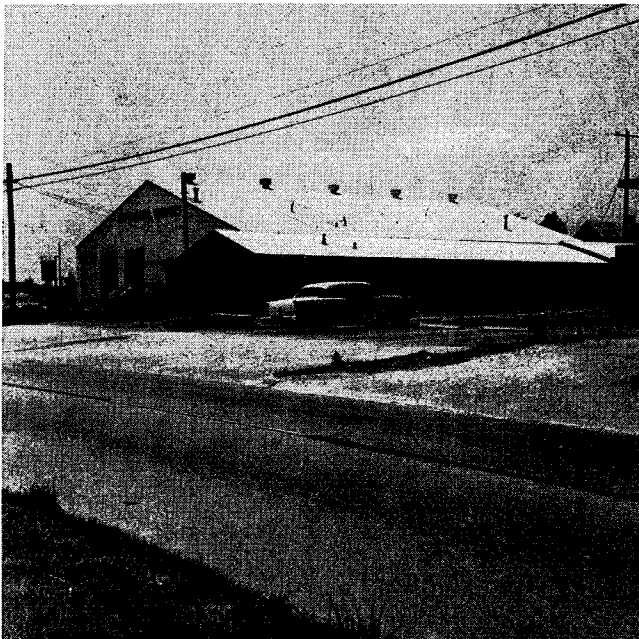
A total of 76 nontraffic serving businesses were in operation on the old route for some time during the study period. Some of them are grocery, lumber and building material, automotive sales and repair, service, and several miscellaneous businesses.



**Automobile Sales Firm**



**Office Building**



**Window Construction Firm**



**Glass Sales Firm**

Several nontraffic serving firms have opened for business on the old route during the after period.

Table 26  
CHANGES IN GROSS DOLLAR SALES OF EIGHT NONTRAFFIC SERVING BUSINESSES LOCATED ALONG  
OLD U. S. 81 BETWEEN SELECTED YEARS—1953, 1957 AND 1961

Business Number <sup>1</sup>	Dollar Volume			Percent Change Between		
	1953	1957	1961	1953-57	1957-61	1953-61
	(Dollars)	(Dollars)	(Dollars)	(Percent)	(Percent)	(Percent)
1	\$ 96,000	\$ 132,000	\$ 110,000	23.8%	16.7%	14.6%
2	258,000	165,000	118,771	-36.0	-28.0	-54.0
3	300,000	450,000	400,000	50.0	-11.1	33.3
4	300,000	453,789	509,582	51.3	69.9	12.3
5	6,000	6,000	5,583	0.0	-7.0	-7.0
6	100,000	120,000	140,000	20.0	16.7	40.0
7	33,225	35,400	35,000	6.5	-1.1	5.3
8	27,000	51,000	57,000	88.9	11.8	111.1
<b>TOTAL</b>	<b>\$1,120,225</b>	<b>\$1,413,189</b>	<b>\$1,375,936</b>	<b>26.2%</b>	<b>-2.6%</b>	<b>22.8%</b>
<b>AVERAGE</b>	<b>\$ 140,028</b>	<b>\$ 176,649</b>	<b>\$ 171,992</b>			
<b>STANDARD DEVIATION</b>	<b>\$ 125,804</b>	<b>\$ 177,975</b>	<b>\$ 182,575</b>			

<sup>1</sup>These businesses consisted of grocery, lumber and building material, automotive repair, and miscellaneous retail firms.

Table 26 shows the dollar volume changes of eight of these businesses which reported actual data all three study years. They represent each of the above types of businesses. Only one showed a decline in gross sales between 1953 and 1957, but four experienced declines between 1957 and 1961. This performance is just the reverse of that experienced by traffic serving businesses,

which as a group showed a loss between 1953 and 1957 and a gain between 1957 and 1961.

Even though these eight businesses show a 2.6 percent decline between 1957 and 1961, they show a 22.8 percent increase for the whole period between 1953 and 1961.

Table 27  
CHANGES IN CALCULATED GROSS DOLLAR SALES OF ALL NONTRAFFIC SERVING BUSINESSES LOCATED  
ALONG OLD U. S. 81 BETWEEN SELECTED YEARS, 1953, 1957 AND 1961

Type of Business	Dollar Volume <sup>1</sup>			Percent Change Between		
	1953	1957	1961	1953-57	1957-61	1953-61
	(Dollars)	(Dollars)	(Dollars)	(Percent)	(Percent)	(Percent)
5 Grocery	\$ 531,000	\$ 594,000	\$ 571,927	11.9%	-3.7%	7.7%
2 Old—Actual Data	354,000	297,000	228,771	-16.1	-23.0	-35.4
1 Old—Calculated Data	177,000	148,500	114,385	-16.1	-23.0	-35.4
2 New—Calculated Data	NA	148,500 <sup>2</sup>	228,771	NA	54.1	NA
11 Lumber and Building Materials	2,100,000	2,203,259	3,383,537	4.5	53.6	61.1
2 Old—Actual Data	600,000	903,789	3,383,537	4.5	53.6	61.1
5 Old—Calculated Data	1,500,000	1,299,470	909,582	50.6	0.6	51.6
3 New—Calculated Data	NA	NA	909,582 <sup>3</sup>	-13.4	-30.0	-39.4
1 New—Actual Data	NA	NA	1,364,373	NA	NA	NA
9 Automotive	30,000	30,000	200,000	NA	NA	NA
1 Old—Actual Data	6,000	6,000	200,000	NA	NA	NA
4 Old—Calculated Data	24,000	24,000	1,317,636	0.0	4292.2	4292.2
2 New—Actual Data	NA	NA	5,583	0.0	-7.0	-7.0
2 New—Calculated Data	NA	NA	16,749	0.0	-30.2	-30.2
10 Service	69,900	69,900	1,282,304	NA	NA	NA
6 Old—Calculated Data	69,900	69,900	13,000	NA	NA	NA
3 New—Actual Data	NA	NA	68,650	0.0	-1.8	-1.8
1 New—Calculated Data	NA	NA	68,650	0.0	-1.8	-1.8
41 Miscellaneous	1,507,937	3,136,558	33,300 <sup>3</sup>	0.0	-52.4	-52.4
4 Old—Actual Data	760,225	1,586,400	23,700	NA	NA	NA
14 Old—Calculated Data	747,712	847,994	11,650	NA	NA	NA
3 New Before 1957	NA	157,025	2,785,593	108.0	-11.2	84.7
9 New Before 1957	NA	232,000 <sup>4</sup>	232,000 <sup>4</sup>	108.7	-85.4	-69.5
—Calculated Data	NA	545,139	742,131 <sup>5</sup>	13.4	-12.5	-0.7
2 New After 1957	NA	NA	192,200	NA	22.4	NA
—Actual Data	NA	NA	742,131	NA	36.1	NA
9 New After 1957	NA	NA	135,000	NA	NA	NA
—Calculated Data	NA	NA	742,131	NA	NA	NA
<b>Total 76 Businesses</b>	<b>\$4,238,837</b>	<b>\$6,033,717</b>	<b>\$8,127,343</b>	<b>42.3%</b>	<b>34.7%</b>	<b>91.7%</b>

<sup>1</sup>The calculated volumes were based on the average volume of reporting businesses by type during each year except under special conditions. In two cases, a business was not used in arriving at the average because it would have greatly distorted the average.

<sup>2</sup>Only one new business by 1957.

<sup>3</sup>Three businesses were closed before 1961.

<sup>4</sup>One business had closed before 1961.

<sup>5</sup>Five businesses were closed before 1961.

Table 27 shows the actual and calculated gross dollar volumes of all the 76 businesses involved in this group. The dollar volumes of nonreporting businesses were calculated on the basis of the average volume of all reporting businesses, new or old, by type for each year involved. The estimated volumes of two businesses were left out of these calculations because they were so large that their volumes could not be estimated on a consistent base. The table shows that none of the types of businesses suffered a loss in sales as a group between 1953 and 1957, but three out of the five types did experience a decline between 1957 and 1961. For the whole period

between 1953 and 1961, only the service group suffered a loss.

Businesses that were depressed between 1957 and 1961 were probably affected by competition from like businesses that had been established in the nearby areas during this period. Two new discount houses opened near the area and two major shopping centers were built, one containing a large mail order house.

Of 21 businesses which supplied fairly complete information during the study period, nine had remained under the same management six or more years. Four had been under the same management between three and six years, four between one and three years, and two under one year. However, most of these 21 businesses were established after 1953. Only seven were established before that year. Thus, these represent the newer businesses which may have more aggressive management than the remaining segment of older nontraffic serving businesses.

Four of the 21 businesses had changed types of business since 1957. This indicates some instability among this group. But, the management of only two businesses felt that diversion of traffic from the old route affected their business. Most of the operators seemed indifferent toward the route change. In fact, many liked it better with less traffic, and particularly fewer trucks, on the old route. They attributed the changes in gross sales of their businesses to one or more factors such as increases in stock, change in location, increase in residential development in the area, and increased competition. The last was the most frequently mentioned.

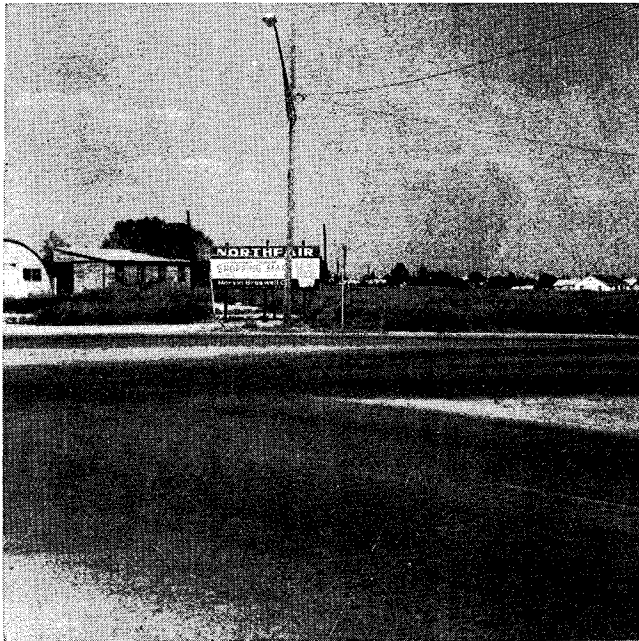
#### *On New Route*

There were nine nontraffic serving retail businesses located on the new route. As was shown in Table 15, most of them were of the automotive type. Six of these opened for business after 1957. This shows that the tempo of business activity on this route has quickened in later years. Only one of the three businesses which were in operation during both 1957 and 1961 reported gross dollar volume figures. Thus, the volumes of all the other businesses were estimated on the basis of the average dollar volume of the old route reporting businesses of like type for the respective years involved. Therefore, as a rough estimate, the nine businesses grossed \$316,571 in 1957 and \$521,545 in 1961 or a 64.7 percent increase. No doubt, the volume of the six new businesses reflected all of this increase, because the reporting business showed no change in dollar volume between the two years.

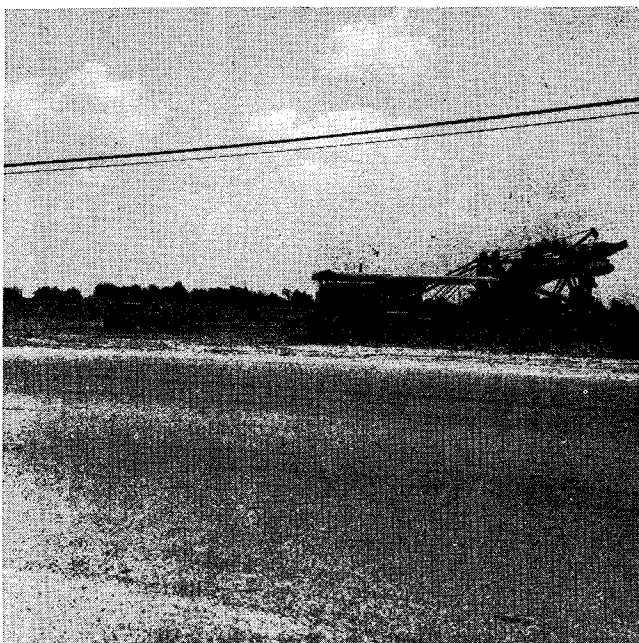
As a group the operators of the new route businesses were pleased with the performance of their businesses during the period for which they were in operation. They were optimistic that their business volumes would continue to improve in the future. Some of these businesses obtain trade from transient customers, but depend mostly on customers from the local area. As residential development continues on either side of the new highway in the area, these businesses expect to receive increased local trade.

