

# **A Study of The Impact of Interstate Highway 45 on Huntsville, Texas**

by

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Research Report Number 4-9

Economic Impact of the Interstate System  
on Selected Areas in Texas

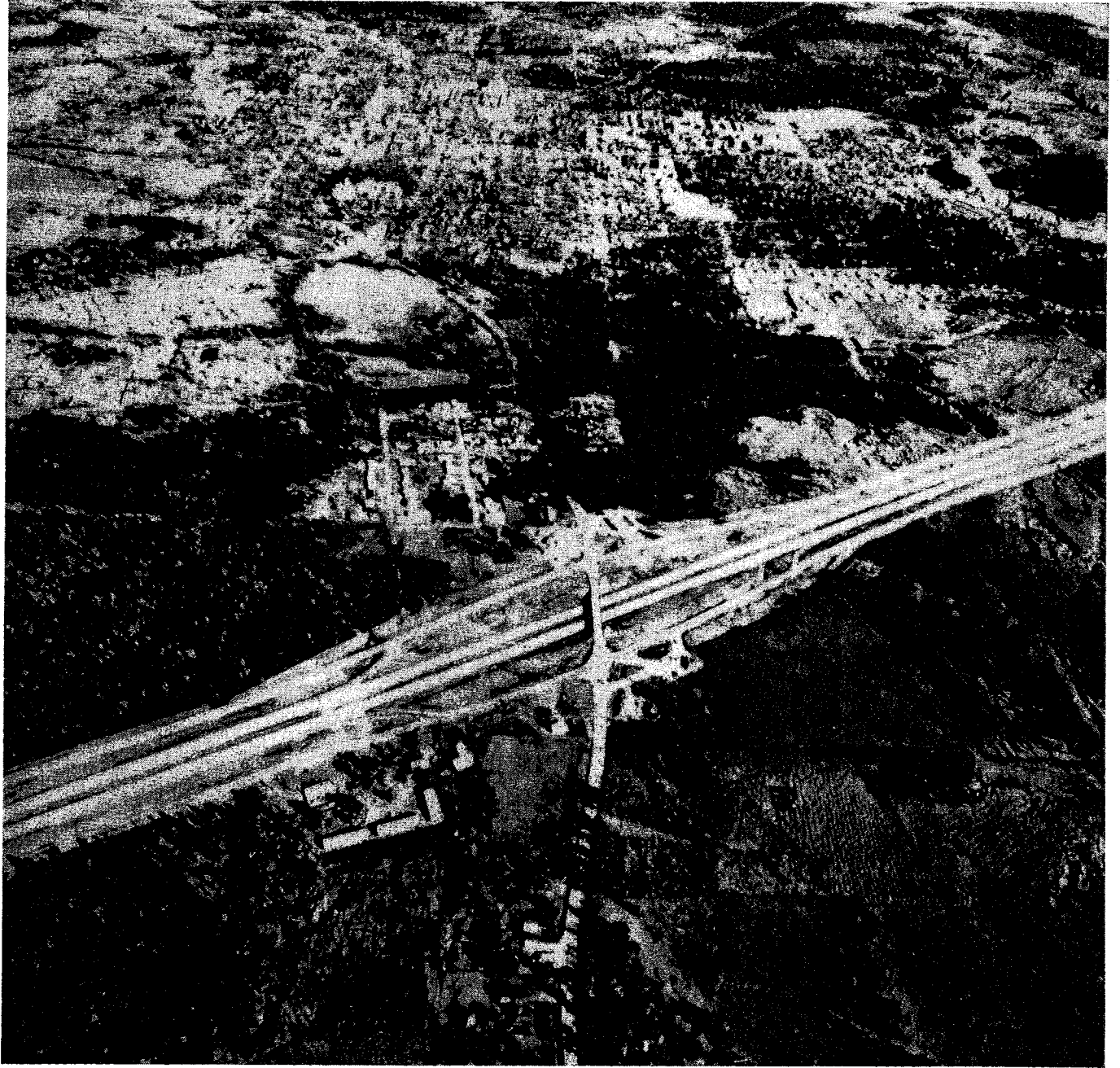
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IH 45 by-passing Huntsville on its west side.

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The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the Bureau of Public Roads.

## 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.

The study was to include an analysis of the economic impact of the Interstate Highway System on local areas. With the advice of the Project Advisory Committee, nine such sites were selected for initial study in or near the following Texas cities: Austin, Temple, Rockwall, Waxahachie, Merkel, Houston, Huntsville, Conroe, and Anahuac. At a later date, the Committee authorized a restudy of the Austin and Temple areas.

Preliminary reports were made to the sponsors on the following study sites: Austin, Temple, Rockwall, Waxahachie, Merkel, and Huntsville. Final reports have been prepared on all the study areas. All of these reports will be published after approval is received from the sponsors.

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## Summary and Conclusions

The summary and conclusions of findings resulting from analyzing land value, land use, business activity, travel patterns, and general community development data collected in Huntsville and the Huntsville study area are presented below. The data suggest that, in general, the economic impact of IH 45 on the study area and the Huntsville community was not detrimental to economic growth. The specific conclusions are as follows:

1. The highway impact on study area land values was significant, especially in the case of acreage tracts. For example, unimproved acreage tracts received a probable highway influence of \$2,376 per acre. This figure is 253 percent of the study area's "before period" price. The abutting unimproved acreage tracts received an even greater impact from IH 45, where the highway influence was \$5,853 per acre.

2. About 11 percent of the timberland and agricultural land changed to other uses after construction began on IH 45. Tracts in close proximity to this facility changed to residential and commercial use, especially at or near two of the interchanges. Many of these tracts changed ownership prior to changing use. In the before construction period, no abutting tracts

were in urban residential or commercial use. After construction of IH 45, there are 13 tracts in those uses.

3. Retail business activity along the old route US 75 continued to expand in number of firms and total gross sales between 1958 and 1964. In fact, gross sales of existing businesses located along this route increased almost as much as the average increase for Huntsville and Texas. If the volume of new businesses locating along the old and new routes are added to the volume of existing businesses, the combined gross sales increased over twice that of Huntsville and Texas. Where all businesses of each type (old open or closed and new) are considered, only the service station group showed a decline in sales after IH 45 was opened to traffic.

4. Construction of the IH 45 by-pass did significantly change the travel patterns of the through traffic. Traffic volume on old US 75 declined over 40 percent between 1958 and 1964. At the same time, the 1964 average daily volume on IH 45 was over 1,000 cars greater than that of the 1958 volume on old US 75.

5. A study of secondary economic data indicates that IH 45 has not impaired the economic growth of Huntsville in any visible way.



# Introduction

## *Huntsville and IH 45*

Huntsville, a town of 12,050 inhabitants in 1960, is located in the southeast section of Texas, 70 miles north of Houston. It is the county seat of Walker County, the home of Sam Houston State Teachers' College, and the headquarters of the State Department of Corrections. The payrolls of these two institutions play the most important role in Huntsville's business economy. The town's largest commercial industry is lumbering. Livestock farming is the most important agricultural enterprise of the county.

The topography of Walker County may be described as a rolling forested plain with about half of the land area located in the Pine Belt. Sam Houston National Forest covers a large portion of the eastern section of the county. Huntsville State Park is situated in this forest 10 miles south of Huntsville. It has a large lake which is extensively used by Houston and other out-of-town residents.

Sam Houston Memorial Park and General Sam Houston's grave, both located in the city of Huntsville, attract thousands of tourists annually. The name of Sam Houston is famous because he was the leader of the armed forces which gained Texas its independence from Mexico in 1836. He also became the first president of Texas.

The transportation system of Huntsville is made up of one railroad, five federal and state highways, and a small municipal airport. (See Figure 1.) The Missouri-Pacific Railroad serves Huntsville from the east. Interstate Highway 45, open to traffic in 1959, parallels old U. S. Highway 75, serving Huntsville from the north and south. U. S. Highway 190 serves the city from east to west. State Highways 19 and 30 lead northeast and southwest, respectively, out of Huntsville. Also, two farm-to-market roads lead out of the town in a north-south direction.

The first official act to obtain a by-pass route around Huntsville occurred in 1952 when officials of Walker County and the City of Huntsville requested the Texas Highway Commission to make traffic studies to be used in a study of highway route revisions in the area. In 1952, an origin and destination survey was conducted which revealed that about 60 percent of the U. S. Highway 75 traffic on the approaches to Huntsville desired to by-pass the city. About 25 percent of the through traffic volume, at a station south of town, was comprised of trucks and truck-trailer combinations. Serious congestion to all traffic resulted from large trucks turning right angles at the courthouse "square" while travelling on U. S. Highway 75.

In April 1953, proposed plans for a by-pass route were approved by the State Highway Commission. However, it was not until January, 1955, that the actual route was selected and deeds were submitted by the Texas Highway Department to Walker County. The county was asked to begin making purchases of a 300-foot right-of-way for a controlled access facility about one and one-quarter miles west of the central business

district. However, it was not until passage of the Federal Highway Revenue Act of 1956 that all the necessary right-of-way was purchased.

Construction of the by-pass route began in September, 1957 and was completed in May, 1959. This route became a part of the Interstate Highway System, known specifically as IH 45. The total cost of the by-pass portion was \$3,561,905.

## *Purpose of Study*

The purpose of the study is to determine the economic changes caused by an Interstate Highway constructed in various types of local areas. The findings in each area, such as Huntsville, may be used in anticipating the economic effects of the Interstate Highway System upon comparable areas over the state.

For the over-all study, the principal objectives were as follows:

1. To determine land value changes in each area and relate these changes to the proximity of the new highway.
2. To determine land use changes in each area and relate these changes to the proximity of the new highway.
3. To determine the effects of the new highway on over-all business activity in each area.
4. To determine the effects of the new highway on general travel habits within each area.
5. To determine other economic changes which might affect the general development of each area.

## *Method of Study*

The primary methodology employed throughout this study is the "before" and "after" construction period comparative technique. The construction schedule of the by-pass dictated the beginning and ending of the construction period.

For a determination of highway influence on land values, two areas (study and control) were selected. Their location with respect to the new highway and Huntsville is shown in Figure 1.

*Study and Control Areas.* The areas selected for the study area and the control area were as comparable as could be found around Huntsville. In their selection, primary attention was devoted to their comparability with the study area in major before construction period characteristics. The principal characteristics used to reflect comparable areas were land use, distance to Huntsville's central business district, and access to transportation facilities.

The control area has not enjoyed new growth as has the study area. This was the case even before IH 45 was located in the latter area. More new subdivisions were established in the study area than in the control area. There is some difference in the quality of the homes in the two areas. After construction of IH 45 on the opposite side of town, most all of the new devel-

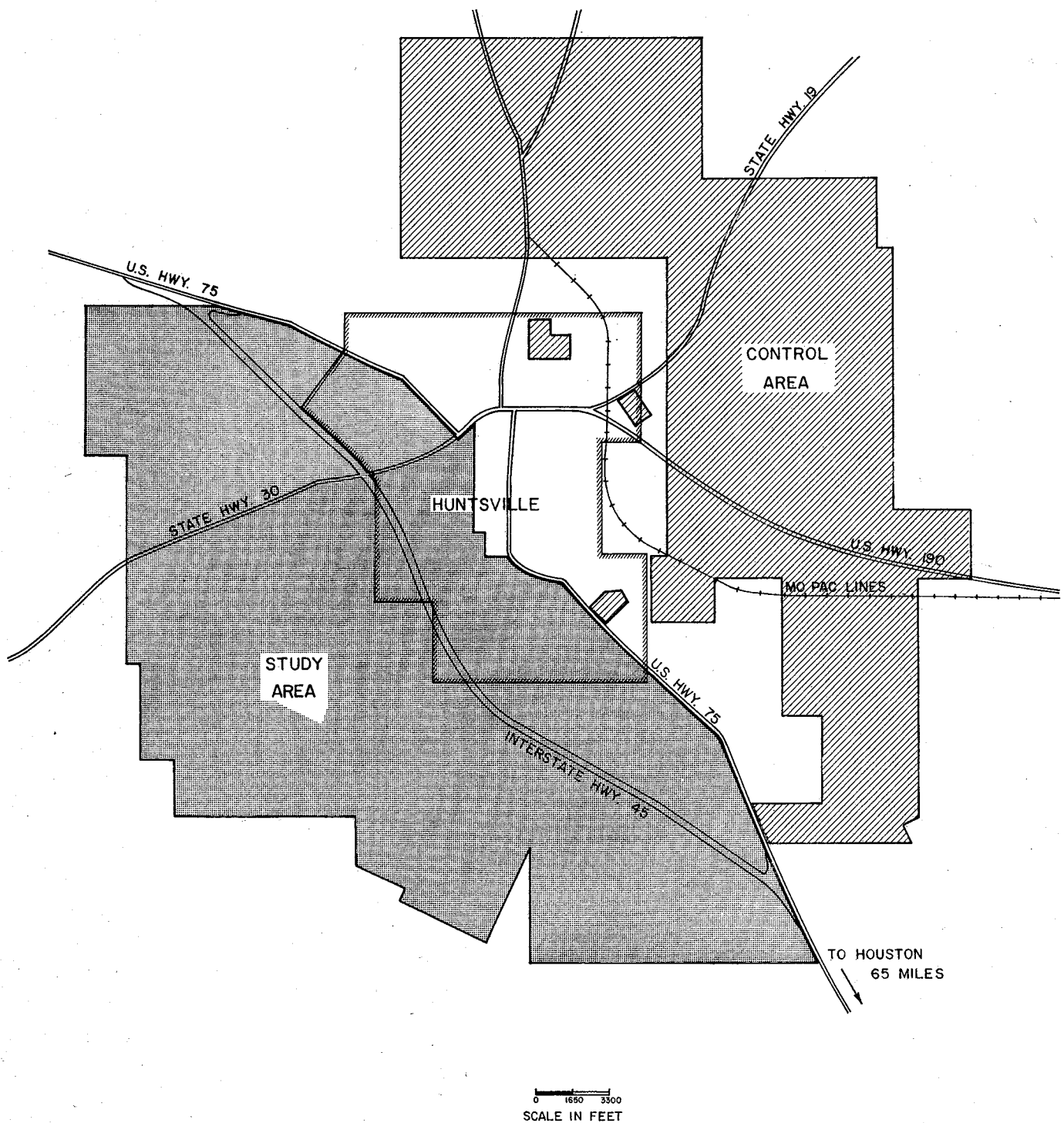


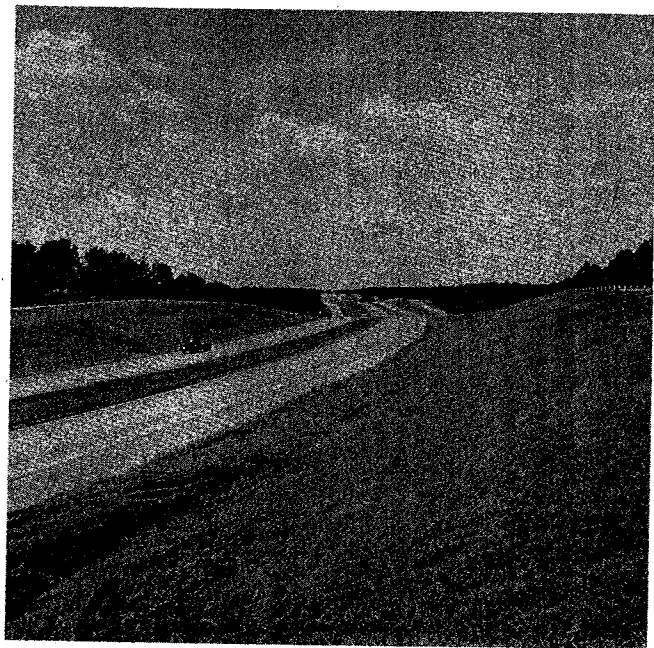
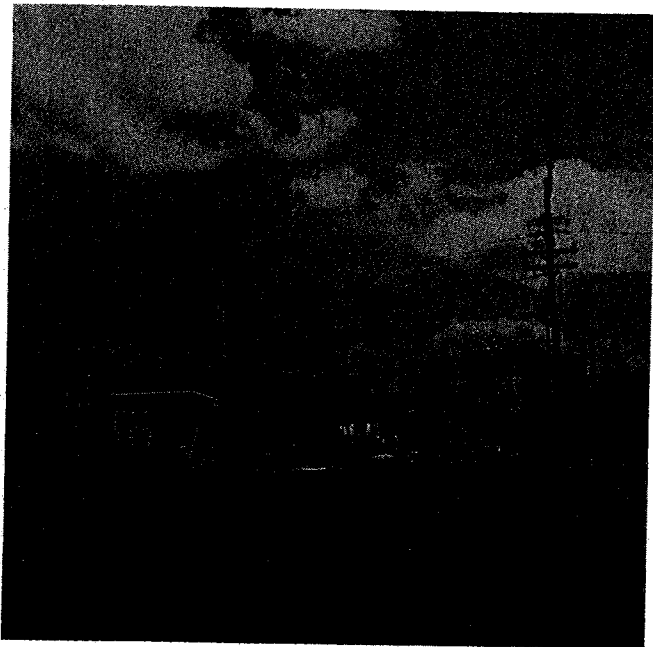
Figure 1. A map showing the relationship of the study and control areas to Huntsville and the transportation facilities in 1964.

opment occurred there, to the extent that the control area yielded only a few subdivision sales.

The study area is composed of approximately 8,800 acres and is about 6.5 miles long and three miles wide. The control area is of similar length, but contains a somewhat smaller total land area. The location of IH 45 in the eastern half of the study area is the only significant difference in the transportation facilities of the two areas.

Data presented later in the land value analysis casts further light on the comparability of the two areas from the standpoint of tracts which sold.

*Time Periods.* The before and after periods were separated by the construction period, making a total of three periods. The before period (1950-54) covers a five-year time span immediately prior to the initial purchasing of the highway right-of-way. The construction period (1955-1959) included the five years required



Old Route US 75 and New Route IH 45, respectively, passing through and around Huntsville.

for right-of-way purchase and construction activities. The after period (1960-1964) is the five-year period immediately after opening the by-pass facility to traffic.

The land value analysis used the above three time periods, with the emphasis on the before and after comparisons. The land use analysis used 1954 as the before period and 1955-64 as the after period, allowing ten years for changes in land use to occur. Last, the business activity analysis used 1958 (last year before opening the by-pass facility) as the before period and 1964 as the after period. This allowed a six-year period for changes in business activity to occur.

*Source of Data.* The land value data were collected from the records of Huntsville Independent School District Tax Department and the deed records of Walker County. Only valid land sales transactions were utilized in the study. All trades, family transactions, transfers by sheriff's sales, etc., were eliminated during the search of the deed records. Also, sales where the consideration could not be determined accurately were eliminated from the analysis. These sales were used only in locating all transactions on a sales distribution map.

The land use data were collected through detailed inspections of the study area and by interviewing local residents and realtors who were familiar with the area. Also, U. S. Department of Agriculture aerial photographs were helpful in determining the before period use.

The business activity data were collected by personal interview of each business located along the old U. S. Highway 75 route through town and the new IH 45 route around town. Also, data on the whole town were collected from the "Census of Business," published by the Bureau of Census, U. S. Department of Commerce.

General traffic pattern data were furnished by the Texas Highway Department.

General community development data were collected from the City of Huntsville, Sam Houston State Teachers'

College, Texas Department of Corrections, local financial institutions, Sales Management Magazine's "Survey of Buying Power," "Census of Business," and Texas Almanac.

*Statistical Treatment.* Some land sales prices were determined by the amount of U. S. Government Internal Revenue Stamps affixed on the deed. In such cases, each \$.55 stamp represents \$500 of consideration, except in the case of the final \$.55 stamp which may represent any value from one to 500 dollars. Thus, a midpoint value of \$250 was added to the sales price established by the other stamps. These prices were then converted to constant dollars by using the U. S. Department of Commerce's Consumer Price Index. (See schedule in Appendix.)

The price per unit (acre or square foot) arrays of property sales were averaged by period in order to make the before and after period comparisons. The mean averages of the study area versus control area were tested for significant differences by using the appropriate "t" test. The results of these tests are reported in the footnotes of the tables. An explanation of the formulas used in making these statistical tests is given in the Appendix.

The chi-square test was applied to the characteristics of major groups of businesses for the purpose of testing the independence of one group from another group.

Texas A&M University's Data Processing Center was used in analyzing the land sales and business activity data.

*Definitions.* Each property was assigned a before and after land use designation based on the following definitions:

1. Timberland—tract used primarily for growing pine or other trees used in pulpwood and lumber production.
2. Agricultural—tract used primarily for agricultural purposes by an owner who depends upon farming

for a livelihood. The minimum size is 10 acres, except for intensive type farming.

3. Held for future use—tract generally considered to be held for future use rather than its utility at present, but it may be farmed or grazed or used for other purposes during the interim period.

4. Rural residential—tract outside the city limits having an occupiable house used primarily as a residence. The maximum size was 15 acres.

5. Urban residential—tract subdivided into lots improved with occupiable houses in most cases.

6. Commercial traffic serving—tract having a commercial business deriving more than 50 percent of its income from traffic.

7. Commercial nontraffic serving—tract having a commercial business deriving less than 50 percent of its income from traffic.

8. Industrial—tract used for manufacturing, product storage, and surface facilities of pipelines.

9. Institutional-municipal—tract used for school, park, hospital, church, or other public function.

# Land Value Influences of IH 45

A total of 924 bonafide land sales, with prices determined, were analyzed in the study. Of these, 502 were from the study area and 422 were from the control area.

There were enough acreage sales in both areas for each period to yield reliable land value estimates. But such was not the case with subdivision sales. Although the control area yielded a total of 92 lot sales, their unequal distribution among the before and after periods and their wide difference in quality between periods rendered them unacceptable to control the study area subdivision values.

Table 1 shows the 832 land sales remaining in the analysis, from which conclusions were drawn. These sales are broken down by area, by improved and unimproved, and by period.

### Study Area

The following presentation shows the analysis of highway impact on acreage land values separate from subdivision land values. Figures 2 and 3 show the location of all study area acreage sales (regardless of whether the sale price was determined) occurring in the before period and in the construction and after periods (combined). Several of the latter period sales were at or near two of the IH 45 interchanges. Those sales with considerations determined are analyzed below.

*Acreage Land.* The major characteristics of the study versus control area acreage sales are presented in Tables 2 and 3. When comparing the mean average of each characteristic between areas, one can see that several of the before period characteristics of unimproved acreage sales were quite similar, such as neighborhood influence, degree of access by road, distance to the central business district, distance to a U. S. highway, and time of sale. The others were quite different. In the case of the after period (includes during period) the between area characteristics were more dissimilar, with degree of access and distance to a U. S. highway being considerably different too. The presence of the new highway definitely influenced these to be more different.

For improved acreage, the between area before period characteristics such as neighborhood influence,

distance to central business district, and time of sale were quite similar. The others were different. In the after period, size and price of tract became fairly similar and the above three remained similar. Degree of access became more dissimilar. Building IH 45 through the study area is the primary reason for such a change.

Table 4 presents the period analysis of unimproved acreage land sales prices for the study and control areas. It indicates that the highway influence on land values was highly significant between the before and after periods.

Table 5 gives the period analysis of improved acreage land sales prices. It also indicates that the highway influence is just about as great, per acre, on these properties as on unimproved properties. Most of the improved acreage tracts were occupied by residences.

From these two tables it can be seen that the overall influence of the Interstate System on land values was substantial.

*Subdivided Land.* The analysis of study area subdivided land sales data is presented in Table 6. This table shows the changes in the prices of both unimproved and improved lots during the entire study period.

Due to the previously stated reasons, this analysis cannot show the extent of highway influence on land values. But for after period unimproved lot prices to increase \$.0643 per square foot or \$2,614 per acre over before period lot prices, it is reasonable to assume that the new highway did have a positive influence on study lot values.

On the other hand, improved lot prices apparently failed to reflect any appreciable change in values as did those of unimproved lots. Although the improved and unimproved lots had similar characteristics during the before and after period, improved lots are fixed in land use and their prices normally do not respond so readily to changing surroundings as do unimproved lots. Also, the problem of depreciation of improvements is involved in the improved lot prices. The proportion of the value of the improvements could have declined between the before and after period. In this case, the land value of the improved lots would have increased.

Table 1  
NUMBER OF LAND SALES TRANSACTIONS USED IN THE ANALYSIS OF LAND VALUES, HUNTSVILLE, TEXAS, 1950-1964

Period	Number of Transactions				Grand Total
	Acreage		Subdivisions		
	Unimproved	Improved	Unimproved	Improved	
	<u>Study Area</u>				
Before Period (1950-54)	38	16	66	40	160
Construction Period (1955-59)	52	23	112	73	260
After Period (1960-64)	41	17	13	11	82
Total All Periods for Study Area	131	56	191	124	502
	<u>Control Area</u>				
Before Period (1950-54)	98	12			110
Construction Period (1955-59)	68	21			89
After Period (1960-64)	97	34			131
Total All Periods for Control Area	263	67			330
Grand Total All Areas	394	123	191	124	832

**Table 2**  
**COMPARATIVE CHARACTERISTICS OF UNIMPROVED ACREAGE TRACT SALES IN THE STUDY AND CONTROL AREAS BY PERIOD<sup>1</sup>**

Characteristic	Before Period		After Period <sup>2</sup>	
	Study Area	Control Area	Study Area	Control Area
Price Per Acre (in Constant Dollars)	939	400	3,052	482
Size of Tract (in Acres)	28.8	15.5	5.7	12.6
Price of Tract (in Dollars)	2,727	1,759	4,855	3,168
Neighborhood Influence <sup>3</sup>	1.71	1.58	1.83	1.66
Degree of Access by Road Type <sup>4</sup>	2.92	2.51	4.23	2.01
Time of Sale (in Months)	129	138	226	233
Distance to Central Business District (in Feet) <sup>5</sup>	14,227	12,784	13,966	12,748
Distance to U. S. Highway (in Feet) <sup>5</sup>	5,201	5,986	4,378	6,867
Distance to State Highway (in Feet) <sup>5</sup>	13,334	6,096	13,164	6,129

<sup>1</sup>The above figures are arithmetic means.

<sup>2</sup>Includes construction period.

<sup>3</sup>An arbitrary code assigned to each tract which is one of the following: 1 for detrimental, 2 for neutral, and 3 for improvement.

<sup>4</sup>The road types are coded as: 1 for minor roads, 2 for F. M. roads, 3 for State Highway, and 4 for U. S. Highway, and 5 for IH System.

<sup>5</sup>These are distances measured from the midpoint of the survey in which the tract is located.

**Table 3**  
**COMPARATIVE CHARACTERISTICS OF IMPROVED ACREAGE TRACT SALES IN THE STUDY AND CONTROL AREAS BY PERIOD<sup>1</sup>**

Characteristic	Before Period		After Period <sup>2</sup>	
	Study Area	Control Area	Study Area	Control Area
Price Per Acre (in Constant Dollars)	4,479	2,982	6,660	3,621
Size of Tract (in Acres)	1.1	3.4	1.6	2.2
Price of Tract (in Dollars)	4,150	5,491	6,398	6,643
Neighborhood Influence <sup>3</sup>	1.81	1.83	1.65	1.60
Degree of Access by Road Type <sup>4</sup>	3.81	2.25	4.17	2.49
Time of Sale (in Months)	136	141	222	243
Distance to Central Business District (in Feet) <sup>5</sup>	13,488	12,470	12,541	12,810
Distance to U. S. Highway (in Feet) <sup>5</sup>	3,104	7,586	3,264	6,296
Distance to State Highway (in Feet) <sup>5</sup>	14,571	5,430	12,653	6,773

<sup>1,2,3,4,5</sup>See corresponding footnotes under Table 2 for explanation.

**Table 4**  
**PRICES OF UNIMPROVED ACREAGE TRACTS LOCATED IN THE STUDY AND CONTROL AREAS, HUNTSVILLE, TEXAS, IN CONSTANT DOLLARS (1947-49 = 100)**

Period	Study Area		Control Area		Difference Between Areas	Percent of Study Area Before Period Price
	Price Per Acre <sup>1</sup>	Standard Deviation	Price Per Acre <sup>1</sup>	Standard Deviation		
Before Period (1950-54)	\$ 939(38)	\$1761	\$ 400(98)	\$ 497	\$ 539 <sup>2</sup>	
Construction Period (1955-59)	2742(52)	6287	487(68)	498	2255	
After Period (1960-64)	3445(41)	9659	479(97)	405	2966 <sup>3</sup>	
Change Between Periods						
Before and Construction						
Dollars	\$1803		\$ 87		\$1716	183% <sup>4</sup>
Percent	192%		22%		170% <sup>5</sup>	
Construction and After						
Dollars	\$ 703		\$ -8		\$ 711	
Percent	26%		-2%		28%	
Before and After						
Dollars	\$2506		\$ 79		\$2427	258% <sup>4</sup>
Percent	267%		20%		247% <sup>5</sup>	
Probable Highway Influence						
Percent	253% <sup>6</sup>					
Dollars	\$2376					

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

<sup>2</sup>The standard error (S. E.) is \$291. Using a probability level of 95 percent, this value is not significant; T is equal to 1.85.