#### *On Old and New Routes*

The actual and calculated gross volumes for the nontraffic serving businesses located on both routes were totaled. The 85 businesses which were involved in the



**Future Shopping Center**



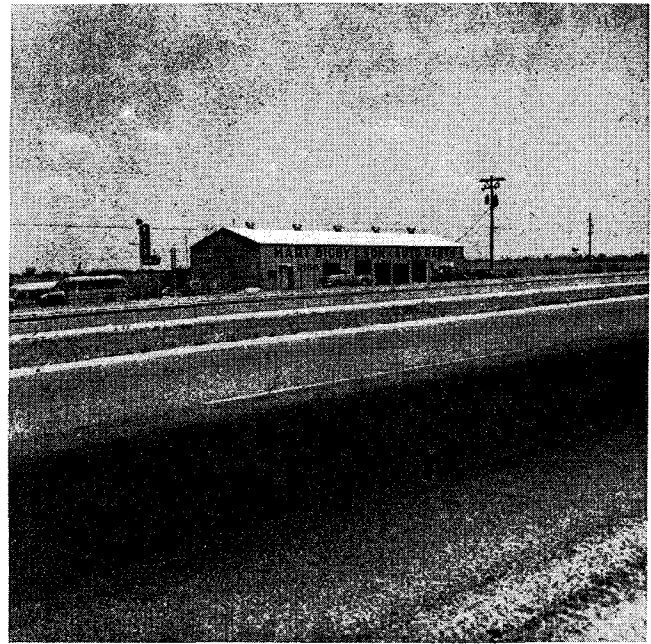
**New Residential Area**

Planned future construction is evident along the old route.

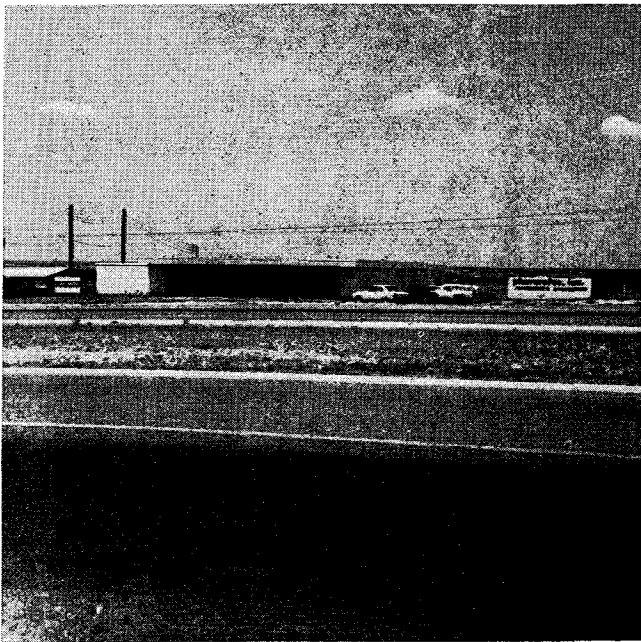




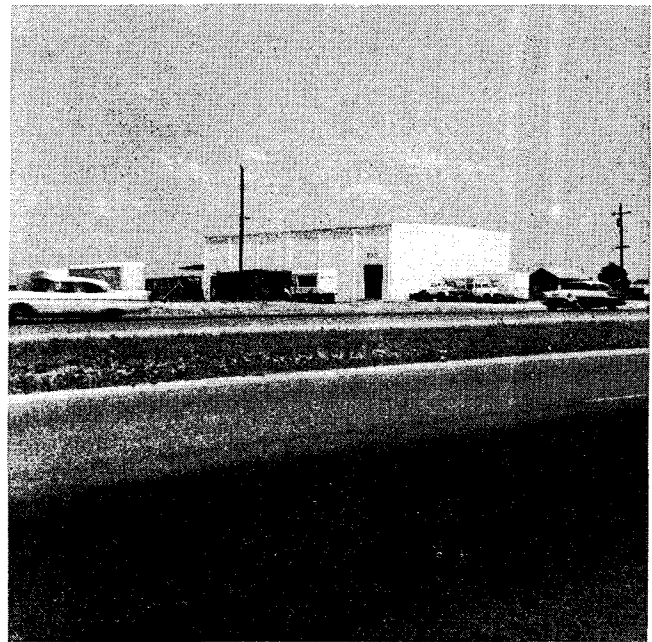
Office Building



Used Auto Parts Firm



Manufacturing Firm



Transfer and Storage Firm

Many types of businesses have located on the new route.

study experienced a 49.8 percent increase between 1953 and 1957 and a further increase of 36.2 percent between 1957 and 1961. For the whole period between 1953 and 1961, these businesses gained 104 percent in gross dollar sales. (See Table 28.)

Most of the above gains can be attributed to the addition of new businesses on both routes which occurred at double the rate of business closures. However, some of the old businesses experienced a fairly high level of gross dollar growth.

Most of the losses were attributed to increased competition and old facilities. As a whole, it is clear that the

route change had no adverse effect on the nontraffic serving businesses along the old route, and actually stimulated such business activity along the new route. The presence of the new highway in the area has provided ideal sites between the new and old route for residential and industrial development. As more of these developments occur, the demand for nontraffic retail businesses will increase in the area served by both routes.

### *Traffic and Nontraffic Serving Businesses*

In total, there were 138 traffic and nontraffic serving businesses located on both routes in the study area

Table 28

A COMPARISON OF CHANGES IN RETAIL SALES AS REFLECTED BY STUDY AREA BUSINESSES VERSUS THAT REPORTED BY SALES MANAGEMENT MAGAZINE'S "SURVEY OF BUYING POWER" FOR THE CITY OF AUSTIN AND THE STATE OF TEXAS, BETWEEN SELECTED YEARS—1953, 1957 AND 1961

Item	Dollar Volume			Percent Change Between		
	1953	1957	1961	1953-57	1957-61	1953-61
	(Dollars)	(Dollars)	(Dollars)	(Percent)	(Percent)	(Percent)
Study Area Businesses						
Traffic Serving	\$ 2,388,058	\$ 2,348,666	\$ 2,751,882	- 1.6%	17.2%	15.2%
Nontraffic Serving	4,238,837	6,350,288	8,648,888	49.8	36.2	104.0
Total All Businesses	6,626,895	8,698,954	11,400,770	31.3	31.1	72.0
"Survey of Buying Power" <sup>1</sup>						
City of Austin	183,143,000	210,803,000	238,221,000	15.1	13.0	30.1
State of Texas	9,131,567,000	10,553,681,000	11,637,843,000	15.6	10.3	27.4

<sup>1</sup>An annual survey is conducted by the Sales Management Magazine on a county and city basis where estimates of retail sales are made by type of business. Key cities and counties within the state are sampled to collect actual retail sales from businesses. Then, these figures are used with the most current reports on retail sales from the Department of Commerce's Survey of Current Business and Census of Business to arrive at estimates for individual cities and counties.

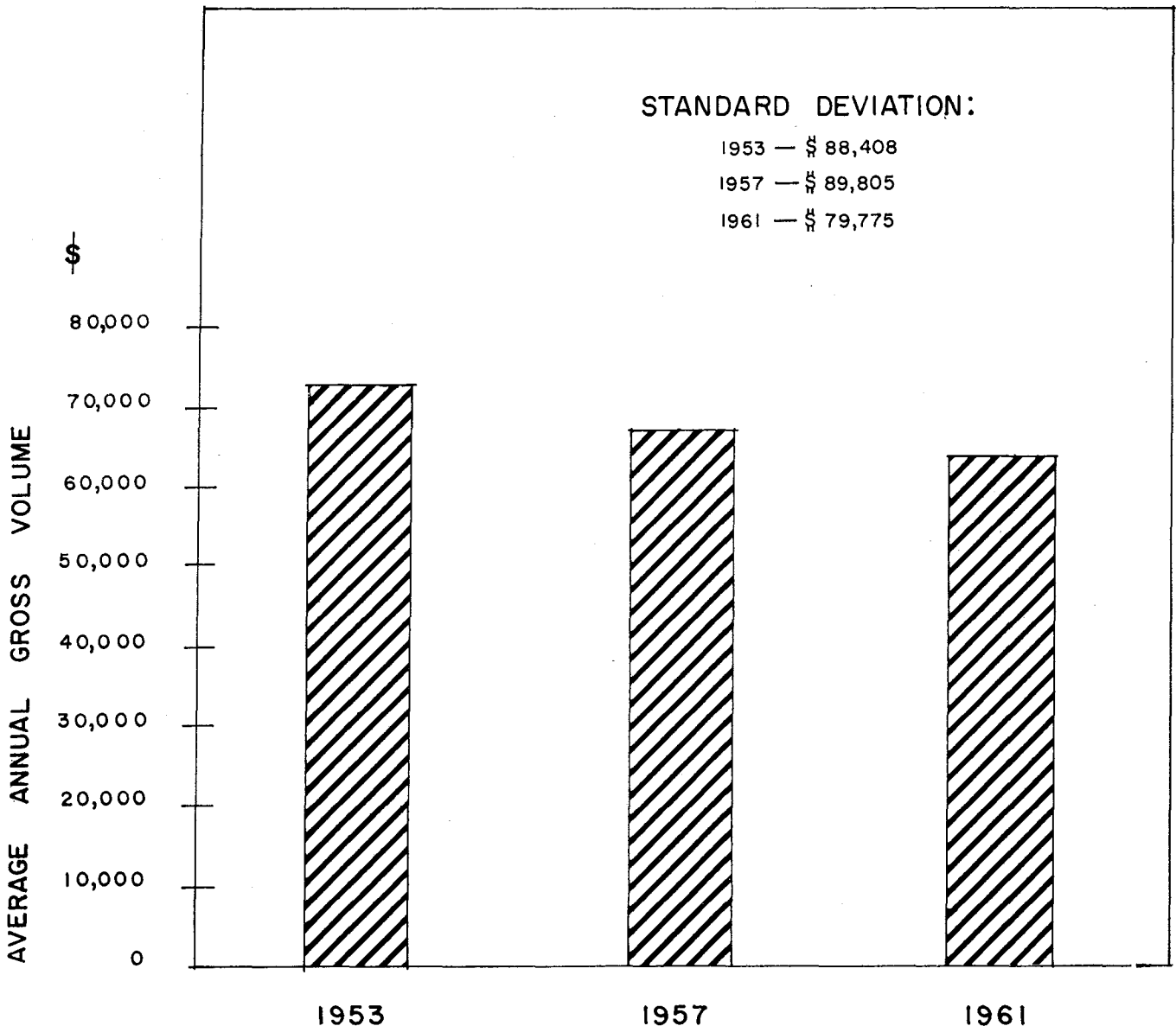


Figure 20. Average annual gross volume of 28 old route businesses.

which were in operation during all or part of the time between 1953 and 1961.

Table 28 shows the actual and calculated gross dollar volumes for the businesses which were in operation during the study period. These businesses showed a gross volume increase of 31.3 percent between 1953 and 1957, 31.1 percent between 1957 and 1961, and 72 percent between 1953 and 1961. These are excellent gains and compare very favorably with businesses in Austin as a whole. According to Sales Management Magazine's "Survey of Buying Power," the gross sales for all Austin retail businesses increased 15.1 percent between 1953 and 1957, 13 percent between 1957 and 1961, and 30.1 percent between 1953 and 1961. As can be seen these percentage changes are roughly one-half of those shown for the study area businesses. From this comparison, it can be seen that the study area as a segment fared much better than the average for all businesses in Austin.

For the same period between 1953 and 1961, the Austin businesses showed a slightly higher percentage increase in gross sales than the State of Texas, 30.1 percent versus 27.4 percent.

Even though only limited comparisons can be made, tabular data are presented in the appendix to show how the Austin businesses by type performed in relation to the same groups reported by the "Survey of Buying Power."

Some of the factors which may have had some influence on the changes in gross sales as experienced by 28 old route study area businesses that were open through the whole time period between 1953 and 1961 are presented in the following graphs. Twenty-one of these are traffic serving businesses. The high proportion of this type firm undoubtedly contributed to the steady decline in average annual gross dollar sales between the years studied. (See Figure 20.)

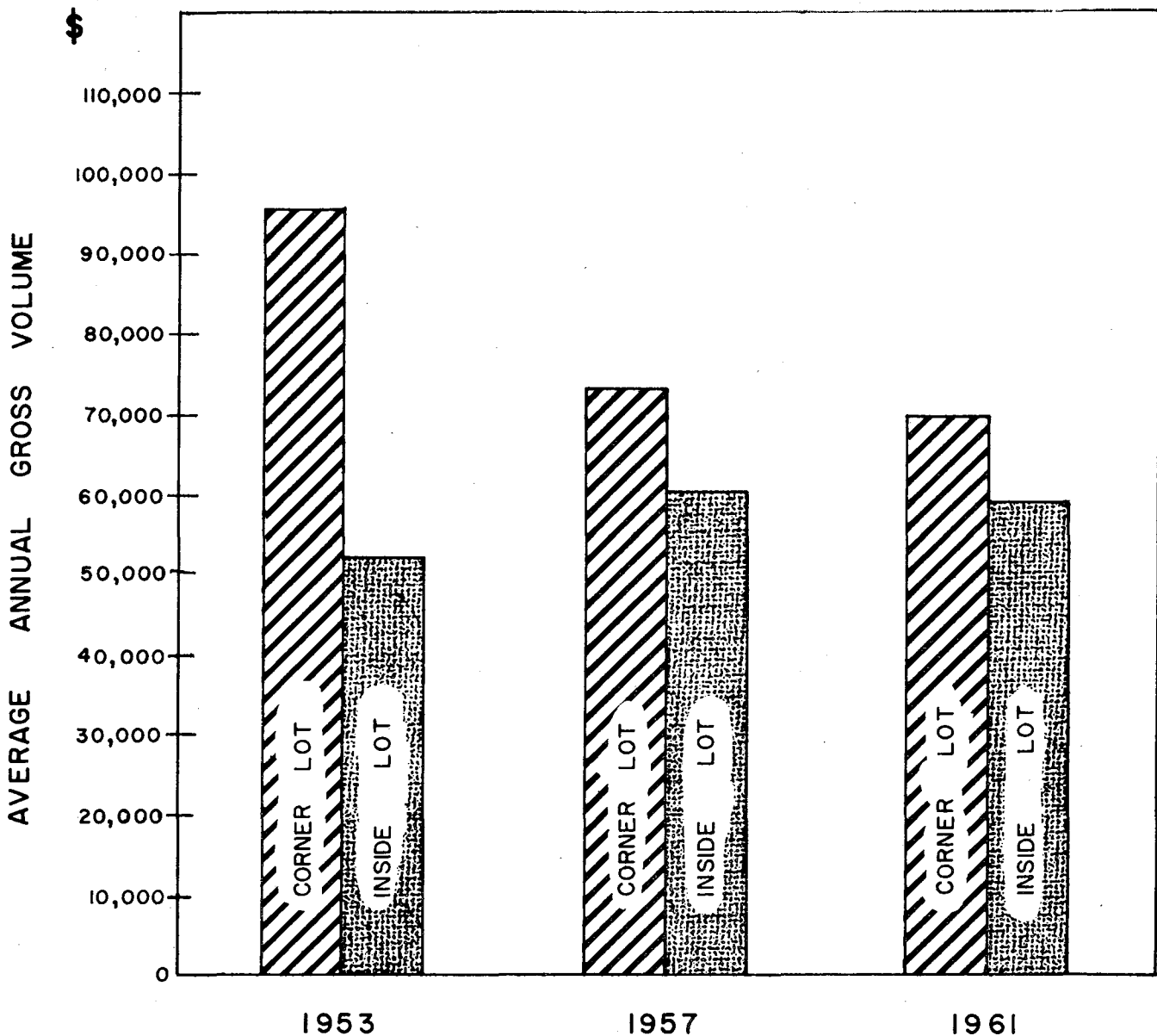


Figure 21. Average annual gross volume of 28 old route businesses according to site location of business.



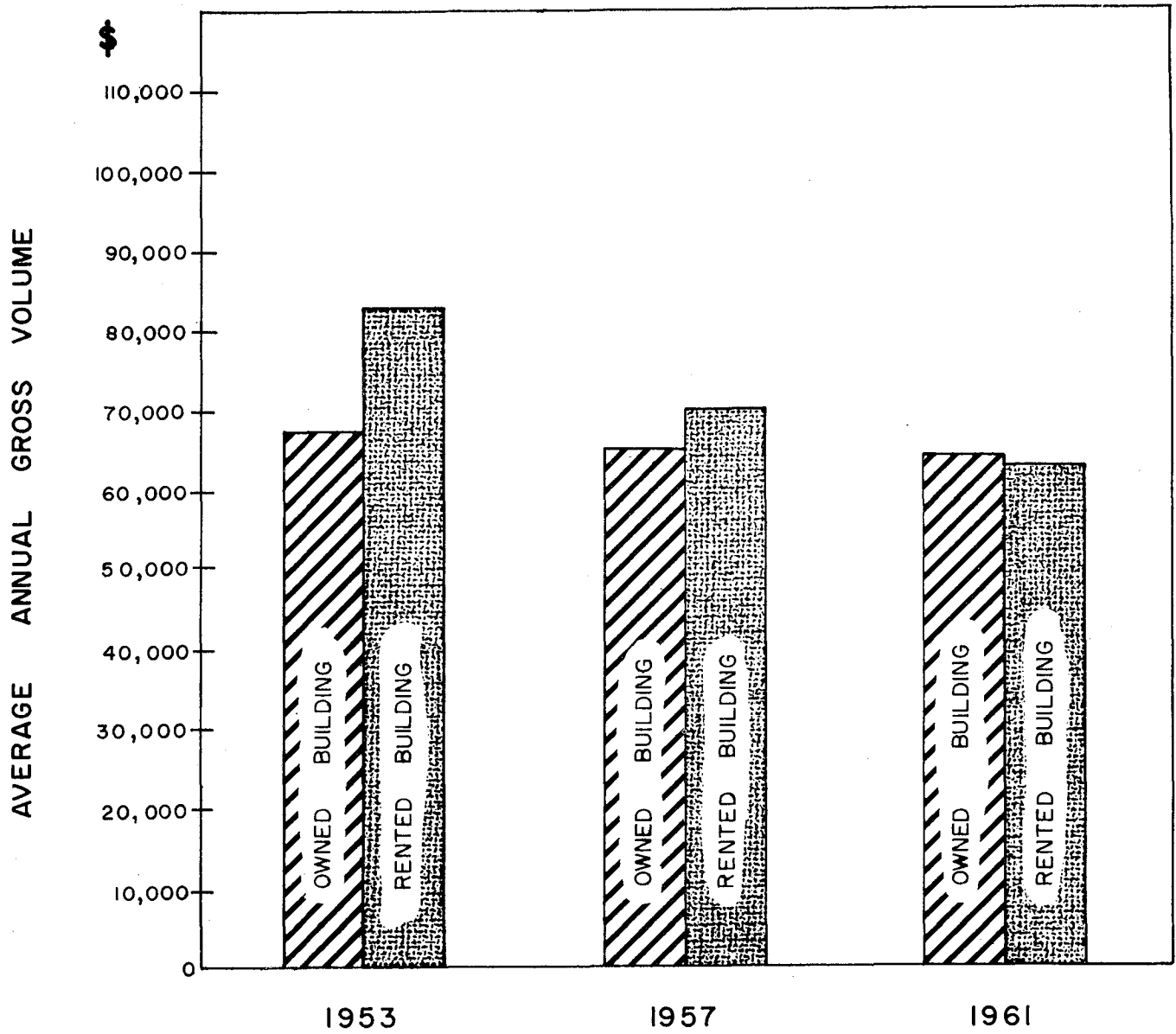


Figure 22. Average Annual Gross Volume of 28 old route businesses according to ownership of building.

The 28 businesses were classified according to their location within the block. The average gross sales of the businesses having corner locations declined throughout the study, while those with inside locations had an increase between 1953 and 1957 and only a slight decrease between 1957 and 1961. (See Figure 21.) Since most of the corner locations were occupied by traffic serving businesses, the decline in sales of corner lot businesses is a direct reflection of their activities.

Businesses housed in rented buildings showed a slightly greater decline in gross sales than those businesses owning their buildings. (See Figure 22.) A reason may be that the tenant operator was not as stable at his location and had not built up as much local trade as the owner operator.

Figure 23 shows fairly clearly that businesses under the same management from three to six years experienced a much more stable volume of business through the

study period than did those under the same management a short period of time. Usually, it takes several years to build up a local clientele. Generally, the longer a business is under the same management the more stable its sales volume becomes.

Figure 24 shows that businesses in frame buildings experienced a greater decline in gross sales than did those built of more permanent materials. Customers tend to prefer doing business in the most pleasing surroundings. Therefore, modern permanent type buildings are more attractive to them than the more obsolete frame structures.

The age of the buildings didn't affect the stability of the average annual gross sales of the businesses, except for buildings in the 12- to 16-year group. (See Figure 25.) This group showed a decline in sales between the years studied. But, note that the businesses operating in buildings from 8 to 12 years old received

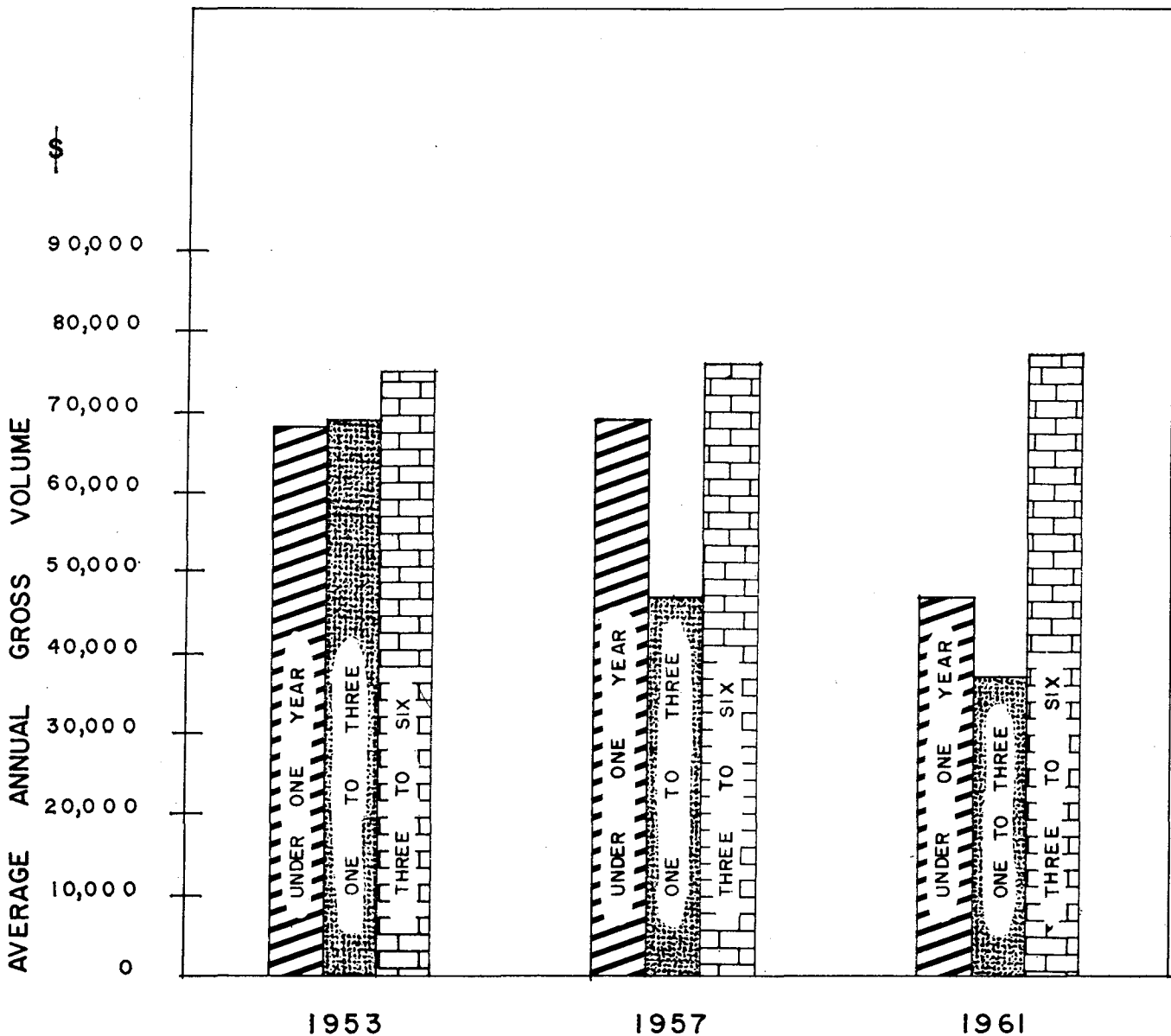


Figure 23. Average annual gross volume of 28 old route businesses according to time under present management.