<sup>3</sup>The S. E. is \$1,491. Using a probability level of 95 percent, this value is significant; T is equal to 1.98.

<sup>4</sup>Assuming that the property prices in the study and control areas would have increased in value by the same dollar value in the absence of a new road improvement, the between period dollar difference between areas would have been zero, but the study area prices changed by a greater amount with the net difference shown above which is the stated percent of the study area's before period price.

<sup>5</sup>Same assumption as Footnote 4, except based on percent changes.

<sup>6</sup>Average of Footnotes 4 and 5 percentage figures for before and after period changes.

<sup>7</sup>Footnote 6 percentage figure multiplied by the study area's before period price.

LEGEND OF PROPERTY SALES

- SOLD ONE TIME
- ▲ SOLD TWO TIMES
- SOLD THREE OR MORE TIMES

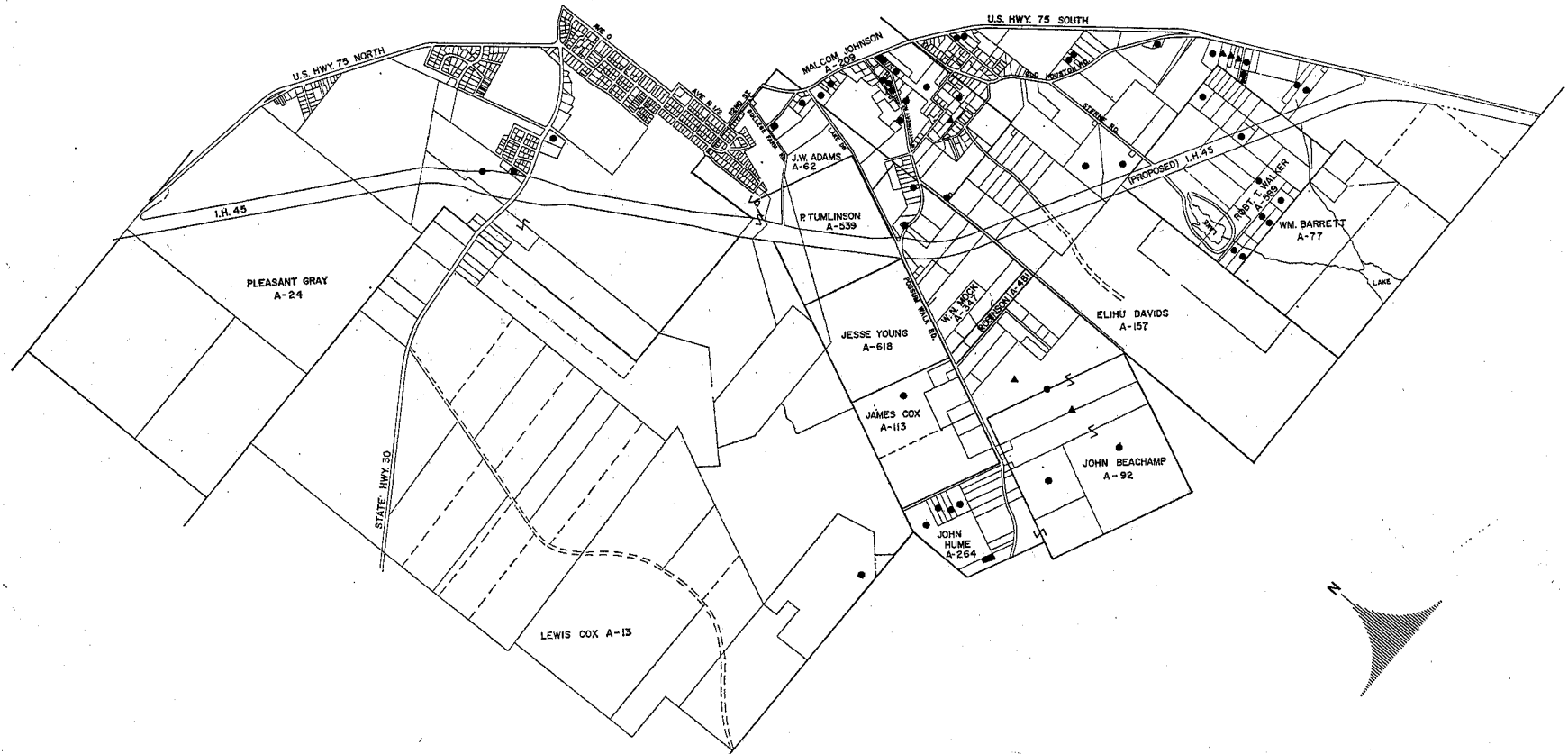


Figure 2. Location of all acreage property sales occurring in the study area before construction of IH 45.

LEGEND OF PROPERTY SALES

- SOLD ONE TIME
- ▲ SOLD TWO TIMES
- SOLD THREE OR MORE TIMES

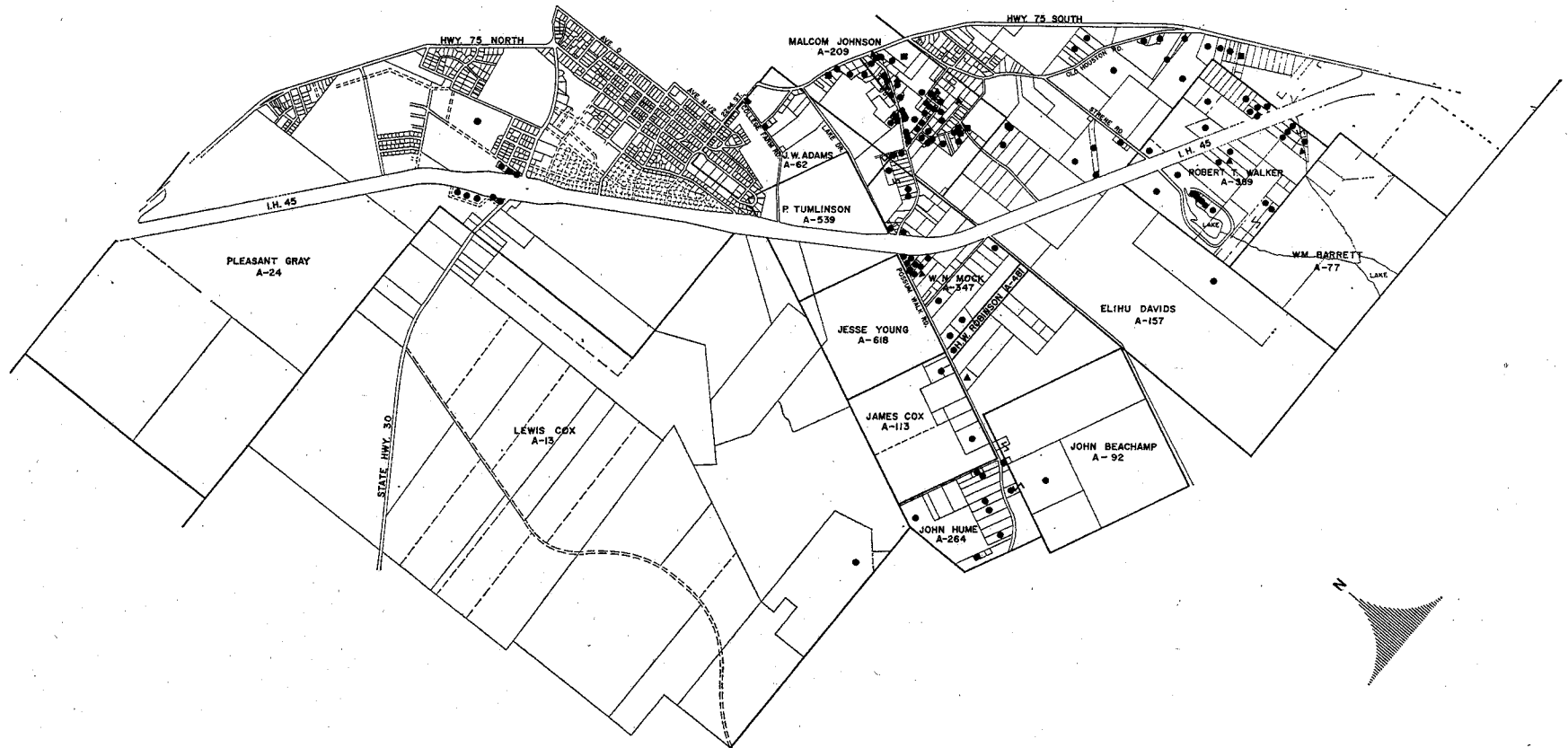


Figure 3. Location of all acreage property sales occurring in the study area during and after construction of IH 45.



**Table 5**  
**PRICES OF IMPROVED ACREAGE TRACTS LOCATED IN THE STUDY AND CONTROL AREAS,**  
**HUNTSVILLE, TEXAS, IN CONSTANT DOLLARS (1947-49 = 100)**

Period	Study Area		Control Area		Difference Between Areas	Percent of Study Area Before Period Price
	Price Per Acre <sup>1</sup>	Standard Deviation	Price Per Acre <sup>1</sup>	Standard Deviation		
Before Period (1950-54)	\$4479(16)	\$2512	\$ 2982(12)	\$2306	\$1497 <sup>2</sup>	
Construction Period (1955-59)	6240(23)	5339	3823(21)	2320	2417	
After Period (1960-64)	7229(17)	6980	3497(34)	2841	3732 <sup>3</sup>	
Change Between Periods						
Before and Construction						
Dollars	\$1761		\$ 841		\$ 920	21%
Percent	39%		28%		11%	
Construction and After						
Dollars	\$989		\$-326		\$1315	
Percent	16%		- 9%		25%	
Before and After						
Dollars	\$2750		\$ 515		\$2235	50%
Percent	61%		17%		44%	
Probable Highway Influence						
Percent	47%					
Dollars	\$2105					

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

<sup>2</sup>The S. E. of the difference between the means is \$403. Using a probability level of 95 percent, this value is significant; t is equal to 3.72.

<sup>3</sup>The S. E. of the difference between the means is \$343. Using a probability level of 95 percent, this value is significant; t is equal to 10.9.

<sup>4</sup>See Footnotes 4, 5, 6, and 7 of Table 4 for an explanation.

Thus, the over-all conclusion is that the location of IH 45 in the study area did cause land values to increase significantly between the before and after construction periods.

#### *Proximity to IH 45*

A further analysis of unimproved study area acreage sales prices was performed on a before and after period basis in order to determine the proximity influence of IH 45 on land values.

Table 7 shows the analysis of proximity influence where the abutting and nonabutting land prices are compared with control area land price. The results suggest that unimproved properties abutting IH 45 received a much greater highway influence than nonabutting properties.

Table 8 shows the averages for the characteristics of abutting and nonabutting sales occurring in the

before and after (includes during period) periods. Several characteristics of each area were quite similar in the before period, such as price of tract, time of sale, corner influence, width of road, type of road surface, degree of access, and distance to central business district. The others are noticeably different. In the after period, the similar characteristics were time of sale, corner influence, size of tract, depth of tract, neighborhood influence, and distance to central business district. The last four were quite different in the before period. The price of tract, width of road, degree of access, and frontage on a road became more different in the after period. Three of these were greatly influenced by IH 45. Of course, the price differences reflect this increased dissimilarity between abutting and nonabutting properties.

So, the conclusion is that the prices of unimproved properties in close proximity to IH 45 received more highway influence than the prices of those further removed.

**Table 6**  
**PRICES OF UNIMPROVED AND IMPROVED SUBDIVIDED LOTS LOCATED IN THE STUDY AREA, HUNTSVILLE, TEXAS, IN CONSTANT DOLLARS (1947-49 = 100)**

Period	Unimproved		Improved	
	Price Per Square Foot <sup>1</sup>	Standard Deviation	Price Per Square Foot <sup>1</sup>	Standard Deviation
Before Period (1950-54)	\$ .1122 (66)	\$.0481	\$ .8819(41)	\$.3112
Construction Period (1955-59)	.1079(112)	.0439	.8692(72)	.3133
After Period (1960-64)	.1722 (13)	.0299	.8818(11)	.3287
Change Between Periods				
Before and Construction				
Dollars	\$-.0043		\$-.0127	
Percent	- 4%		- 1%	
Construction and After				
Dollars	\$ .0643		\$ .0126	
Percent	60%		1%	
Before and After				
Dollars	\$ .0600		\$-.0001	
Percent	53%		Nil	

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

**Table 7**  
**PRICES OF UNIMPROVED ACREAGE TRACTS ABUTTING AND NONABUTTING IH 45 IN THE STUDY AREA**  
**COMPARED TO THE CONTROL AREA, HUNTSVILLE, TEXAS, IN CONSTANT DOLLARS (1947-49 = 100)**

Period	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 Vs. Non-abutting	Abutting Vs. Control	Non-abutting Vs. Control	Abutting	Non-abutting
Before Period (1950-54) <sup>2</sup>	\$ 1197 (6)	\$ 891(32)	\$ 400(98)	\$ 306	\$ 797	\$ 491		
Construction Period (1955-59)	8127(10)	1460(42)	487(68)	6667	7640	973		
After Period (1960-64) <sup>3</sup>	7205(16)	1038(25)	479(97)	6167	6726	559		
Change Between Periods Before and Construction								
Dollars	\$ 6930	\$ 569	\$ 87	\$ 6391	\$ 6843	\$ 482	572%	54%
Percent	579%	64%	22%	515%	557%	42%		
Construction and After								
Dollars	\$- 922	\$- 422	\$- 8	\$- 500	\$- 914	\$-414		
Percent	- 11%	- 29%	- 2%	- 18%	- 13%	27%		
Before and After								
Dollars	\$ 6008	\$ 147	\$ 79	\$ 5861	\$ 5929	\$ 68	495%	8%
Percent	502%	16%	20%	486%	482%	- 4%		
Probable Highway Influence								
Percent	489%	2%						
Dollars	\$ 5853	\$ 18						

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

<sup>2</sup>The S. E. of the difference between abutting and nonabutting means is \$178. Using a probability level of 95 percent, this value is not significant; t is equal to 1.72. The S. E. of the difference between abutting and control means is \$69. Using a probability level of 95 percent, this value is significant; t is equal to 11.61. The S. E. of the difference between nonabutting and control means is \$325. Using a probability level of 95 percent, this value is not significant; T is equal to 1.51.