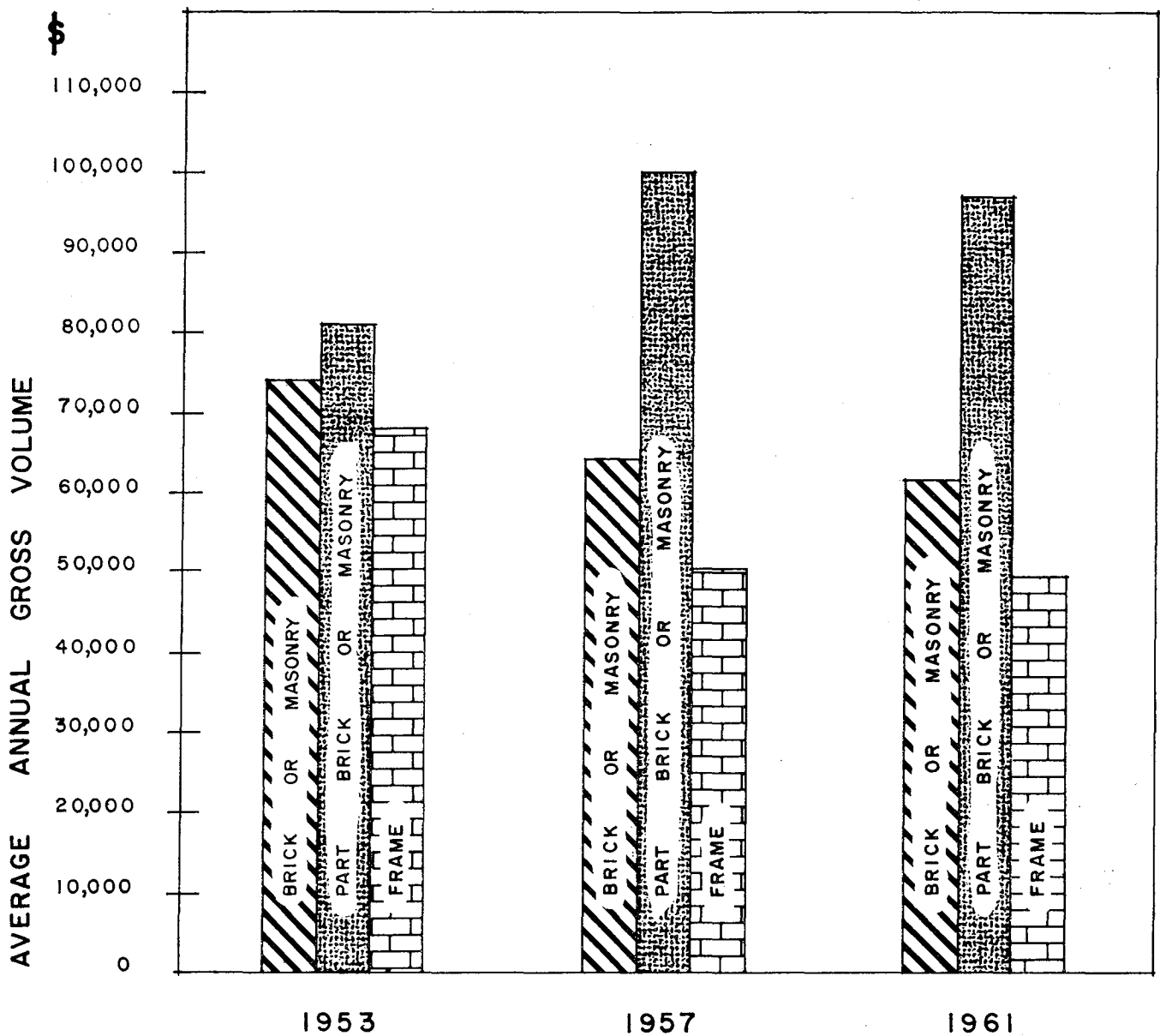


Figure 24. Average annual gross volume of 28 old route businesses by type of building.

much more business than those in the older two groups. Customers are more likely to trade at the newer buildings, especially the highway customers.

Some of the above factors obviously did influence the volume of sales of these 28 businesses during the years studied. On the other hand, other factors had very little effect. The importance of time under present management and the type and ownership of building seem to have been more pronounced than others.

Census tract information indicates that the population of a considerable area engulfing the old and new routes of the study area increased between 1950 and 1960. The population density in census tract 15, which includes that part of the study within the city limits increased from 2.01 to 5.92 persons per acre. The size of the tract was enlarged from 1,995 to 2,787 acres, but the added acreage was considered more sparsely populated than the original 1950 acreage. Most of this in-

crease occurred in the latter 1950's, coincident with the general buildup of the area following opening of the new highway.

Land values of abutting real estate along the old route study area were apparently suppressed between 1954 and 1959. During this period, the city of Austin's Tax Department reduced the assessed valuations as much as \$25 per front foot. This coincides with the drop in gross sales experienced by many old route businesses after the new highway was constructed. However, in 1960, the city reappraised the property and raised the assessed valuations back to the pre-bypass levels. This indicates that the land values of these properties regained their original values. It is believed that these land values have continued to increase since 1960.

In conclusion, the new highway did reduce the traffic volumes on the old route which in turn decreased the gross sales of most of the traffic serving businesses.

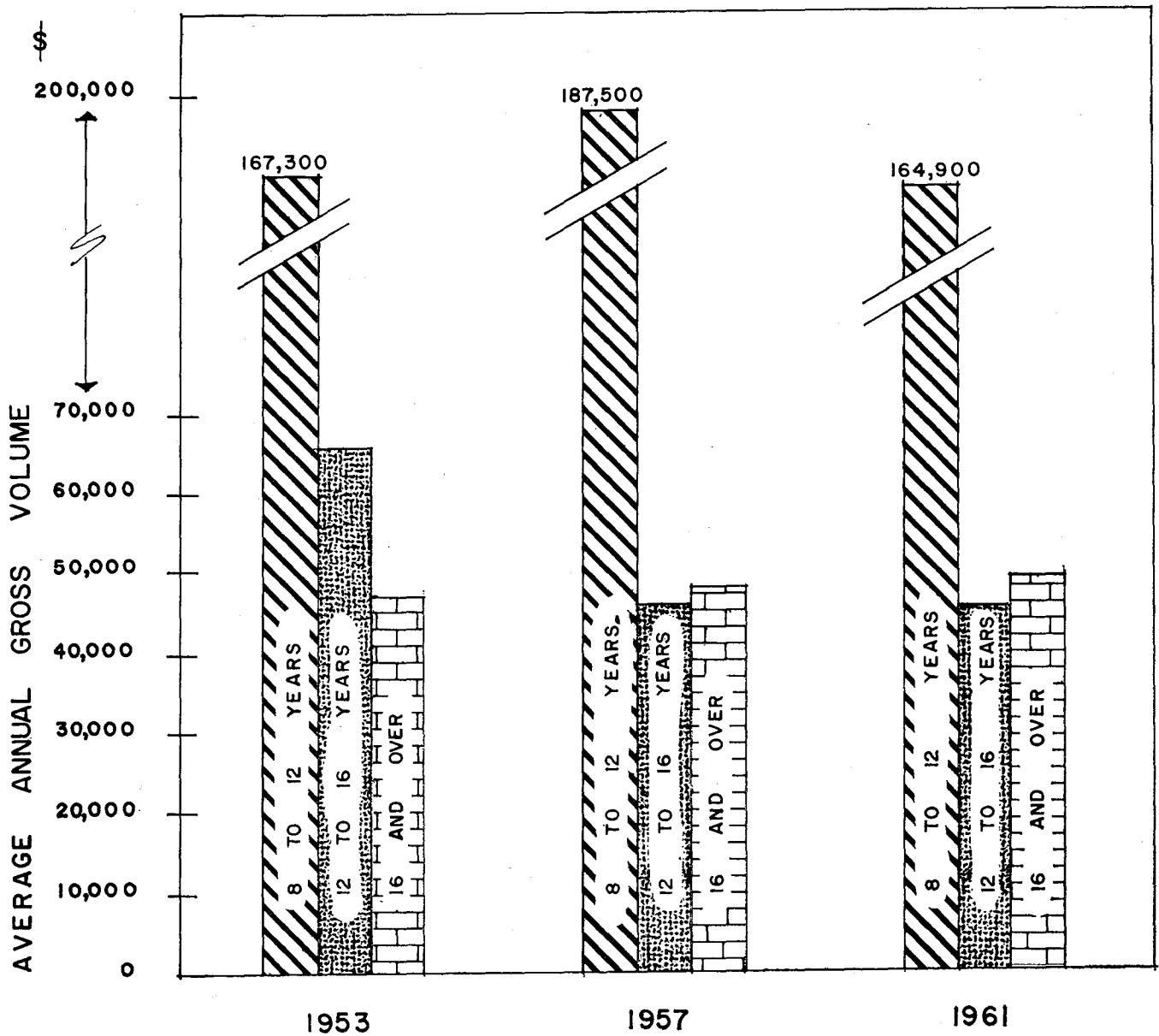


Figure 25. Average annual gross volume of 28 old route businesses by age of building.

Individual losses were high in some cases. However, much of the traffic lost from the old has been restored, primarily by a continued buildup of residences in the area. Thus, business activity has been stimulated and new businesses of both the traffic serving and nontraffic serving types have been established on the new and old routes. The new highway is due a major part of the

credit for this increased business activity which has resulted in the overall gain in gross sales by all businesses as a group during the study period. Prospects look even brighter in the future. Several new businesses have been established along the route after the data for this study were gathered, and additional new construction is underway.

## Other Economic Changes Affecting the Austin Area

This section of the report reviews some of the other economic changes affecting the Austin area and the city of Austin before and after the new highway was constructed. The statistics presented here are based on the whole city which engulfs part of the study area.

There are several indicators which reflect a city's economic well being during a certain period. But for a city as large as Austin, which has diversified support from several facets, the effects of one particular economic stimulus (such as the building of an Interstate Highway) are difficult, if not impossible, to isolate. This is really why a much smaller area than the city was chosen for study of the other effects. However, it seems desirable to show the changes in some economic indicators which would reflect the general economic well being of Austin during the study period of the actual study area as discussed in the other sections.

Table 29 presents the percentage changes in 13 different economic indicators between selected years which correspond to those used in the business study area analysis. Only one of the indicators, new dwelling units authorized, was negative between 1953 and 1957. The others showed healthy increases, with five showing a greater than 20 percent increase. This period represents

the first after period as far as the new highway is concerned.

Again, between the years 1957 and 1961 (the second after period) only one of the indicators (University of Texas enrollment) was negative. It seems completely unrelated to the influence of the new highway. Two others increased only slightly, but the remaining indicators experienced large increases, four of which were above 20 percent.