<sup>3</sup>The S. E. of the difference between the abutting and nonabutting means is \$772. Using a probability level of 95 percent, this value is significant; t is equal to 7.99. The S. E. of the difference between the abutting and control means is \$299. Using a probability level of 95 percent, this value is significant; t is equal to 22.50. The S. E. of the difference between the nonabutting and control means is \$31. Using a probability level of 95 percent, this value is significant; T is equal to 17.8.

<sup>4</sup>See Footnotes 4, 5, 6, and 7 of Table 4 for an explanation.

**Table 8**  
**COMPARATIVE CHARACTERISTICS OF UNIMPROVED ABUTTING AND NONABUTTING ACREAGE TRACT SALES IN THE STUDY AREA BY PERIOD<sup>1</sup>**

Characteristic	Before Period		After Period <sup>2</sup>	
	Abutting	Non-abutting	Abutting	Non-abutting
Price of Tract (in Constant Dollars)	2,958	2,684	8,095	3,597
Price per Acre (in Constant Dollars)	1,197	891	7,559	1,303
Time of Sale (in Months from Arbitrary Date)	140	127	236	222
Size of Tract (in Acres)	14.4	31.5	5.3	5.8
Depth of Tract (in Feet)	985	812	482	490
Frontage on Road (in Feet)	302	417	378	252
Land Use (in Code No.) <sup>3</sup>	29	40	33	41
Neighborhood Influence (in Code No.) <sup>4</sup>	2.2	1.6	2.1	1.8
Corner Versus Inside Location (in Code No.) <sup>5</sup>	1.2	1.2	1.3	1.7
Width of Road Serving Tract (in Feet)	69	60	300	60
Type of Road Surface (in Code No.) <sup>6</sup>	2.3	2.3	2.9	2.4
Degree of Access by Road Type (in Code No.) <sup>7</sup>	3.5	2.8	5.0	3.9
Distance to State Highway (in Feet) <sup>8</sup>	11,353	13,164	10,160	12,869
Distance to U.S. Highway (in Feet) <sup>8</sup>	2,122	4,783	4,422	4,440
Distance to I.H. 45 Interchange (in Feet) <sup>8</sup>			2,332	4,426
Location with Respect to Side of I.H. 45 (in Code No.) <sup>9</sup>			1.3	1.7
Distance to Central Business District (in Feet) <sup>8</sup>	13,313	13,334	12,480	13,743

<sup>1</sup>See corresponding footnotes under Table 2.

<sup>2</sup>See corresponding footnotes under Table 2.

<sup>3</sup>The before and after sale land uses, as defined in the introduction, were given arbitrary codes. As is the case with all coded items in this Table, the larger the coded average the higher the land use, the better the neighborhood, etc.

<sup>4</sup>See Footnote 3 under Table 2.

<sup>5</sup>Coded inside locations as 1 and corner locations as 2.

<sup>6</sup>Coded dirt roads as 1, gravel roads as 2, and hard-top roads as 3.

<sup>7</sup>See Footnote 4 under Table 2.

<sup>8</sup>All the distance items in this table reflect distances measured from the property by way of roads and not from survey midpoints.

<sup>9</sup>Coded tracts not on townside as 1, and tracts on townside as 2.

# Land Use Influences of IH 45

The analysis of changes in study area land uses associated with the construction of IH 45 is presented here. Such changes in land use occurred sometime in the 1954-64 period, during and after construction of IH 45. Changes in the whole study area are discussed first, followed by a discussion of changes in the use of land in close proximity to IH 45.

## Study Area

Table 9 shows the quantity of study area land that was in various uses as of 1954 and 1964. As can be seen, most of the land in the area was in agricultural use during both of these years. Other large blocks of land were in timberland and institutional uses. Also, many acres were held for future use by the land owners.

There was a net decline in the number of acres devoted to the first three land uses between the before and after years. Since the over-all quantity of land remained the same, a net decline in one use was reflected in a corresponding increase in other uses. It is significant that the higher types of land uses, that is, residential and commercial, all increased in acreage. The greatest volume of land changing to any one use was for road purposes, primarily for construction of IH 45. The next largest quantity changed to residential use.

**Table 9**  
**QUANTITY OF STUDY AREA LAND IN VARIOUS USES IN 1954 AND 1964**

Land Use	Number of Acres <sup>1</sup>		Change Between 1955 and 1962	
	1954	1964	Acres	Percent
Timberland	1,600	1,374	-226	- 14%
Agricultural	4,000	3,607	-393	- 10
Institutional-Municipal	1,007	905	-102	- 10
Held for Future Use	1,416	1,460	+ 44	+ 3
Rural Residential	231	343	+112	+ 48
Urban Residential	289	486	+197	+ 68
Industrial	1	1	0	0
Commercial Traffic Serving	16	31	+ 15	+ 94
Commercial Nontraffic Serving	13	25	+ 12	+ 92
Other (Roads and Gullies)	227	568	+341	150
<b>Total Area</b>	<b>8,800</b>	<b>8,800</b>		

<sup>1</sup>Approximate figures.

Figure 4 is a 1958 aerial photograph of the Huntsville study area. It reflects the land use about midway in the 1954-64 period. It shows the construction phase of IH 45 around Huntsville.

Figures 5A and 5B show the exact location of tracts in various uses in 1954 and 1964. Actually, Figure 5B, the overlay, shows land use changes which have occurred in the study area since 1954.

## Proximity to IH 45

From Figures 5A and 5B, the use changes in land abutting the new highway can be noted. Assuming that the before period tracts were bisected by IH 45 in the same manner as they were during the after period, the number of tracts in various uses are as follows:

Land Use	Number of Abutting Tracts	
	Before Period	After Period
Timberland	16	9
Agricultural	14	3
Institutional	6	6
Held for Future Use	1	24
Rural Residential	2	8
Urban Residential	0	4
Commercial Traffic Serving	0	7
Commercial Nontraffic Serving	0	2
	<u>39</u>	<u>63</u>

The above does not take into account the number of subdivided lots fronting on IH 45. Instead, the only two subdivisions are counted as tracts. There were no abutting subdivisions in the before period.

Therefore, the above count shows no abutting tracts in three of the higher uses during the before period. But, in the after period, 19 tracts had changed to the higher uses (residential-commercial) and the number of tracts in lower uses (first three) had decreased from 36 to 18. Land held for future use had increased from one to 24 tracts. In addition, the total number of abutting tracts increased significantly during the period.

The conclusion is that IH 45 did cause a significant change in land use of abutting properties between the before and after periods. The pattern was for land in lower uses to change to higher uses. The same was true for the nonabutting properties which are adjacent to roads that intersect IH 45. Elsewhere, very little land area changed from lower to higher uses.



Figure 4. A 1958 aerial photograph of the Huntsville study area. Source: United States Department of Agriculture.



**Figure 5B.**  
**Overlay Map of the Huntsville Study Area Showing Land Use Changes**  
**In the 1954-64 Period, during and after Construction of IH 45.**



**LEGEND:**

TIMBERLAND

AGRICULTURAL LAND

INSTITUTIONAL-MUNICIPAL

LAND NOT IN PRODUCTIVE USE

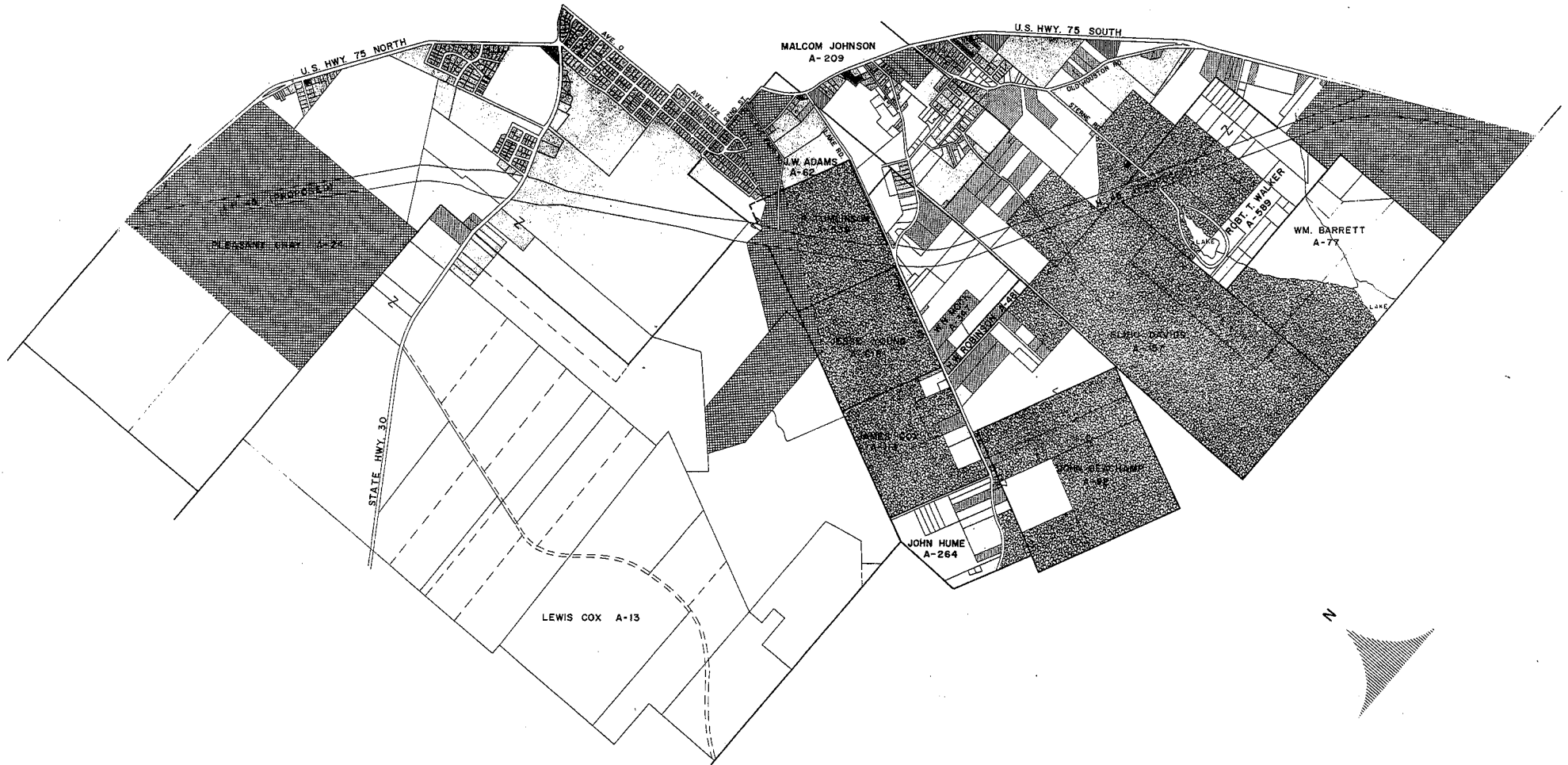
RURAL RESIDENTIAL

URBAN RESIDENTIAL

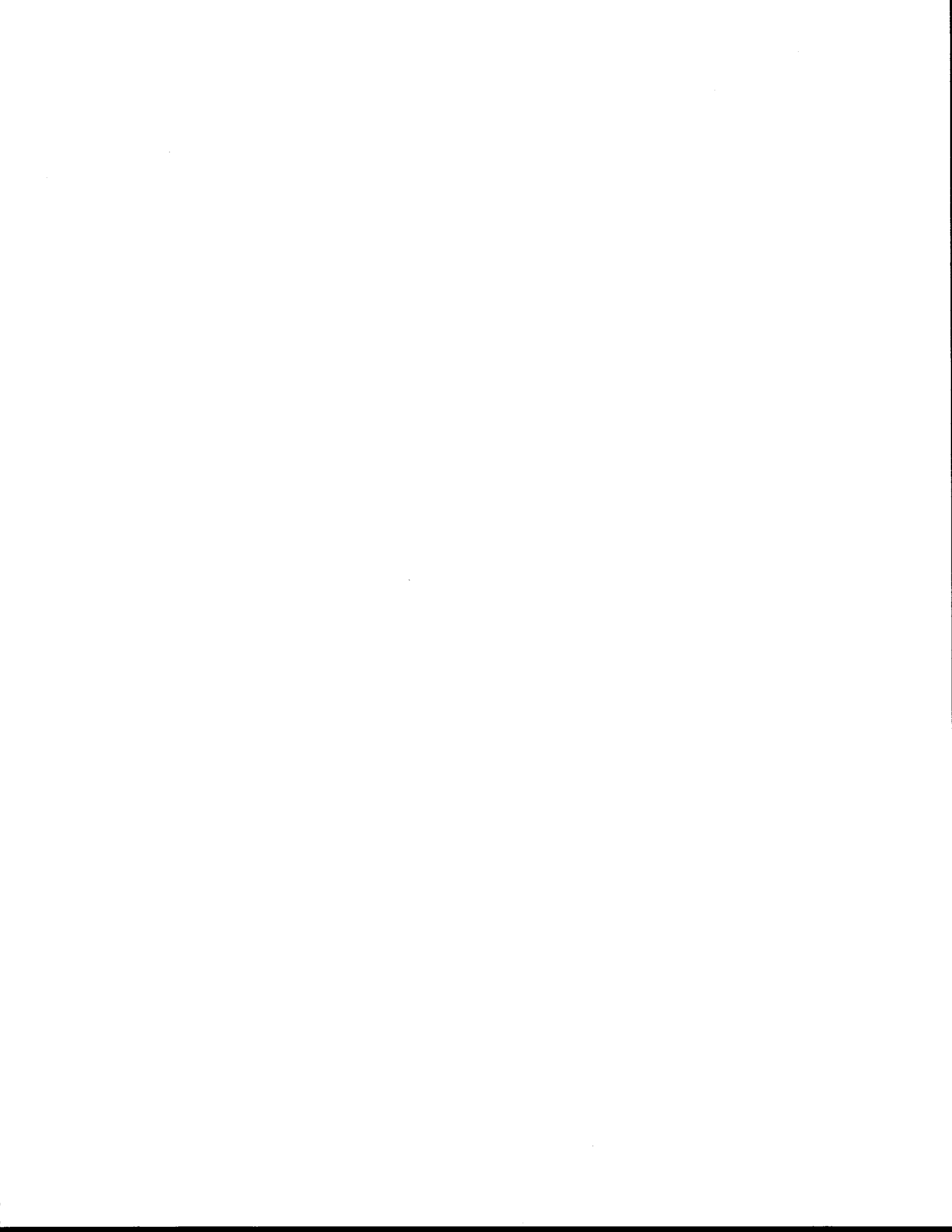
INDUSTRIAL

COMMERCIAL TRAFFIC SERVING

COMMERCIAL NON-TRAFFIC SERVING



**Figure 5A.**  
**Base Map of the Huntsville Study Area Showing Land Use As of 1954,**  
**before Construction of IH 45.**