Comparing the two periods, eight of the indicators showed greater increases between 1953 and 1957 than between 1957 and 1961. Only four indicators showed greater increases between 1957 and 1961 than between 1953 and 1961. The 1958 recession may have been the most important reason for the poor performance of the last period.

For the overall period between 1953 and 1961, all the indicators were positive and all but one showed over a 20 percent increase. Five increased over 50 percent. Therefore, these economic indicators suggest that the City of Austin fared quite well economically between the before period year (1953) and the after period year (1961), and the future economic growth looks bright for this capital city.

**Table 29**  
**CHANGES IN SELECTED ECONOMIC INDICATORS IN THE CITY OF AUSTIN BETWEEN DESIGNATED YEARS—1953, 1957 AND 1961.**

Item	Quantities			Percent Changes Between		
	1953	1957	1961	1953-57	1957-61	1953-61
	(Number)	(Number)	(Number)	(Percent)	(Percent)	(Percent)
Natural Population Increase <sup>1</sup>	3,065	3,667	3,692	19.6	.7	20.5
Assessed Valuation of Property	\$382,365,500 <sup>2</sup>	\$447,580,660	\$536,774,830	17.1	19.9	40.4
Total Employed <sup>3</sup>	64,323	71,685	80,950	11.4	12.9	25.8
Total Employed in Manufacturing <sup>3</sup>	4,057	5,325	5,870	31.3	10.2	44.7
Total Employed in Nonmanufacturing <sup>3</sup>	38,466	43,710	49,220	13.6	12.6	28.0
New Dwelling Units Authorized	1,313	1,205	2,165	-8.2	79.7	64.9
Total Building Permit Values	\$ 34,116,375	\$ 43,319,981	\$ 57,330,225	27.0	32.3	68.0
Electric Customers	44,338	51,499	55,437	16.2	7.6	25.0
Water Customers	40,082	46,948	52,550	17.1	11.9	31.1
Enrollment at University of Texas <sup>4</sup>	15,732	19,002	18,740	20.8	-1.4	19.1
Enrollment in Austin Independent School District	23,541	30,100	35,673	27.9	18.5	51.5
Motor Vehicle Registration <sup>5</sup>	58,632	76,265	98,830	30.1	29.6	68.6
Postal Receipts	\$ 2,573,987	\$ 3,500,462	\$ 5,033,061	36.0	43.8	95.5

<sup>1</sup>Difference between deaths and births.

<sup>2</sup>1954 figures after reassessment.

<sup>3</sup>In Travis County.

<sup>4</sup>On school year basis, such as 1953-54.

<sup>5</sup>For the Austin Area.

Source: Basic data about Austin and Travis County prepared by Department of Planning, City of Austin, Texas.

# Appendix

## Objectives and Procedures

### Objectives

One of the principal objectives of the original study and the restudy was to measure any changes in land values that occurred during a specified period of time within given areas near the Interstate Highway System. A second part of this objective was to determine the extent to which these changes might be attributed to or associated with the construction and operation of that facility. Another principle objective was to determine the changes in land use that may have occurred within these same areas, and to attempt to explain these changes in terms of influence by the facility. Still another objective was to determine the relationship of land use to land values, as land in the area of the highway facilities progresses through sequential uses. A final objective was to determine the effect of the highway facility upon over-all business activity and general community development in the areas which were served by it.

### Procedures

A uniform set of procedures was developed for use in each of the study areas. Except where local conditions made deviations necessary, the same procedures were followed in each area.

#### A. The procedures followed in developing and analyzing the land value information were as follows:

##### 1. Area Selection:

A general area was first selected for the original study. The Interstate Highway facility in the area had, in the opinion of the Project Advisory Committee, been constructed long enough for changes in land use and land values to become apparent and for variation in over-all business activity to be discernible. This same area is used for the restudy. This area is located in the vicinity of Austin. It extends along new IH 35 from the intersection of U. S. 290 north to Walnut Creek.

##### 2. Boundary Selection:

- a. Exterior boundaries of the area were carefully selected to permit the inclusion of the major expected influence zone and still keep the area to a manageable size.
- b. Interior boundaries were drawn so that properties were divided into two classes for analytical purposes—abutting and nonabutting.
- c. Other feasible interior property divisions were made in each area as follows:

- (1) Division into two sections to determine influence of distance from central business district on land values.

- (2) Division into acreage and subdivided properties. These were further broken down into improved and unimproved tracts.

##### 3. Time Periods:

To measure changes in land value, three time periods were chosen for the original study. An additional period was added to the restudy. The length of each period was determined by the construction schedule for the area. The periods were selected as follows:

- a. Study Periods—the first study period was the length of time from the completion of construction through 1957 (1954-57). The second study period was 1958-61 inclusive. These two periods were combined into an eight year whole after period for analysis.
- b. Construction Period—The construction period was the time from the announcement of location through completion of construction (1949-53).
- c. Base Period—The base period was an eight year period preceding the announcement of construction of the facility (1941-48). The length of the base period was partially determined by the availability of sales information.

##### 4. Property Identification:

Through use of city records, county maps, ASC aerial photos and state right of way strip maps, each piece of property within the study and control areas was identified and the owner recorded.

##### 5. Land Sales:

Through the use of ownership maps, each property transaction was traced through the deed records in the County Clerk's office. Sales prices were recorded for each legitimate sale. Family sales and other questionable transactions were excluded. In cases where the actual consideration was not revealed, the median of the value range as revealed by Federal Revenue Stamps was used. (These stamps are affixed in multiples of \$.55 per \$500.) Property sales were then coded according to whether they were improved or unimproved. Large acreages with farm houses and barns were coded as unimproved sales. Fortunately, most of these sales had been made without improvements.

##### 6. Control Areas:

Specific control areas were selected for the Austin study area. These control areas were selected to represent properties similar to

those prevalent in the study area prior to construction of the Interstate System. Entire land surveys were used as acreage control areas, and all land sales within each survey were recorded. Several control subdivisions were selected and the sales recorded.

7. Statistical Treatment of Sales:

- a. To remove the effect of general inflation over the large number of years studied, each sale was deflated by the Bureau of Labor Statistics' Consumer Price Index (1947-1949=100). This reduced all sales prices to a common dollar base.
- b. The sales were next converted to a common price per unit so that comparisons could be made from a common unit base. Area weighted values were computed in the original study, but the restudy also used the average price per acre resulting from an array of sales' price per acre.
- c. A three year moving average of the average price per unit was shown graphically for each area in the restudy.
- d. All sales were then grouped according to the various classifications being considered.
- e. Changes between periods were shown as both dollar and percentage changes.
- f. Study and control area before and after period means were tested for significant differences.

B. The procedures followed in the analysis of land use changes were as follows:

1. Land use for the last year in the base period (1948) was investigated and recorded for each piece of property within the study area. This use was then compared to the after period land use as determined for 1957 and 1961.
2. Properties were grouped into eight classes according to the following system of land uses.
  - a. Agricultural land
    - (1) Used primarily for agricultural purposes.
    - (2) Minimum size 10 acres (exception: truck or other intensive type farm-minimum size 2 acres).
  - b. Land held for future use
    - (1) Generally considered to be held for future use rather than its utility at present.
    - (2) May be farmed or grazed or used for other agricultural purposes during interim period.
    - (3) May be either inside or outside city limits.

c. Rural residence

- (1) Used primarily as a dwelling place. Must have occupiable house but need not necessarily be occupied.
- (2) Outside city limits.
- (3) Maximum size 10 acres: Larger size becomes either a or b above, depending on whether farming activity is carried on. (Exception: Truck or other intensive type farm-maximum size 2 acres).

d. Urban residence

- (1) Dwelling unit inside city limits.
- (2) Subdivisions outside city limits.
- (3) Maximum size 5 acres (larger plots will be classed as b above).

e. Commercial Traffic Serving

- (1) Any commercial firm deriving more than 50 percent of its income from traffic.
- (2) Primarily nonmanufacturing.

f. Commercial Nontraffic Serving

- (1) Any commercial firm deriving less than 50 percent of its income from traffic.
- (2) Primarily nonmanufacturing.

g. Industrial

- (1) Manufacturing firm.

h. Institutional-Municipal

- (1) Any publicly owned property (City, County, State or Federally owned property).
- (2) Any group owned or operated property (churches, schools, cemeteries, etc.).

3. Changes in land uses are shown graphically by means of before and after land use maps, the latter two being overlays. Also, an after period aerial photograph is shown.

C. The procedures followed in relating changes in land value to changes in land use were as follows:

1. Land use at time of sale was determined according to the classifications in B above for each piece of property sold. Post-sale use was also determined for each property.
2. Each sales card was classified in accordance with the changes in land use attendant to the sale.
3. Analyses were run on each land use classification change. All sales were grouped by use changes and the analysis was made on the basis of relative changes in price. Data not area weighted were used in the restudy.
4. The relationship between the changes in land use and land value is shown graphically.

D. The procedures followed in determining the effects of the new facilities on retail business activity were as follows:

1. It was decided to use the gross sales figures of retail businesses as the most practical measure of business activity.
2. A complete inventory of businesses along both the old and new routes was made for the years 1953, 1957, and 1961. Since the study began in 1957 it was difficult to inventory the 1953 businesses without missing some which closed before 1957.
3. All retail businesses located on the old route within the study area were personally interviewed by members of the research staff. A concerted effort was made to obtain gross sales figures for the last year prior to opening the new facility (1953) and the fourth and eighth years after the opening of the new highway (1957 and 1961 respectively). Additional information concerning the operation of each business was also obtained.
4. All retail businesses located on the new route were interviewed and a record of 1957 and 1961 sales were obtained. Since the new route was located on a new location, businesses were not established until after the new highway had been opened for business.
5. All businesses were classified into homogeneous groups such as service stations, motels, etc. These groups were then classed as traffic serving or nontraffic serving businesses in accordance with their dependence on traffic for their revenue.
6. In analyzing the effect of the new facility on business activity, as many as six combinations of businesses were used for comparison of each group of businesses. The number of comparisons used depended upon the availability of data in each case. These comparisons are:

a. Business Comparisons

- (1) Cooperating old businesses — old route.
- (2) Total old businesses—old route (derived by adding in the calculated volumes for noncooperating businesses).
- (3) New business—old route (those established after the new facility had opened).
- (4) All businesses—old route.
- (5) New businesses—new route.
- (6) All businesses—both routes.

b. Business Grouping

The purpose of grouping the businesses in this manner was to allow an inspection of the effects on businesses from several viewpoints. We are interested in

the influences of the new facility from the following standpoints.

- (1) As it influences particular group of old firms located on the old route.
- (2) As it influences traffic serving as opposed to nontraffic serving old businesses on the old route.
- (3) As it influences activity on the old route as a whole (old plus new firms).
- (4) As it influences the development within the entire area under study (both old and new routes).

E. The procedures followed in determining other economic changes which occurred in the area during the period studied are below. Basic data about Austin and Travis County prepared by the Department of Planning, City of Austin, were collected and are as follows:

1. Natural population increases.
2. Assessed valuation of property.
3. Total persons employed.
4. Total persons employed in manufacturing.
5. Total persons employed in nonmanufacturing.
6. New dwelling units authorized.
7. Total building permit values.
8. Electric customers.
9. Water customers.
10. Enrollment at University of Texas.
11. Enrollment in Austin Independent School District.
12. Motor vehicle registration.
13. Postal receipts.

### ***Formulas Used In Making Statistical Tests On Land Value Data***

In the footnotes of the land value tables, certain statistical data are presented to aid the reader in further evaluating the land value information given in the tables. By using the appropriate large and small sample formulas, the standard errors of the difference between various pairs of means (study versus control areas, Section 1 versus Section 2, etc.) were computed and shown in the footnotes under each table. These standard errors were used in formulas deriving T and Student's t values. The quantity T, or Student's t, is the deviation of the difference between two sample means from the mean of the population, expressed in units of the standard error of the difference between the means. The only difference between T and Student's t is that the latter is used for a sample with small numbers of observations. These T or Student's t values are also shown. Finally, the approximate confidence level in which these T or t values are significant is shown.