**LEGEND:**

TIMBERLAND

AGRICULTURAL LAND

INSTITUTIONAL- MUNICIPAL

LAND NOT IN PRODUCTIVE USE

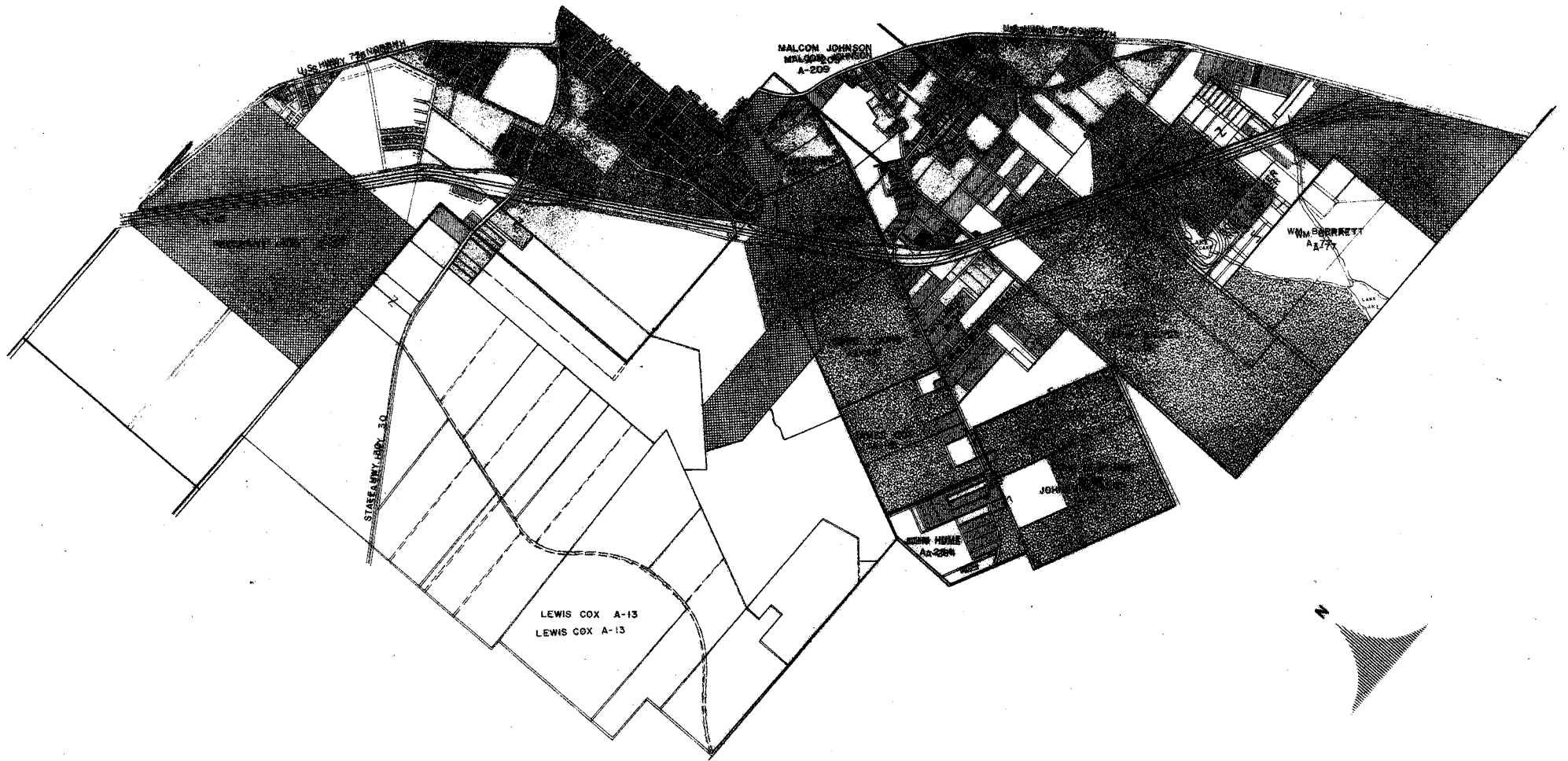
RURAL RESIDENTIAL

URBAN RESIDENTIAL

INDUSTRIAL

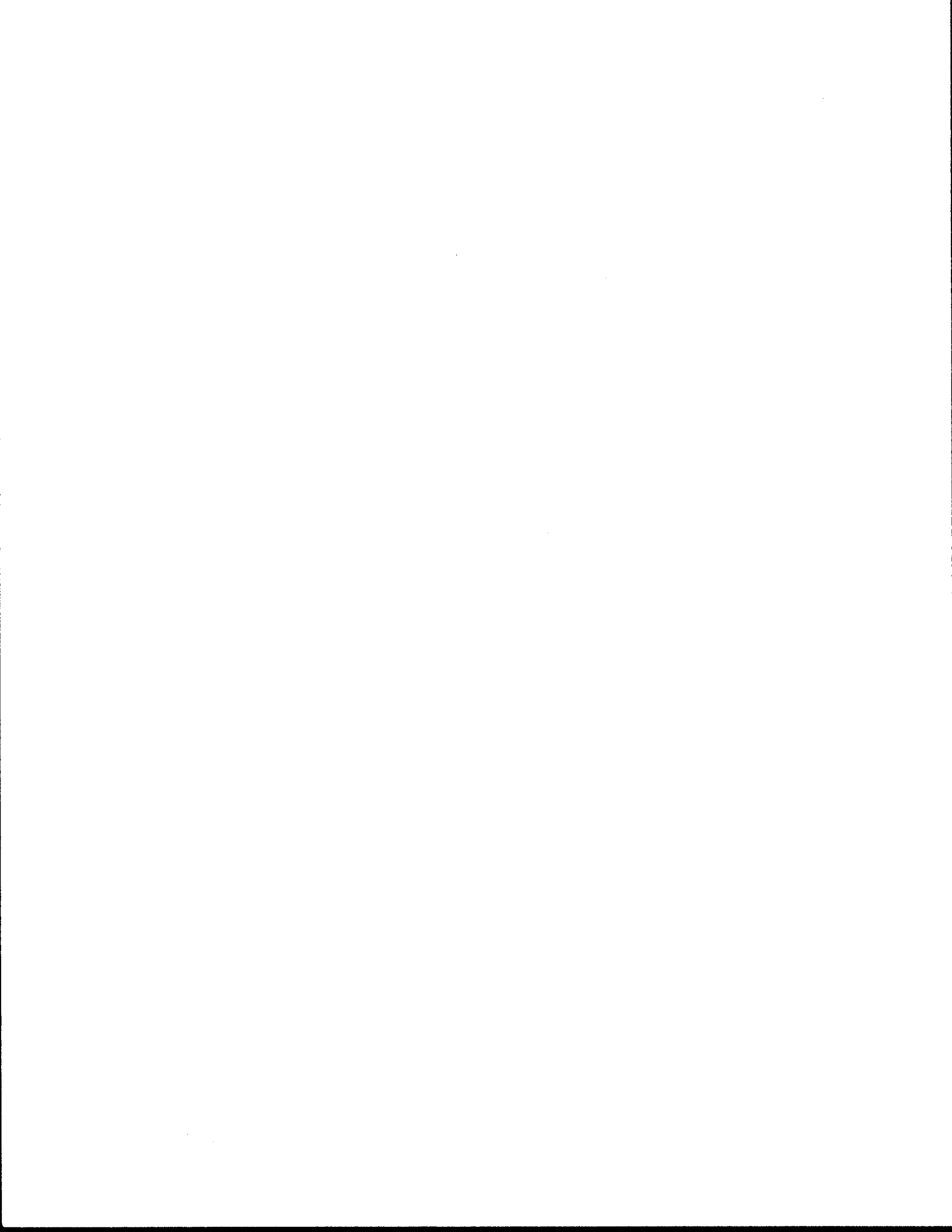
COMMERCIAL TRAFFIC SERVING

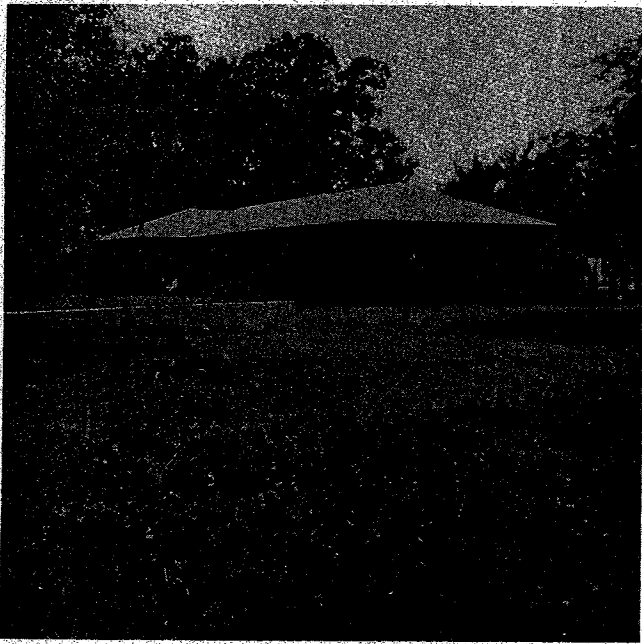
COMMERCIAL NON-TRAFFIC SERVING



**Figure 5B.**

Overall Map of the Island of Hawaii, as of 1954, showing land use as of 1954. In the 1954-64 Period of Congressional Construction of HI 45.