An explanation of the formulas used in determining the standard error of difference between two means and the T or t values is presented below.



1. For pairs of samples, each of which is made up of 30 or more observations, the formula used for computing the standard error of the difference between the means of these two samples is given by

$$S_d = \sqrt{\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2}}$$

where  $\sigma_1$  and  $\sigma_2$  are the standard deviations of the populations from which samples 1 and 2 come respectively. With the two  $\sigma$ 's not known, the corresponding sample standard deviations were used.  $N_1$  and  $N_2$  are the number of observations that make up samples 1 and 2 respectively. In determining whether the differences between the means of samples 1 and 2 deviates significantly at a certain confidence level, a T value is computed by the formula  $T = D/S_d$  where D is the difference between the means of samples 1 and 2, and  $S_d$  is the standard error given above. It is assumed that samples 1 and 2 come from normal populations with the same means.

2. For a pair of samples consisting of less than 30 observations, the standard error of the difference between the means of these two samples is given by

$$S_d = \sqrt{\frac{\sigma_1^2 + \sigma_2^2}{N_1 + N_2 - 2}}$$

where  $\sigma_1$  and  $\sigma_2$  are the standard deviations of the populations from which samples 1 and 2 come respectively. With the two  $\sigma$ 's not known, we substituted for them the  $\sigma$ 's of the corresponding samples.  $N_1$  and  $N_2$  are the number of observations that make up samples 1 and 2 respectively. In determining whether the difference between the means of samples 1 and 2 deviates significantly at a certain confidence level, a T value is computed by using Student's t and is given by

$$t = \frac{D}{S_d} \sqrt{\frac{N_1 + N_2}{N_1 \times N_2}}$$

where D is the difference between the means of samples 1 and 2, and  $S_d$  is the standard error given above. It is assumed that samples 1 and 2 come from normal populations with the means.

### Consumer Price Index

As a means of measuring price changes, constant dollars were calculated and presented in the analysis of this report. The actual dollars were multiplied by the reciprocal of the consumer price index for the United States, as published by the U. S. Department of Commerce, Bureau of Labor Statistics, to arrive at the constant dollar value.

Below is a listing of the consumer price index and its reciprocal for each year involved. The base was 1947-49=100.

<i>Year</i>	<i>Index</i>	<i>Reciprocal</i>
1944	75.2	1.330
1945	76.9	1.300
1946	83.4	1.200
1947	95.5	1.047
1948	102.8	0.973
1949	101.8	0.982
1950	102.8	0.973
1951	111.0	0.901
1952	113.5	0.881
1953	114.4	0.874
1954	114.8	0.871
1955	114.5	0.873
1956	116.2	0.861
1957	120.2	0.832
1958	123.5	0.810
1959	124.6	0.803
1960	126.5	0.791
1961	127.9	0.782

*Other Supporting Data in Tabular Form*

Table 30  
CHANGES IN ACTUAL LAND PRICES OF UNIMPROVED ACREAGE TRACTS IN THE STUDY AND CONTROL AREAS, AUSTIN, TEXAS

Item	Price Per Acre <sup>1</sup>		Difference Between Areas	Percent of Study Area Before Period Price
	Study Area	Control Area		
Before Period (1941-48)	\$ 464 (96)	\$114 (152)	\$ 350 <sup>2</sup>	
Construction Period (1949-53)	1,210 (42)	325 (139)	885	
First After Period (1954-57)	2,664 (64)	624 (81)	2,040	
Second After Period (1958-61)	3,327 (33)	786 (96)	2,541	
Whole After Period (1954-61)	2,889 (97)	711 (177)	2,178 <sup>3</sup>	
Increase Between Periods Before and Construction				
Dollars	\$ 746	\$211	\$ 535	115% <sup>4</sup>
Percent	161%	185%	-24% <sup>5</sup>	
Construction and Whole After				
Dollars	\$1,679	\$386	\$1,253	
Percent	139%	119%	20% <sup>5</sup>	
Before and Whole After				
Dollars	\$2,425	\$597	\$1,902	410% <sup>4</sup>
Percent	523%	524%	-1% <sup>5</sup>	
Probable Highway Influence				
Percent <sup>6</sup>	205%			
Dollars <sup>7</sup>	\$ 951			

<sup>1</sup>Number of transactions is shown in parentheses.

<sup>2</sup>The standard error (S.E.) is \$90. This is significant at a confidence level of 99 percent. T is equal to 3.91.

<sup>3</sup>The S.E. is \$236. This is significant at a confidence level of 99 percent. T is equal to 9.23.

<sup>4</sup>See Footnote 4 of Table 3 for explanation of this type of measurement.

<sup>5</sup>See Footnote 5 of Table 3 for explanation of this type of measurement.

<sup>6</sup>See Footnote 6 of Table 3 for explanation of this type of measurement.

<sup>7</sup>See Footnote 7 of Table 3 for explanation of this type of measurement.

Table 31  
CHANGES IN ADJUSTED LAND PRICES OF UNIMPROVED ACREAGE TRACTS IN THE STUDY AND CONTROL AREAS OF AUSTIN, TEXAS, WEIGHTED BY AREA SOLD IN CONSTANT DOLLARS (1947-49 = 100)

Study Period	Number of Sales	Number of Acres	Adjusted Price/Acre	Price Changes Between Periods	
				Per Acre	Per Acre
	(Number)	(Number)	(Dollars)	(Dollars)	(Percent)
STUDY AREA					
Before Period (1941-48)	96	1,986	\$ 401		
Construction Period (1949-53)	42	567	509	\$ 108	26%
First After Period (1954-57)	64	612	1,213	704	138
Second After Period (1958-61)	33	182	2,240	1,027	85
Whole After Period (1954-61)	97	794	1,448	1,047 <sup>1</sup>	261 <sup>1</sup>
CONTROL AREA					
Before Period (1941-48)	152	13,898	67		
Construction Period (1949-53)	139	9,698	95	28	42
First After Period (1954-57)	81	3,360	169	74	78
Second After Period (1958-61)	96	3,876	156	-13	-8
Whole After Period (1954-61)	316	7,236	162	95 <sup>1</sup>	142 <sup>1</sup>

<sup>1</sup>Changes between the Before Period (1941-48) and the Whole After Period (1954-61) of the Study and Control Areas.

Table 32  
CHANGES IN ACTUAL LAND PRICES OF UNIMPROVED SUBDIVISION LOTS IN THE STUDY AND CONTROL AREAS, AUSTIN, TEXAS

Item	Price Per Square Foot <sup>1</sup>		Difference Between Areas	Percent of Study Area Construction Period Price
	Study Area	Control Area		
Before Period (1941-48)	\$.0138 (266)	\$.0223 (3)	-\$ .0085	
Construction Period (1949-53)	.0380 (160)	.0194 (84)	.0186 <sup>2</sup>	
First After Period (1954-57)	.0735 (409)	.0644 (166)	.0091	
Second After Period (1958-61)	.1830 (353)	.1054 (78)	.0774	
Whole After Period (1954-61)	.1243 (762)	.0776 (244)	.0467 <sup>3</sup>	
Increase Between Periods				
Construction and Whole After				
Dollars	\$.0863	\$.0528	\$.0335	88% <sup>4</sup>
Percent	227%	272%	-45% <sup>5</sup>	
Probable Highway Influence				
Percent <sup>6</sup>	22%			
Dollars <sup>7</sup>	\$.0084			

<sup>1</sup>Number of transactions is shown in parentheses.

<sup>2</sup>The S.E. is \$.00246. This is significant at a confidence level of 99 percent. T is equal to 7.58. The S.E. of the difference between the before period means is \$.00876. This is significant at a confidence level of 66 percent. t is equal to .969. Due to the small number of observations in the control area, the before period was not used for comparative purposes.

<sup>3</sup>The S.E. is \$.00974. This is significant at a confidence level of 99 percent. T is equal to 4.80.

<sup>4</sup>See Footnote 4 of Table 3 for explanation of this type of measurement.

<sup>5</sup>See Footnote 5 of Table 3 for explanation of this type of measurement.

<sup>6</sup>See Footnote 6 of Table 3 for explanation of this type of measurement.

<sup>7</sup>See Footnote 7 of Table 3 for explanation of this type of measurement. However, the construction period study area price is used instead of the before period price.

Table 33  
CHANGES IN ADJUSTED LAND PRICES OF UNIMPROVED SUBDIVISION LOTS IN THE STUDY AND CONTROL AREAS OF AUSTIN, TEXAS, WEIGHTED BY AREA SOLD IN CONSTANT DOLLARS (1947-49 = 100)

Study Period	Number of Sales	Number of Sq. Ft.	Adjusted Price/Sq. Ft.	Price Changes Between Periods	
				Per Sq. Ft.	Per Sq. Ft.
	(Number)	(Sq. Ft.)	(Dollars)	(Dollars)	(Percent)
STUDY AREA					
Before Period (1941-48)	266	3,137,191	\$.0181		
Construction Period (1949-53)	160	3,077,950	.0282	\$.0101	56%
First After Period (1954-57)	409	6,763,997	.0577	.0295	105
Second After Period (1958-61)	353	5,171,879	.1449	.0872	151
Whole After Period (1954-61)	762	11,935,876	.0955	.0673 <sup>1</sup>	239 <sup>1</sup>
CONTROL AREA					
Before Period (1941-48)	3	88,426	.0239		
Construction Period (1949-53)	84	1,419,185	.0188	-.0051	-21
First After Period (1954-57)	166	4,060,228	.0421	.0233	123
Second After Period (1958-61)	78	1,591,682	.0638	.0217	52
Whole After Period (1954-61)	244	5,651,910	.0482	.0294 <sup>1</sup>	156 <sup>1</sup>

<sup>1</sup>Changes between the construction period (1949-53) and the whole after period (1954-61) of the study and control areas. This comparison was made due to the small number of before period sales in the control area.

**Table 34**  
**CHANGES IN ACTUAL LAND PRICES OF ABUTTING AND NONABUTTING UNIMPROVED ACREAGE TRACTS**  
**IN THE STUDY AREA AS COMPARED TO THE CONTROL AREA, AUSTIN, TEXAS**

Item	Price Per Acre <sup>1</sup>			Difference Between Areas			Percent of Respective Parts of Study Area's Before Period Price	
	Study Area Abutting	Study Area Nonabutting	Control Area	Abutting versus Non-abutting	Abutting versus Control Area	Non-abutting versus Control Area	Abutting	Non-abutting
Before Period (1941-48) <sup>2</sup>	\$ 382 (47)	\$ 542 (49)	\$114 (152)	\$ 160	\$ 268	\$ 428		
Construction Period (1949-53)	1074 (26)	1430 (16)	325 (139)	356	749	1105		
First After Period (1954-57)	3094 (49)	1258 (15)	624 (81)	1836	2470	634		
Second After Period (1958-61)	4277 (18)	2186 (15)	786 (96)	2091	3491	1400		
Whole After Period (1954-61) <sup>3</sup>	3412 (67)	1722 (30)	711 (177)	1690	2701	1011		
Increase Between Periods Before and Construction								
Dollars	\$ 692	\$ 888	\$211	\$-196	\$ 481	\$ 677	126% <sup>4</sup>	125% <sup>4</sup>
Percent	181%	164%	185%	17%	-4% <sup>5</sup>	21% <sup>5</sup>		
Construction and Whole After								
Dollars	\$2338	\$ 292	\$386	\$ 2046	\$1952	\$-94		
Percent	218%	20%	119%	198%	99% <sup>5</sup>	-99% <sup>5</sup>		
Before and Whole After								
Dollars	\$3030	\$ 1180	\$597	\$ 1850	\$2433	\$ 583	640% <sup>4</sup>	108% <sup>4</sup>
Percent	793%	218%	524%	575%	269% <sup>5</sup>	-306% <sup>5</sup>		
Probable Highway Influence								
Percent <sup>6</sup>	455%	-149%						
Dollars <sup>7</sup>	\$1738	\$-808						

<sup>1</sup>Number of transactions is shown in parentheses.