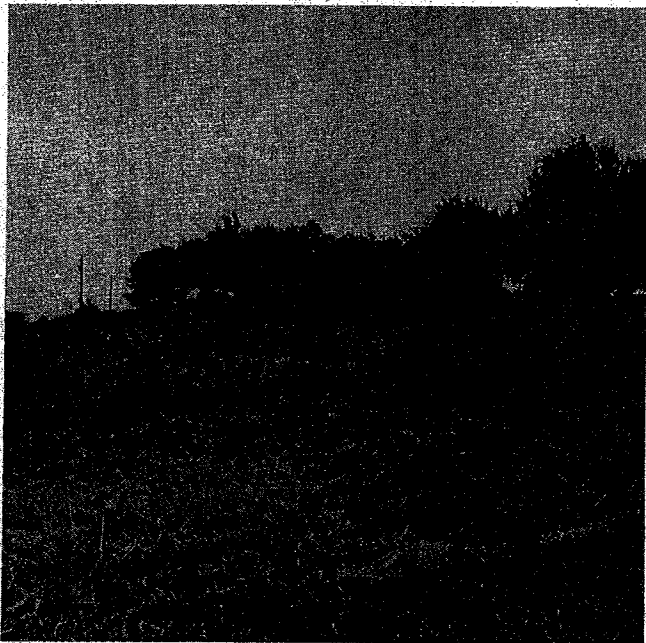




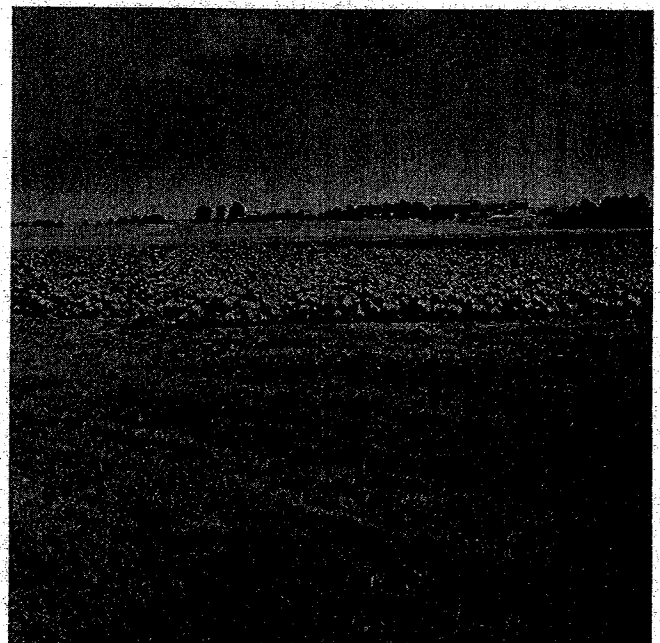
**New Rural Residence**



**New Urban Subdivision**

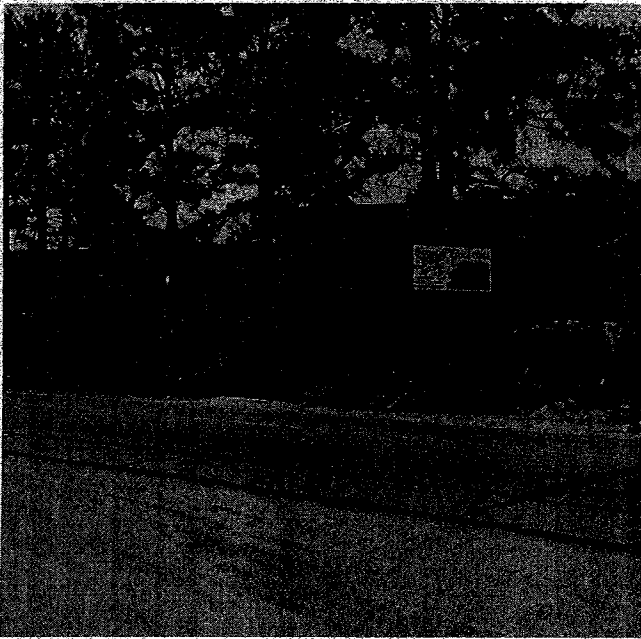


**Land Being Held for Future Use**

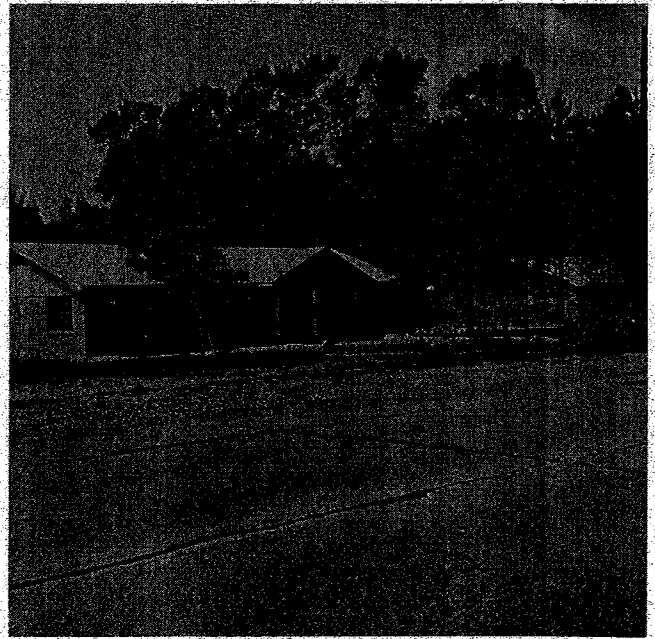


**Institutional Farmland**

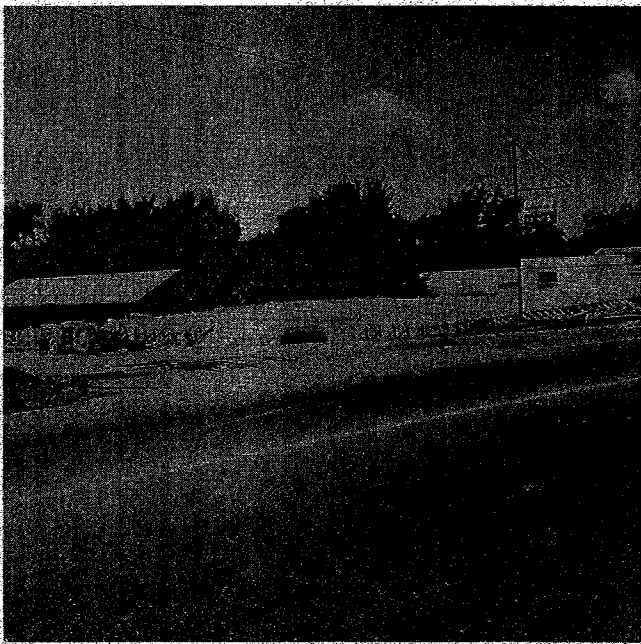
**Some tracts of study area land in various uses abutting IH 45 during 1934.**



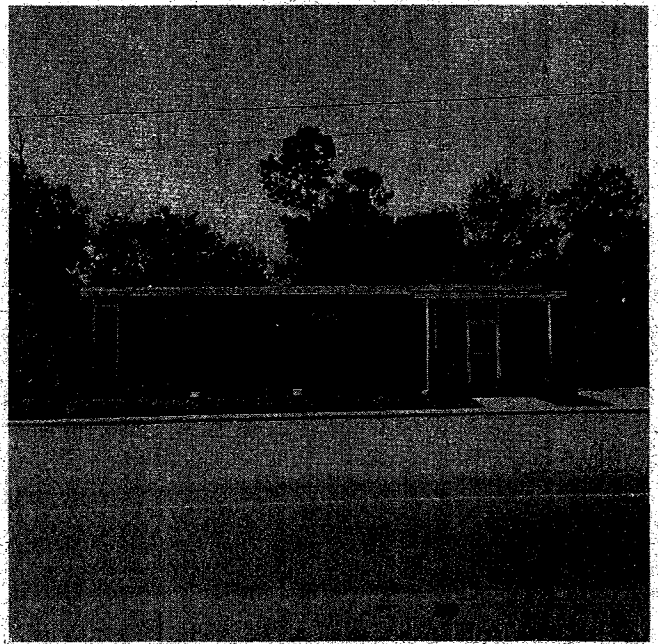
**New Apartment Home**



**New Residence**

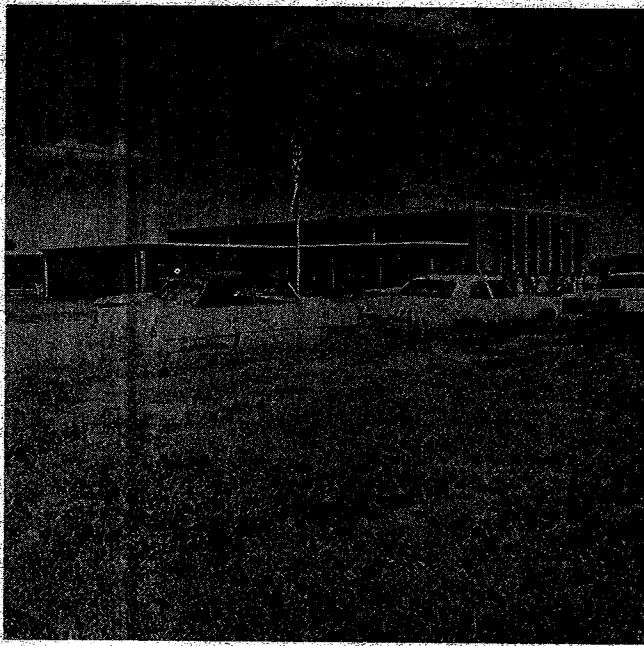


**New Commercial Building**



**New Chamber of Commerce Building**

**Tracts of study area land in various uses abutting the old US 75 during 1964.**



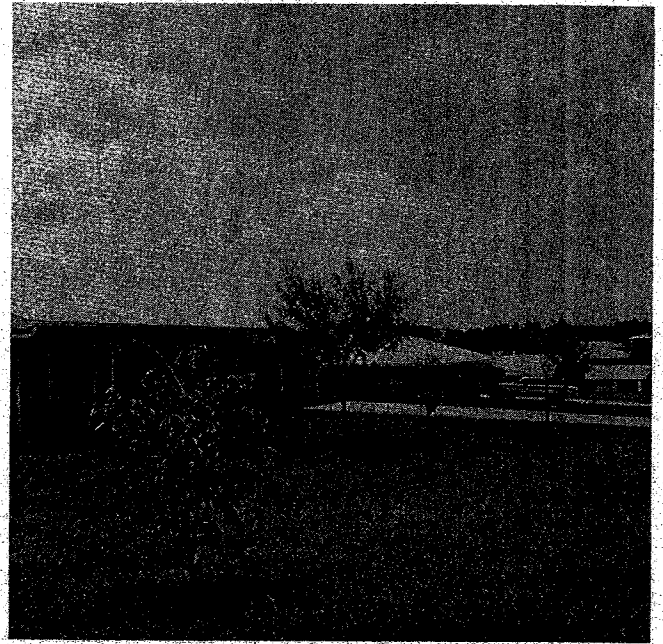
New Elementary School



Old Rural Residence



New Apartment House



New Urban Residence

Tracts of study area land in various uses during 1964.

## Business Activity Influences of IH 45

The extent of IH 45's influence on business activity is an important part of this analysis. Table 10 shows the number of various types of businesses located along old U. S. Highway 75 and IH 45 in 1958 and 1964. In terms of total change, some 49 new businesses located on both routes. Thirteen of these located on the new route. In contrast, 18 old route businesses closed between the two years.

It is significant to note that although the majority of the new businesses are of the nontraffic serving type, a greater proportion of all businesses are now of the traffic serving type than in 1958. Most of the new nontraffic serving type are located along the old route and most of the new traffic serving type are located along IH 45. Figure 6 and 7 show the location of the old existing and closed businesses and the new businesses on the old and new routes.

Interviews with the operators of each business revealed that the majority thought that businesses had not been adversely affected by the IH 45 by-pass. However, this opinion was more widely held by operators of non-traffic serving businesses. Many of the operators of traffic serving businesses along the old route felt that

their businesses were hurt by the by-pass. The most frequent remark made about the by-pass effects was that it relieved the old route of the traffic congestion problem, primarily caused by the big trucks.

A comparison of the 1958 and 1964 gross sales for all businesses on both routes is shown in Table 11. The 49 percent increase is very significant when compared to the increases achieved by all businesses in Huntsville and Texas, as reported in the U. S. "Census of Business." It shows that both the old and new routes were excellent locations for retail businesses from the standpoint of gross sales.

A number of businesses reduced their hours of operation as a result of the new highway. It was found, for example, that service stations experienced a 19 percent decline in total hours of operation. The loss of through traffic forced most of these stations to start closing earlier at night. The local customers do not have off-hours demand on such businesses, at least not to the extent that would justify them to stay open for business. These operators reduced their operating costs by closing early. This cost reduction actually prevented a drastic decline in their profits.

Table 10  
NUMBER OF RETAIL BUSINESSES LOCATED ON U. S. 75 AND I.H. 45 IN HUNTSVILLE DURING 1958 AND/OR 1964

Type of Business	U.S. 75 Businesses			I.H. 45 Businesses	Total Businesses
	Open 1958 And 1964	Closed Before 1964	Open After 1958	Open By 1964	U.S. 75 And I.H. 45
<b>Traffic Serving Businesses</b>					
Service Stations	16	6	4	6	32
Food Service	6	3	4	3	16
Motels	6	1	2	2	11
<b>Total Traffic Serving Businesses</b>	<b>28</b>	<b>10</b>	<b>10</b>	<b>11</b>	<b>59</b>
<b>Nontraffic Serving Businesses</b>					
Grocery Stores	4	0	3	0	7
Lumber and Portable Buildings	1	0	0	0	1
Automotive Sales and Repair	5	5	6	1	17
Service Businesses	13	0	9	1	23
Dry Goods	5	0	2	0	7
Furniture, Hardware, and Appliances	6	0	1	0	7
Other	10	3	5	0	18
<b>Total Nontraffic Serving Businesses</b>	<b>44</b>	<b>8</b>	<b>26</b>	<b>2</b>	<b>80</b>
<b>Total All Businesses</b>	<b>72</b>	<b>18</b>	<b>36</b>	<b>13</b>	<b>139</b>

Table 11  
GROSS SALES OF STUDY AREA BUSINESSES VERSUS ALL HUNTSVILLE AND TEXAS BUSINESSES REPORTED BY THE U. S. "CENSUS OF BUSINESS" 1958 AND 1964

Group of Businesses	Gross Dollar Sales		Change Between 1958 and 1964	
	1958	1964	Dollars	Percent
Study Area	\$ 7,167,454	\$ 10,681,834	+\$ 3,514,380	+49.0%
Huntsville	\$ 14,320,000	\$ 17,249,000	+\$ 2,929,000	+20.5%
Texas	\$12,180,706,000	\$14,594,644,000	+\$2,413,938,000	+19.8%

\*The Census of Business figures represent 1963 sales. Also, the retail and service businesses are combined to be comparable to study area businesses.

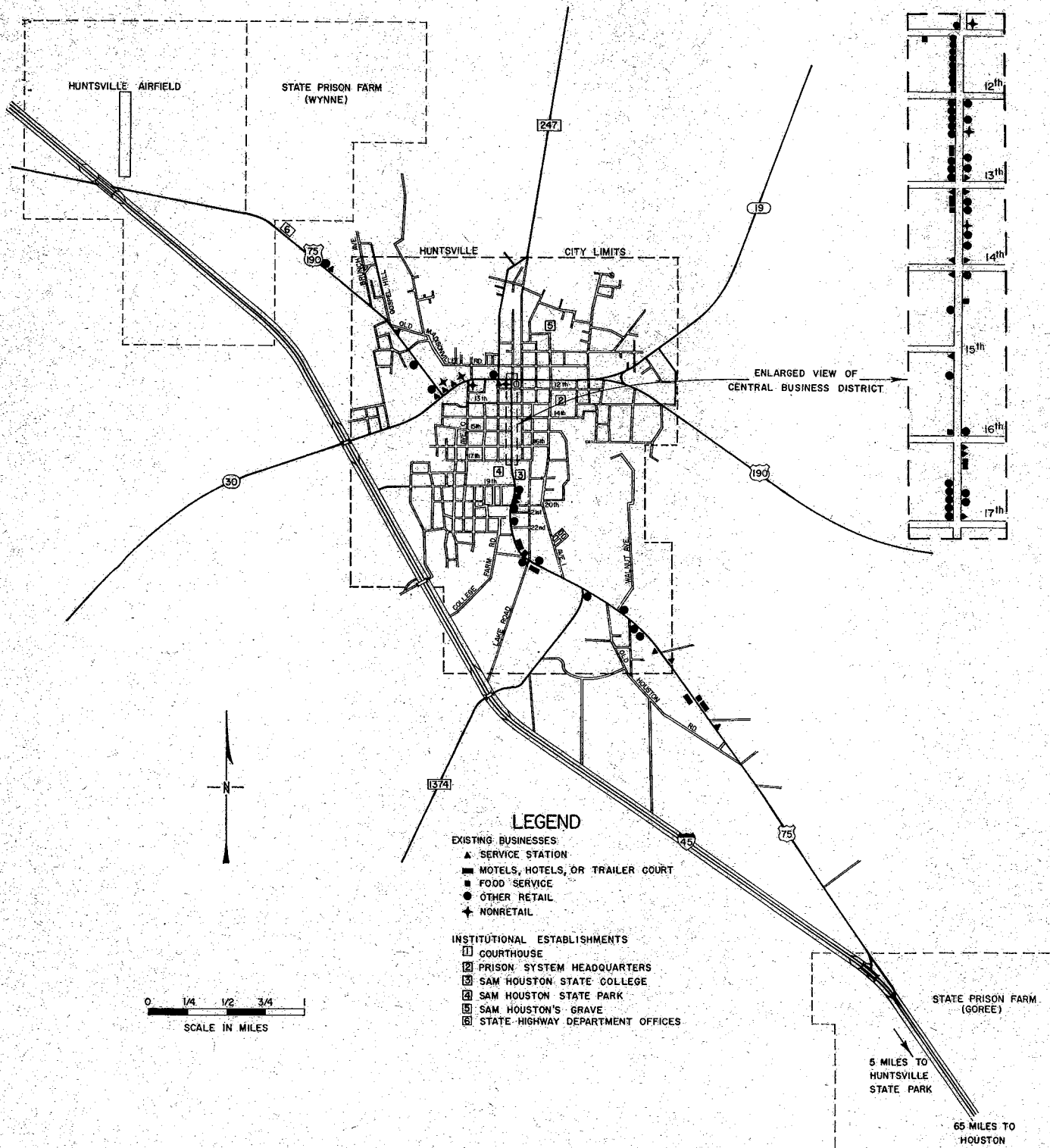


Figure 6. A map of Huntsville showing the location of existing retail businesses along US 75 as of 1958.