<sup>2</sup>The S.E. of the difference between the means of the study area (abutting) and the study area (nonabutting) is \$173. This is significant at a confidence level of 64 percent. T is equal to .92. The S.E. of the difference between the means of the study area (nonabutting) and the control area is \$162. This is significant at a confidence level of 99 percent. T is equal to 2.64. The S.E. of the difference between the means of the study area (abutting) and the control area is \$66. This is significant at a confidence level of 99 percent. T is equal to 4.09.

<sup>3</sup>The S.E. of the difference between the means of the study area (abutting) and the study area (nonabutting) is \$368. This is significant at a confidence level of 99 percent. T is equal to 4.59. The S.E. of the difference between the means of the study area (nonabutting) and the control area is \$228. This is significant at a confidence level of 99 percent. T is equal to 4.43. The S.E. of the difference between the means of the study area (abutting) and the control area is \$301. This is significant at a confidence level of 99 percent. T is equal to 8.87.

<sup>4</sup>See Footnote 4 of Table 3 for an explanation of this type of measurement. However, the study area is divided into abutting and nonabutting land in this table.

<sup>5</sup>See Footnote 5 of Table 3 for an explanation of this type of measurement.

<sup>6</sup>See Footnote 6 of Table 3 for an explanation of this type of measurement.

<sup>7</sup>See Footnote 7 of Table 3 for an explanation of this type of measurement.

**Table 35**  
**CHANGES IN ADJUSTED LAND PRICES OF ABUTTING AND NONABUTTING UNIMPROVED ACREAGE**  
**TRACTS IN THE AUSTIN, TEXAS, STUDY AREA, WEIGHTED BY AREA SOLD IN CONSTANT DOLLARS**  
**(1947-49 = 100)**

Study Period	Number of Sales	Number of Acres	Adjusted Price/Acre	Price Changes Between Periods	
				Per Acre	Per Acre
	(Number)	(Acres)	(Dollars)	(Dollars)	(Percent)
<b>ABUTTING</b>					
Before Period (1941-48)	47	892	\$ 248		
Construction Period (1949-53)	26	364	553	\$ 305	123%
First After Period (1954-57)	49	307	1,757	1,204	218
Second After Period (1958-61)	18	41	6,652	4,895	279
Whole After Period (1954-61)	67	347	2,328	2,080 <sup>1</sup>	839 <sup>1</sup>
<b>NONABUTTING</b>					
Before Period (1941-48)	49	1,094	165		
Construction Period (1949-53)	16	203	430	265	161
First After Period (1954-57)	15	305	665	235	55
Second After Period (1958-61)	15	141	976	311	47
Whole After Period (1954-61)	30	447	764	599 <sup>1</sup>	363 <sup>1</sup>

<sup>1</sup>Changes between the Before Period (1941-48) and the whole After Period (1954-61) of abutting and nonabutting tracts in the Study Area.

Table 36  
**CHANGES IN ACTUAL LAND PRICES OF ABUTTING AND NONABUTTING UNIMPROVED SUBDIVIDED LOTS IN THE STUDY AREA AS COMPARED TO THE CONTROL AREA, AUSTIN, TEXAS**

Item	Price Per Square Foot <sup>1</sup>			Difference Between Areas			Percent of Respective Parts of Study Area's Construction Period Price	
	Study Area Abutting	Study Area Nonabutting	Control Area	Abutting Versus Non-abutting	Abutting Versus Control Area	Non-Abutting Versus Control Area	Abutting	Non-abutting
Before Period (1941-48)	\$.0227(3)	\$.0137(263)	\$.0223(3)	\$.0090	\$.0004	\$.0086		
Construction Period (1949-53) <sup>2</sup>	.0503(7)	.0375(153)	.0194(84)	.0128	.0309	.0181		
First After Period (1954-57)	.1127(23)	.0712(386)	.0644(166)	.0415	.0483	.0068		
Second After Period (1958-61)	.1269(19)	.1862(334)	.1056(78)	.0593	.0213	.0806		
Whole After Period (1954-61) <sup>3</sup>	.1191(42)	.1246(720)	.0776(244)	.0055	.0415	.0470		
Increase Between Periods Before and Construction								
Dollars	\$.0276	\$.0238	-\$ .0029	\$.0038	\$.0305	\$.0267		
Percent	122%	174%	-13%	-52%	135%	187%		
Construction and Whole After								
Dollars	\$.0688	\$.0871	\$.0582	-\$ .0183	\$.0106	\$.0289	21% <sup>4</sup>	77% <sup>4</sup>
Percent	137%	232%	300%	-95%	-163% <sup>5</sup>	-68% <sup>5</sup>		
Before and Whole After								
Dollars	\$.0964	\$.1109	\$.0553	-\$ .0145	\$.0411	\$.0556		
Percent	425%	809%	248%	-384%	177%	561%		
Probable Highway Influence								
Percent <sup>6</sup>	-71%	-5%						
Dollars <sup>7</sup>	-\$ .0357	-\$ .00188						

<sup>1</sup>Number of transactions is shown in parentheses.

<sup>2</sup>Due to the small number of observations in two areas, the before period was not used for comparative purposes in this table. The S.E. of the difference between the means of the study area (abutting) and the study area (nonabutting) is \$.011. This is significant at a confidence level of 77 percent. T is equal to 1.21. The S.E. of the difference between the means of the study area (nonabutting) and the control area is \$.0025. This is significant at a confidence level of 99 percent. T is equal to 7.39. The S.E. of the difference between the means of the study area (abutting) and the control area is \$.0018. This is significant at a confidence level of 99 percent. T is equal to 17.19.

<sup>3</sup>The S.E. of the difference between the means of the study area (abutting) and the study area (nonabutting) is \$.0122. This is significant at a confidence level of 35 percent. T is equal to .45. The difference between the means of the study area (abutting) and the control area is \$.0099. This is significant at a confidence level of 99 percent. T is equal to 4.20. The S.E. of the difference between the means of the study area (nonabutting) and the control area is \$.01. This is significant at a confidence level of 99 percent. T is equal to 4.64.

<sup>4</sup>See Footnote 4 of Table 3 for an explanation of this type of measurement. However, the study area is divided into abutting and nonabutting land in this table.

<sup>5</sup>See Footnote 5 of Table 3 for an explanation of this type of measurement.

<sup>6</sup>See Footnote 6 of Table 3 for an explanation of this type of measurement.

<sup>7</sup>See Footnote 7 of Table 3 for an explanation of this type of measurement.

Table 37  
**CHANGES IN ADJUSTED LAND PRICES OF ABUTTING AND NONABUTTING SUBDIVIDED LOTS IN THE STUDY AREA OF AUSTIN, TEXAS, WEIGHTED BY AREA SOLD IN CONSTANT DOLLARS (1947-49 = 100)**

Study Period	Number of Sales	Number of Sq. Ft.	Adjusted Price/Sq. Ft.	Price Changes Between Periods	
				Per Sq. Ft.	Per Sq. Ft.
	(Number)	(Sq. Ft.)	(Dollars)	(Dollars)	(Percent)
<b>ABUTTING</b>					
Before Period (1941-48)	3	13,750	\$.0292		
Construction Period (1949-53)	7	156,000	.0284	-\$ .0008	-3%
First After Period (1954-57)	23	532,624	.0969	.0685	241
Second After Period (1958-61)	19	400,051	.1131	.0162	17
Whole After Period (1954-61)	42	932,675	.1039	.0755 <sup>1</sup>	266 <sup>1</sup>
<b>NONABUTTING</b>					
Before Period (1941-48)	263	3,123,441	.0181		
Construction Period (1949-53)	153	2,921,350	.0282	.0101	56
First After Period (1954-57)	386	6,231,373	.0544	.0262	93
Second After Period (1958-61)	334	4,771,828	.1475	.0931	171
Whole After Period (1954-61)	720	11,100,070	.0939	.0657 <sup>1</sup>	233 <sup>1</sup>

<sup>1</sup>Changes between the Construction Period (1949-53) and the Whole After Period (1954-61) of the Abutting and Non-abutting Values in the Study Area.

Table 38

CHANGES IN THE ACTUAL LAND PRICES OF UNIMPROVED SUBDIVISION LOTS IN SECTIONS 1 & 2 OF THE STUDY AREA AS COMPARED TO THE CONTROL AREA, AUSTIN, TEXAS

Item	Price Per Sq. Foot <sup>1</sup>			Difference Between Areas			Percent of Study Area Section's Construction Period Price	
	Study Area Section 1	Study Area Section 2	Control Area	Section 1 Vs Section 2	Section 1 Vs Control Area	Section 2 Vs Control Area	Section 1	Section 2
Before Period (1941-48)	\$.0138(266)	\$	\$.0223(3)	\$	\$.0085	\$		
Construction Period (1949-53) <sup>2</sup>	.0402(112)	.0333(48)	.0194(84)	.0069	.0208	.0139		
First After Period (1954-57)	.0459(96)	.0819(313)	.0644(166)	.0360	.0185	.0175		
Second After Period (1958-61)	.0836(91)	.2181(262)	.1056(78)	.1345	.0220	.1125		
Whole After Period (1954-61) <sup>3</sup>	.0643(187)	.1439(575)	.0776(244)	.0796	.0133	.0663		
Increase Between Periods Construction and Whole After								
Dollars	\$.0241	\$.1106	\$.0582	-\$ .0865	-\$ .0341	\$.0524	-85% <sup>4</sup>	157% <sup>4</sup>
Percent	60%	332%	300%	-272%	-230% <sup>5</sup>	32% <sup>5</sup>		
Probable Highway Influence								
Percent <sup>6</sup>	-158%	95%						
Dollars <sup>7</sup>	-.0635	\$.0316						

<sup>1</sup>Number of transactions is shown in parentheses.

<sup>2</sup>The S.E. of the difference between the means of Sections 1 and 2 of the study area is \$.0056. This is significant at a confidence level of 75 percent. T is equal to 1.24. The S.E. of the difference between the means of the study area (Section 2) and the control area is \$.0053. This is significant at a confidence level of 99 percent. T is equal to 2.65. The S.E. of the difference between the means of the study area (Section 1) and the control area is \$.0025. This is significant at a confidence level of 99 percent. T is equal to 8.31. The construction period was used here because of inconclusive data on Section 2 of the study area of the before period.

<sup>3</sup>The S.E. of the difference between the means of the study area (Section 1) and the control area is \$.0075. This is significant at a confidence level of 92 percent. T is equal to 1.78. The S.E. of the difference between the means of Sections 1 and 2 of the study area is \$.0121. This is significant at a confidence level of 99 percent. T is equal to 6.59. The S.E. of the difference between the means of the study area (Section 2) and the control area is \$.0119. This is significant at a confidence level of 99 percent. T is equal to 5.57.

<sup>4</sup>See Footnote 4 of Table 3 for an explanation of this type of measurement. However, the study area is divided into two sections in this table.

<sup>5</sup>See Footnote 5 of Table 3 for an explanation of this type of measurement.

<sup>6</sup>See Footnote 6 of Table 3 for an explanation of this type of measurement.

<sup>7</sup>See Footnote 7 of Table 3 for an explanation of this type of measurement.

Table 39

CHANGES IN ADJUSTED LAND PRICES OF UNIMPROVED ACREAGE TRACTS IN SECTIONS 1 AND 2 OF THE STUDY AREA OF AUSTIN, TEXAS, WEIGHTED BY AREA SOLD IN CONSTANT DOLLARS (1947-49 = 100)

Study Period	Number of Sales	Number of Acres	Adjusted Price/Acre	Price Changes Between Periods	
				Per Acre	Per Acre
	(Number)	(Acres)	(Dollars)	(Dollars)	(Percent)
SECTION 1					
Before Period (1941-48)	64	1,425	\$ 244		
Construction Period (1949-53)	27	357	437	\$ 193	79%
First After Period (1954-57)	25	244	1,755	1,318	302
Second After Period (1958-61)	17	49	4,641	2,886	164
Whole After Period (1954-61)	42	293	2,234	1,990 <sup>1</sup>	816 <sup>1</sup>
SECTION 2					
Before Period (1941-48)	32	561	95		
Construction Period (1949-53)	15	210	630	535	563
First After Period (1954-57)	39	368	852	222	35
Second After Period (1958-61)	16	133	1,365	513	60
Whole After Period (1954-61)	55	501	988	893 <sup>1</sup>	940 <sup>1</sup>

<sup>1</sup>Changes between the Before Period (1941-48) and the Whole After Period (1954-61) of Sections 1 and 2 of the Study Area.

Table 40  
**CHANGES IN ACTUAL LAND PRICES OF UNIMPROVED ACREAGE TRACTS IN SECTIONS 1 AND 2 OF THE STUDY AREA AS COMPARED TO THE CONTROL AREA, AUSTIN, TEXAS**

Item	Price Per Acre <sup>1</sup>			Difference Between Areas			Percent of Study Area Section's Before Period Price	
	Study Area Section 1	Study Area Section 2	Control Area	Section 1 Vs Section 2	Section 1 Vs Control Area	Section 2 Vs Control Area	Section 1	Section 2
Before Period (1941-48) <sup>2</sup>	\$ 542(64)	\$ 307(32)	\$114(152)	\$235	\$ 428	\$ 193		
Construction Period (1949-53)	1,334(27)	987(15)	325(139)	347	1,009	662		
First After Period (1954-57)	2,750(25)	2,608(39)	624(81)	142	2,126	1,984		
Second After Period (1958-61)	3,265(17)	3,392(16)	786(96)	127	2,479	2,606		
Whole After Period (1954-61) <sup>3</sup>	2,959(42)	2,836(55)	711(177)	123	2,248	2,125		
Increase Between Periods Before and Construction								
Dollars	\$ 792	\$ 680	\$211	\$112	\$ 581	\$ 469	107% <sup>4</sup>	153% <sup>4</sup>
Percent	146%	221%	185%	-75%	-39% <sup>5</sup>	36% <sup>6</sup>		
Construction and Whole After								
Dollars	\$1,625	\$1,849	\$386	-\$224	\$1,239	\$1,463		
Percent	122%	187%	119%	-65%	3% <sup>5</sup>	68% <sup>6</sup>		
Before and Whole After								
Dollars	\$2,417	\$2,529	\$597	-\$112	\$1,820	\$1,932	336% <sup>4</sup>	629% <sup>4</sup>
Percent	446%	824%	524%	-378%	-78% <sup>5</sup>	300% <sup>6</sup>		
Probable Highway Influence								
Percent <sup>7</sup>	129%	465%						
Dollars <sup>7</sup>	\$ 699	\$1,428						

<sup>1</sup>Number of transactions is shown in parentheses.

<sup>2</sup>The S.E. of the difference between the means of Sections 1 and 2 of the study area is \$151. This is significant at a confidence level of 68 percent. T is equal to 1.00. The S.E. of the difference between the means of Section 2 of the study area and the control area is \$90. This is significant at a confidence level of 97 percent. T is equal to 2.15. The S.E. of the difference between the means of Section 1 of the study area and the control area is \$117. This is significant at a confidence level of 99 percent. T is equal to 3.65.

<sup>3</sup>The S.E. of the difference between the means of Sections 1 and 2 of the study area is \$465. This is significant at a confidence level of 21 percent. T is equal to .264. The S.E. of the difference between the means of Section 1 of the study area and the control area is \$360. This is significant at a confidence level of 99 percent. T is equal to 6.25. The S.E. of the difference between the means of Section 2 of the study area and the control area is \$308. This is significant at a confidence level of 99 percent. T is equal to 6.91.

<sup>4</sup>See Footnote 4 of Table 3 for an explanation of this type of measurement. However, the study area is divided into Sections 1 and 2 in this table.

<sup>5</sup>See Footnote 5 of Table 3 for an explanation of this type of measurement. Here again, the study area is divided into Sections 1 and 2 in this table.

<sup>6</sup>See Footnote 6 of Table 3 for an explanation of this type of measurement.

<sup>7</sup>See Footnote 7 of Table 3 for an explanation of this type of measurement.

Table 41  
**CHANGES IN ADJUSTED LAND PRICES OF UNIMPROVED SUBDIVISION LOTS IN SECTIONS 1 AND 2 OF THE STUDY AREA OF AUSTIN, TEXAS, WEIGHTED BY AREA SOLD IN CONSTANT DOLLARS (1947-49 = 100)**

Study Period	Number of Sales	Number of Sq. Ft.	Adjusted Price/Sq. Ft.	Price Changes Between Periods	
				Per Sq. Ft.	Per Sq. Ft.
	(Number)	(Sq. Ft.)	(Dollars)	(Dollars)	(Percent)
SECTION 1					
Before Period (1941-48)	266	3,137,191	\$.0181		
Construction Period (1949-53)	112	1,774,435	.0357	\$.0176	97%
First After Period (1954-57)	96	1,641,810	.0361	.0004	1
Second After Period (1958-61)	91	1,104,093	.0645	.0284	79
Whole After Period (1954-61)	187	2,745,903	.0476	.0119 <sup>1</sup>	33
SECTION 2					
Before Period (1941-48)					
Construction Period (1949-53)	48	1,303,515	.0180		
First After Period (1954-57)	313	5,122,187	.0647	.0467	259
Second After Period (1958-61)	262	4,067,786	.1667	.1020	158
Whole After Period (1954-61)	575	9,189,973	.1098	.0918 <sup>1</sup>	510 <sup>1</sup>

<sup>1</sup>Changes between the construction period (1949-53) and the whole after period (1954-61) of Sections 1 and 2 of the study area. This comparison was made due to the lack of before period sales in the control area.

Table 42

## CHANGES IN GASOLINE GALLONAGE SALES OF THIRTEEN SERVICE STATIONS LOCATED ALONG OLD U. S. 81 BETWEEN SELECTED YEARS — 1953, 1957 AND 1961

Station Number	Gasoline Volume			Percent Change Between		
	1953	1957	1961	1953-57	1957-61	1953-61
	(Gallons)	(Gallons)	(Gallons)	(Percent)	(Percent)	(Percent)
1	19,655	19,655	28,598	0.0%	45.5%	45.5%
2	24,000	208,383	231,942	768.3	11.3	866.4
3	26,323	19,101	18,483	- 27.4	- 3.2	- 29.8
4	156,000	78,000	79,232	- 50.0	1.6	- 49.2
5	246,407	185,332	121,000	- 24.8	-34.7	- 50.9
6	166,255	134,345	161,098	- 19.2	19.9	- 3.1
7	158,962	167,247	180,000	5.2	7.6	13.2
8	267,537	241,043	222,831	- 9.9	- 7.6	- 16.7
9	133,716	84,025	54,000	- 37.2	-35.7	- 59.6
10	164,040	148,620	137,403	- 9.4	- 7.5	- 16.2
11	264,011	220,865	265,000	- 16.3	20.0	0.4
12	491,000	42,373	61,205	- 91.4	44.4	- 87.5
13	201,744	247,560	148,112	22.7	-40.2	- 26.5
Total Stations	2,319,650	1,796,549	1,708,904	- 22.6%	- 4.9%	- 26.3%
Average	178,435	138,196	131,454			
Standard Deviation	127,004	82,393	80,074			

Table 43

## CHANGES IN ACTUAL AND CALCULATED GASOLINE GALLONAGE SALES OF ALL SERVICE STATIONS LOCATED IN THE AUSTIN STUDY AREA BETWEEN SELECTED YEARS — 1953, 1957 AND 1961

Item	Gasoline Volume			Percent Change Between		
	1953	1957	1961	1953-57	1957-61	1953-61
	(Gallons)	(Gallons)	(Gallons)	(Percent)	(Percent)	(Percent)
Old Route						
13 Old Stations Reporting Actual Data All Years	2,319,650	1,796,549	1,708,904	- 22.6%	- 4.9%	- 26.3%
3 Old Stations Reporting Actual Data Two Years	176,397 <sup>1</sup>	185,107	144,898 <sup>2</sup>	4.9	-21.7	-17.9
1 Old Station Not Reporting Any Actual Data—Calculated	173,229 <sup>3</sup>	142,949 <sup>3</sup>		-17.5	NA	NA
Total 17 Old Stations	2,669,276	2,124,605	1,853,802	-20.4	-12.7	-30.6
3 New Stations Open Before 1957 Reporting Actual Data	NA	648,720	658,096	NA	1.4	NA
2 New Stations Open After 1957 Reporting Actual Data	NA	NA	298,585	NA	NA	NA
Total 22 Old Route Stations	2,669,276	2,773,325	2,810,483	3.9%	1.3%	5.3%
New Route						
3 New Stations	NA	417,017	1,007,314	NA	141.6	NA
Total 25 Stations Within Study Area	2,669,276	3,190,342	3,817,797	19.5%	19.7%	43.0%

<sup>1</sup>The gallonage was estimated on one of these stations by dividing its dollar volume by the average price per gallon sold by all old stations reporting both gross dollar and gallonage volumes during 1953.

<sup>2</sup>This is the volume of two stations. One closed before 1961.

<sup>3</sup>Since neither gallonage nor dollar volume was secured on this station, the average gallonage volume of all old reporting stations for the respective years was assumed to be the volume of this station.

<sup>4</sup>This station was closed before 1961.



Table 44  
**CHANGES IN OCCUPANCY OF SEVEN MOTELS LOCATED ON OLD U. S. 81 BETWEEN SELECTED YEARS —  
 1953, 1957, AND 1961**

Motel Number	Normal Capacity		Average Nightly Occupancy Rate			Percent Change Between		
	1953-57	1961	1953	1957	1961	1953-57	1957-61	1953-61
	(Number)	(Number)	(Number)	(Number)	(Number)	(Percent)	(Percent)	(Percent)
1	49	54	46.6	29.4	32.4	-36.9%	10.2%	-30.5%
2	36	36	31.3	14.4	14.4	-54.0	00.0	-54.0
3	47	51	44.7	28.2	35.7	-36.9	26.6	-20.0
4	35	20	26.3	21.0	11.0	-20.2	-47.6	-58.2
5	30	27	25.5	22.5	18.1	-11.8	-19.6	-29.0
6	49	49	45.6	19.6	9.3	-57.0	-52.6	-79.6
7	14	14	11.2	11.2	11.2	00.0	00.0	00.0
<b>Total</b>	<b>260.</b>	<b>251</b>	<b>231.2</b>	<b>146.3</b>	<b>132.1</b>	<b>-36.7%</b>	<b>- 9.7%</b>	<b>-42.9%</b>

Table 45  
**A COMPARISON OF CHANGES IN RETAIL SALES AS REFLECTED BY STUDY AREA BUSINESSES VERSUS  
 THAT REPORTED BY SALES MANAGEMENT MAGAZINE'S "SURVEY OF BUYING POWER" FOR THE CITY  
 OF AUSTIN BETWEEN SELECTED YEARS—1953, 1957, AND 1961**

Type of Business	Percent Changes in Retail Sales Between					
	Study Area Businesses			"Survey of Buying Power"		
	1953-57	1957-61	1953-61	1953-57	1957-61	1953-61
	(Percent)	(Percent)	(Percent)	(Percent)	(Percent)	(Percent)
Food	11.9%	— 3.7%	7.7%	19.0%	23.9%	47.4%
Lumber, Building, Hardware	4.5	53.6	61.1	<sup>1</sup>	10.0	<sup>1</sup>
Automotive	853.3	456.6	5,206.0	1.8	- 6.2	- 4.5
Eating and Drinking Establishments	-25.6	9.4	- 18.6	<sup>1</sup>	21.0	<sup>1</sup>
Service Stations	11.6	24.5	38.9	<sup>1</sup>	28.7	<sup>1</sup>
Others <sup>2</sup>	98.6	- 5.0	88.7	<sup>3</sup>	13.3	<sup>3</sup>

<sup>1</sup>In 1953, businesses within these groups were not separated out of the total retail sales.

<sup>2</sup>Other firms included in this category are general merchandise and apparel, furniture and household appliances, drug and miscellaneous stores.

<sup>3</sup>Figures are not comparable.