### Old Route US 75 Businesses

Table 12 presents the gross sales analysis of old route US 75 businesses. Only those businesses that operated during both years of study were used in this analysis. This was done to show how the old businesses which remained in continuous operation performed be-

fore and after removal of through traffic from the old route.

*Traffic Serving.* Service stations, food service establishments, and motels were regarded as traffic serving businesses. As can be seen from Table 12, the combined gross sales of these businesses increased over 13 percent between 1958 and 1964. Separately, motels were the

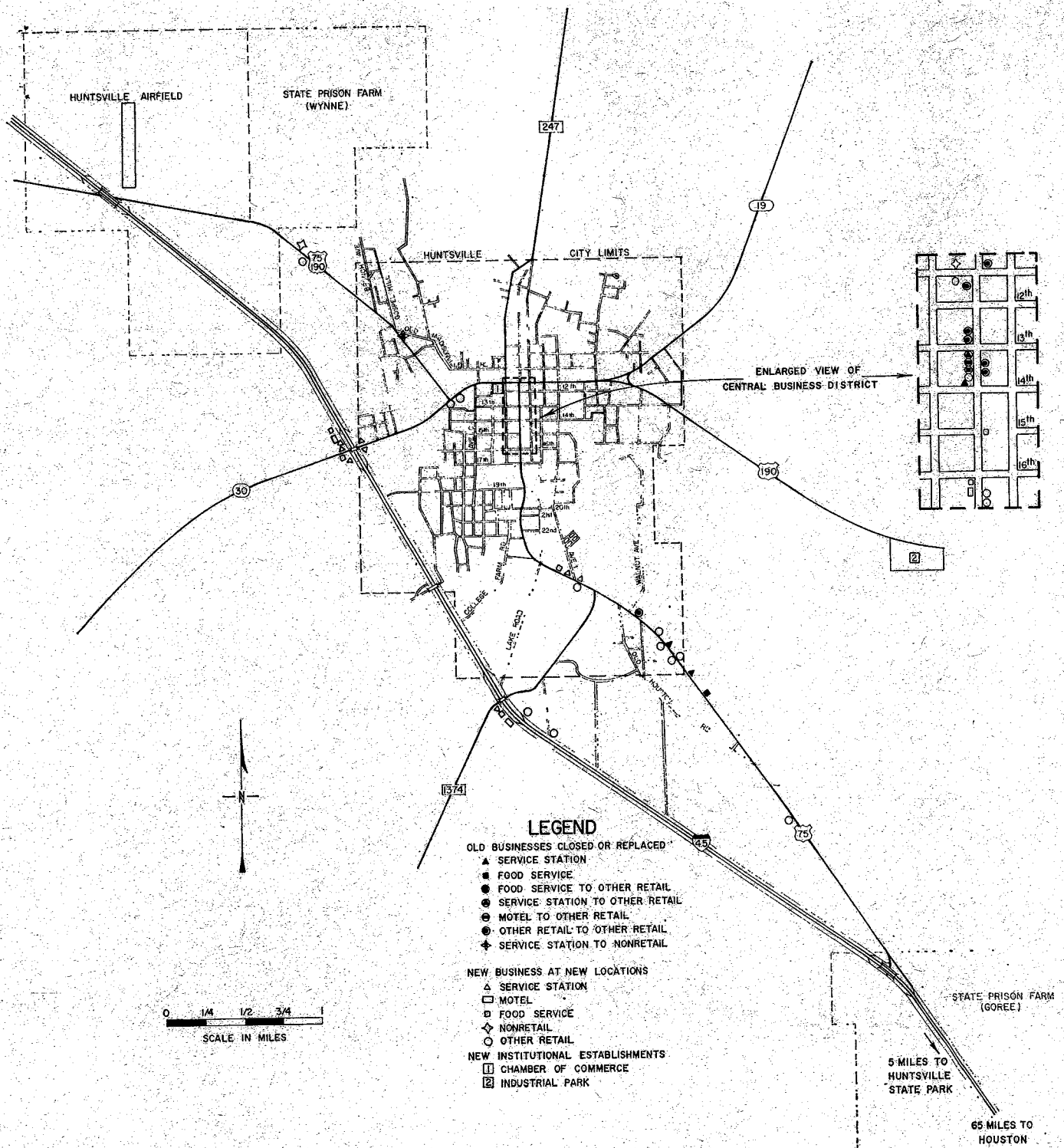


Figure 7. A map of Huntsville showing the location of closed or replaced and new retail businesses along old US 75 and IH 45 as of 1965.

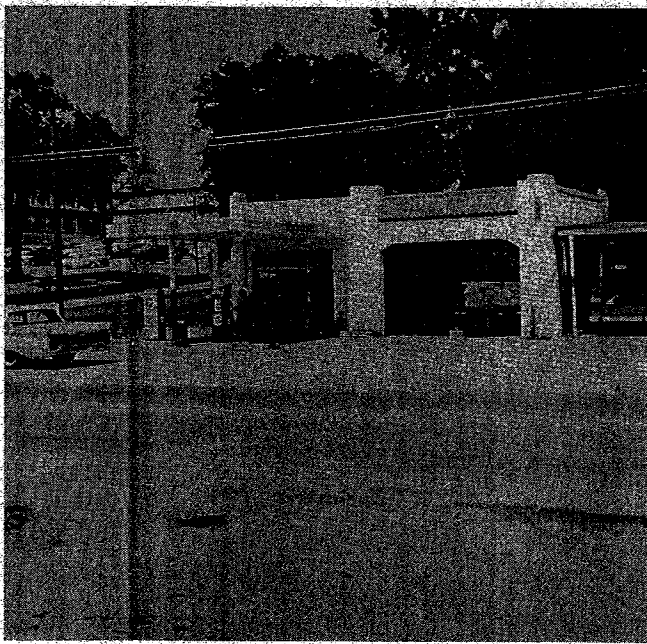
only class of businesses which, as a group, showed a decline in sales. Motels are more dependent on through traffic customers than are service stations and food service establishments.

A look at Table 13, where total business for the before and after periods (including closed businesses and new businesses) are considered, reveals that service stations on the old route show a decline in gross sales

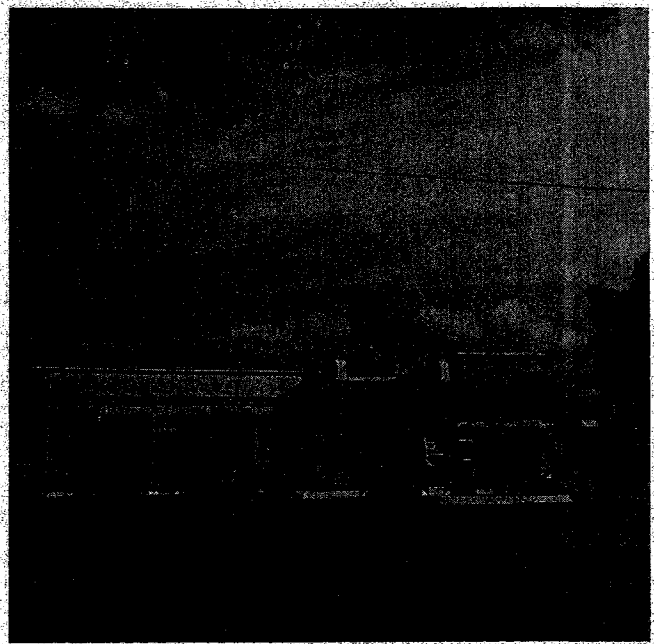
as a group. Motels now show an increase. Actually, there are two fewer service stations and one more motel in the after period as opposed to the before period. But for all traffic serving businesses, the number of firms is the same both years, and the gross sales have increased modestly.

The 8.5 percent decline in gross sales for service stations was not quite as severe as the 10.5 percent de-

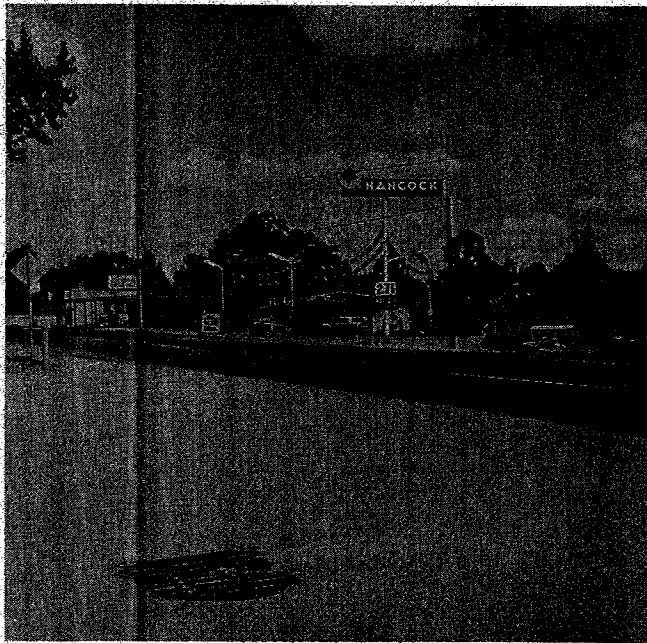




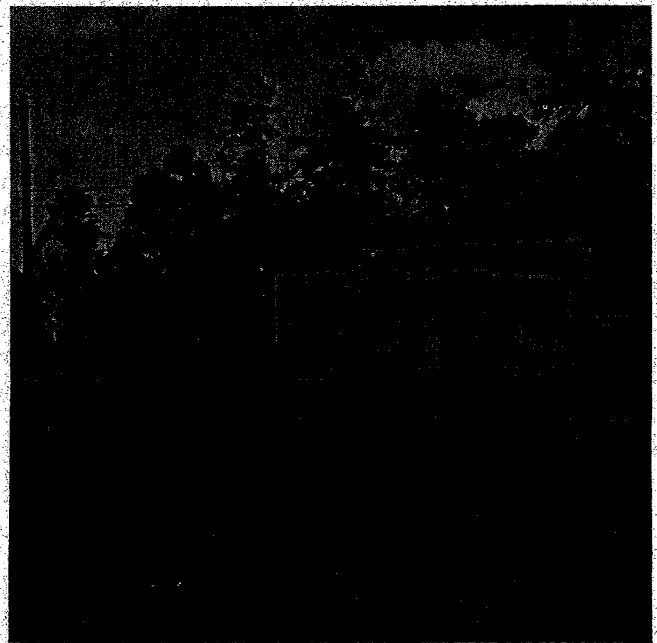
Old



Old



New



New

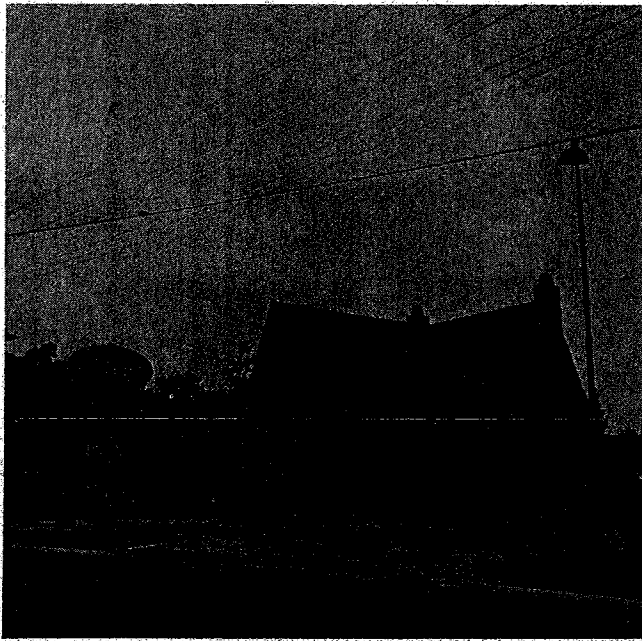
Service stations operating along old route US 75 in 1964.

cline in gallonage. This indicates that the old route stations obtained more local service trade after the bypass took away some of the predominantly gasoline-purchasing through customers. Many of the operators stated that they had more local customers after the old route was relieved of traffic congestion.

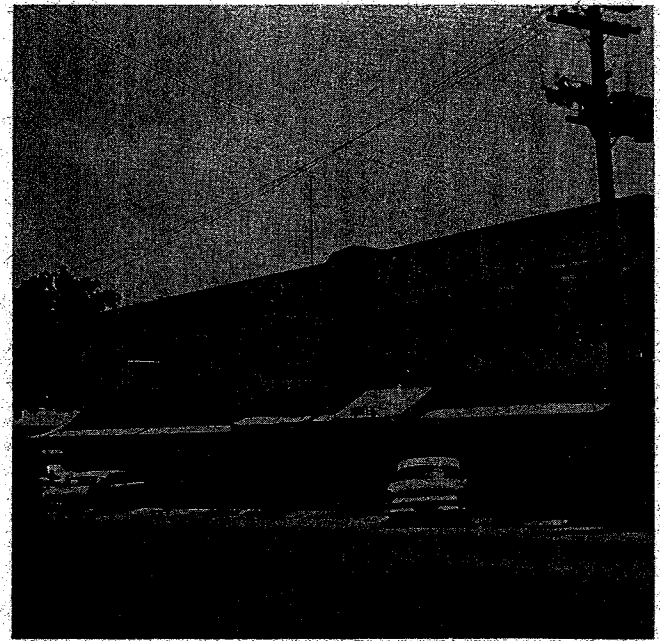
The businesses which closed after opening the highway by-pass were on less favorable sites and in poorer quality buildings than those that have remained in oper-

ation. Also, a greater portion of the closed businesses were rented, and these had a higher turnover in management in the before period. Even their competitors were nearer to them. Last, more of these businesses were closer to the central business district than those remaining in operation.

As would be expected, the new businesses are in higher quality housing than the old remaining businesses. Also, a greater proportion of them are owned



Service Station



Food Service

Two traffic serving firms located along the old route US 75 which closed after construction of IH 45.

instead of rented. But, more of these businesses are further from the central business district than the old businesses.

*Nontraffic Serving.* All retail firms other than the above traffic serving businesses were considered as non-traffic serving businesses. Table 12 shows the results of the gross sales analysis for these businesses which were in operation both study years.

Grocery stores are the only businesses of the whole group which experienced a decline in sales. One factor contributing to this was the opening of a nonroute super-market between 1958 and 1964. The other types of businesses made considerable gains. Also, Table 12 shows that the nontraffic serving group's gross sales increase was 6 percent greater than that of the traffic serving group.

When the new businesses and old closed businesses are used in the analysis, Table 14 indicates that the whole group of nontraffic serving businesses experienced an excellent gain in sales. There were only two new route businesses constructed during the study period. They are included with the total 1964 businesses since they could not be treated separately without revealing their sales volumes.

The closed businesses were housed in lower quality buildings than those that remained open. They also experienced a higher turnover in ownership before the new by-pass was opened.

The new businesses are located in significantly different quality housing. In most cases, they are in higher quality buildings than those which house the old businesses. Also, the new businesses had proportionately

Table 12  
GROSS SALES OF OLD ROUTE U. S. 75 BUSINESSES IN OPERATION IN BOTH YEARS 1958 AND 1964

Type of Business	Number of Businesses 1958 & 1964	Gross Dollar Sales		Change Between 1958 & 1964	
		1958	1964	Dollars	Percent
<b>Traffic Serving</b>					
Service Stations	11	\$ 657,413	\$ 821,477	+\$164,064	+ 25.0%
Food Service	6	\$ 452,766	\$ 481,849	+\$ 29,083	+ 6.4%
Motels	6	\$ 119,051	\$ 90,853	-\$ 28,198	- 23.7%
Total	23	\$1,229,230	\$1,394,179	+\$164,949	+ 13.4%
<b>Nontraffic Serving</b>					
Grocery	4	\$1,477,769	\$1,160,029	-\$317,740	- 21.5%
Automotive Sales and Repair	5	\$ 491,420	\$1,161,440	+\$670,020	+136.3%
Service	13	\$ 325,423	\$ 375,265	+\$ 49,842	+ 15.3%
Dry Good	5	\$ 414,369	\$ 510,468	+\$ 96,099	+ 23.2%
Furniture, Hardware, and Appliance	6	\$ 608,368	\$ 879,253	+\$270,885	+ 44.5%
Other	11	\$ 683,055	\$ 748,822	+\$ 65,767	+ 9.6%
Total	44	\$4,000,404	\$4,835,277	+\$834,873	+ 20.9%
Grand Total	67	\$5,229,634	\$6,229,456	+\$999,822	+ 19.1%

Table 13  
GROSS SALES OF STUDY AREA TRAFFIC SERVING BUSINESSES IN HUNTVILLE 1958 AND 1964

Type of Business by Route	Number of Businesses		Gross Dollar Sales		Change Between 1958 and 1964	
	1958	1964	1958	1964	Dollars	Percent
<b>Old Route US 75</b>						
Service Stations	22	20	\$1,452,265	\$1,329,206	-\$123,059	- 8.5%
Food Services	9	10	\$ 641,378	\$ 790,663	+\$149,285	+23.3%
Motels	7	8	\$ 137,051	\$ 163,444	+\$ 26,393	+19.3%
All Old Route Firms	38	38	\$2,230,694	\$2,283,313	+\$ 52,619	+ 2.4%
<b>New Route IH 45</b>						
Service Stations		6		\$ 401,140	+\$401,140	NA
Food Services and Motels		5		\$ 193,257	+\$193,257	NA
All New Route Firms		11		\$ 594,397	+\$594,397	NA
<b>Combined Routes</b>						
Service Stations	22	26	\$1,452,265	\$1,730,346	+\$278,081	+19.1%
Food Services	9	13	\$ 641,378	\$ 943,633	+\$302,255	+47.1%
Motels	7	10	\$ 137,051	\$ 203,731	+\$ 66,680	+48.7%
All Firms	38	49	\$2,230,694	\$2,877,710	+\$647,016	+29.0%
Average Per Firm	NA	NA	\$ 58,702	\$ 58,729	+\$ 27	NIL

fewer management changes between 1959 and 1964, which reflects a greater stability in management. However, they were located at proportionately greater distances from their competitors and from the central business district than the old businesses.

#### *New Route IH 45 Businesses*

Six years after its completion, a total of 13 retail businesses had located on the IH 45 by-pass. Of these, 11 were traffic serving and two were nontraffic serving.

*Traffic Serving.* The traffic serving businesses generated almost \$600,000 in gross sales during 1965. (See Table 13.) These businesses included one motel.

Thus, the combined 1965 sales for businesses on both routes were 29 percent greater than the 1958 sales for old route businesses. This increase was due almost entirely to the establishment of new firms, since the average per firm increased by only a slight amount.

*Nontraffic Serving.* The two nontraffic serving businesses which located on the by-pass were a radio

station and automobile repair shop. The latter received some highway customers.

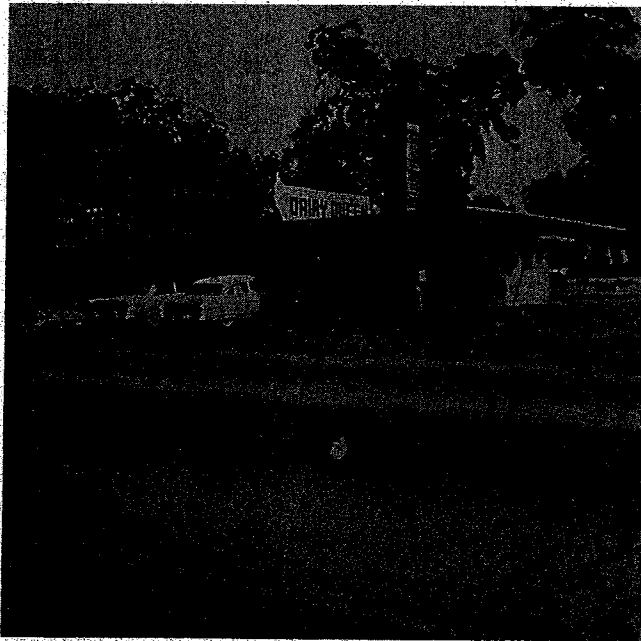
The operators of these two firms were satisfied with their location with respect to the new highway and thought that it provided considerable advertising advantages to their businesses. The gross sales of these businesses were incorporated into Table 14 to prevent disclosure to the public.

In conclusion, the combined retail sales of the old and new route businesses increased by a much greater extent than did all businesses in the whole town. Although the new by-pass may have taken potential customers away from some of these businesses, on the whole it is obvious that both traffic and nontraffic serving businesses experienced an exceptional growth. Many of the operators claimed that the new by-pass had helped them gain local trade and had encouraged an expansion in business activity on both routes. The analysis reveals this to be especially true in the case of nontraffic serving businesses.

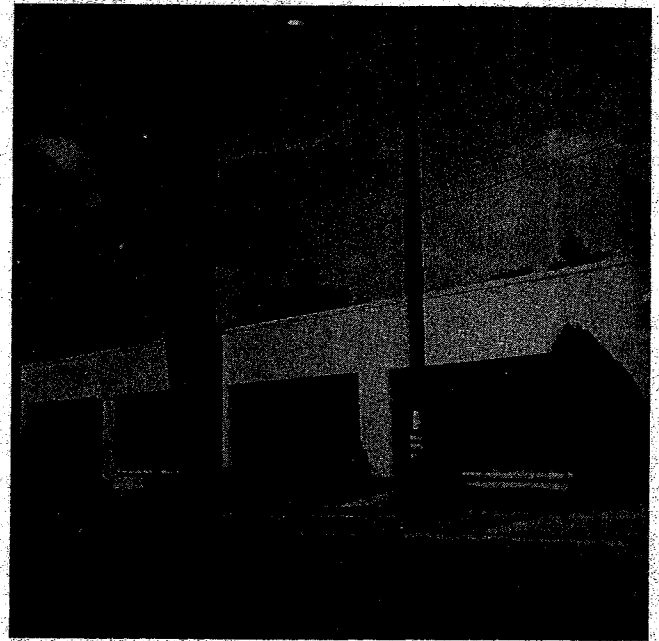
Table 14  
GROSS SALES OF STUDY AREA NONTRAFFIC SERVING BUSINESSES IN HUNTSVILLE 1958 AND 1964

Type of Business	Number of Businesses		Gross Dollar Sales		Change Between 1958 and 1964	
	1958	1964	1958	1964	Dollars	Percent
Grocery	4	7	\$1,477,764	\$2,733,402	+\$1,255,638	+85.0%
Automotive Sales and Repairs	10	12	\$1,294,607	\$2,019,748	+\$ 725,141	+56.0%
Service	13	23	\$ 325,423	\$ 641,240	+\$ 315,817	+97.0%
Dry Good	5	7	\$ 414,369	\$ 635,823	+\$ 221,454	+53.4%
Furniture, Hardware, and Appliance	6	7	\$ 608,368	\$ 898,253	+\$ 289,885	+47.6%
Other	14	16	\$ 816,229	\$ 875,658	+\$ 59,429	+ 7.3%
All Firms	52	72	\$4,936,760	\$7,804,124	+\$2,867,364	+58.1%
Average Per Firm			\$ 94,938	\$ 108,391	+\$ 13,453	+14.2%

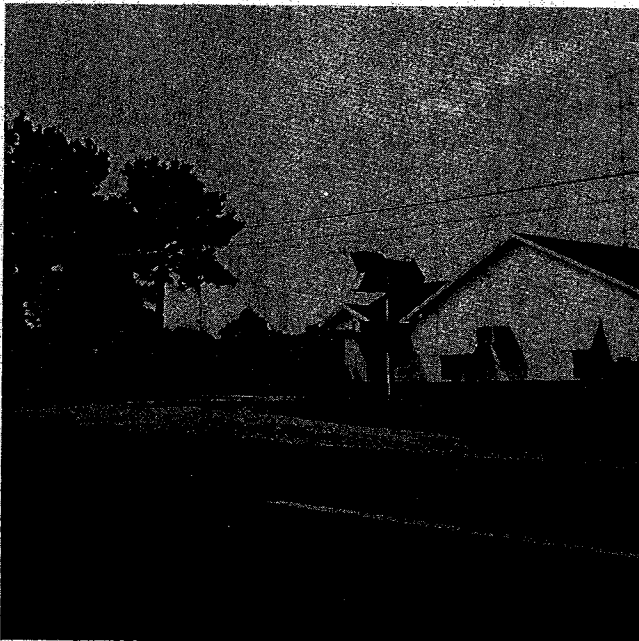
The new route had only two businesses of this type. The gross sales of these businesses are incorporated in this table.



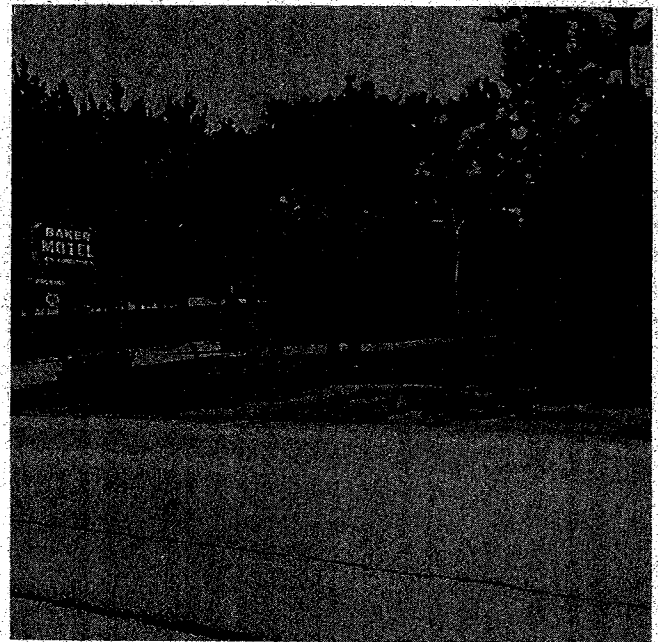
Food Service



Food Service

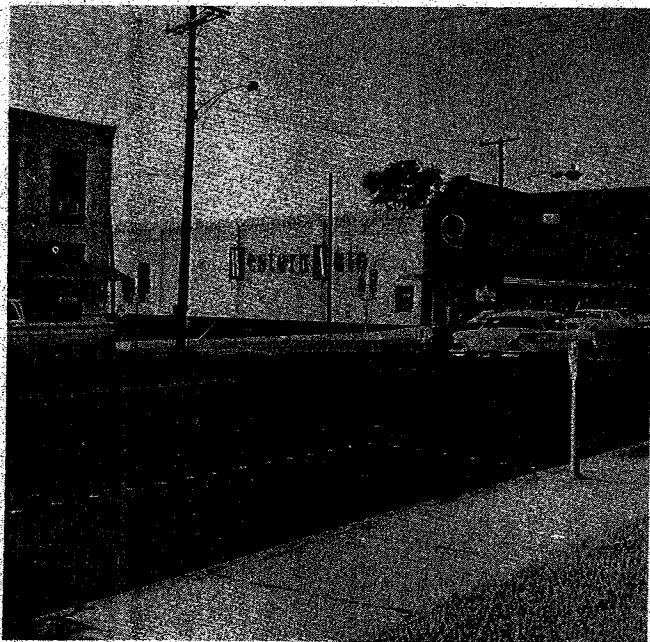


Motel

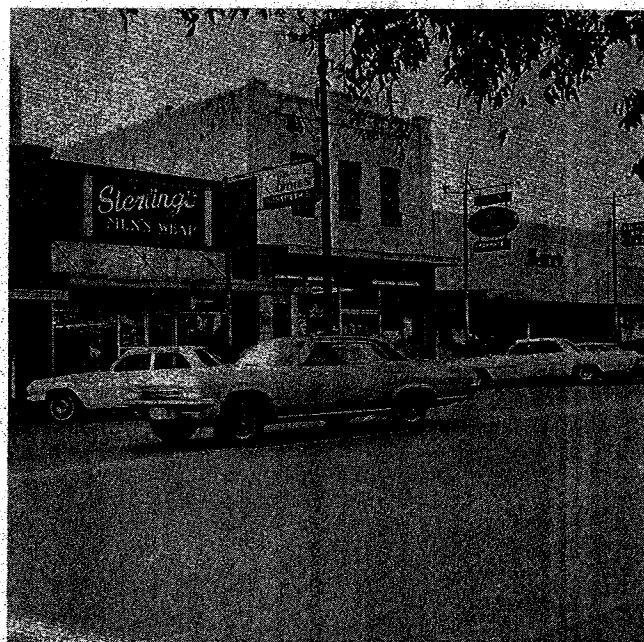


Motel

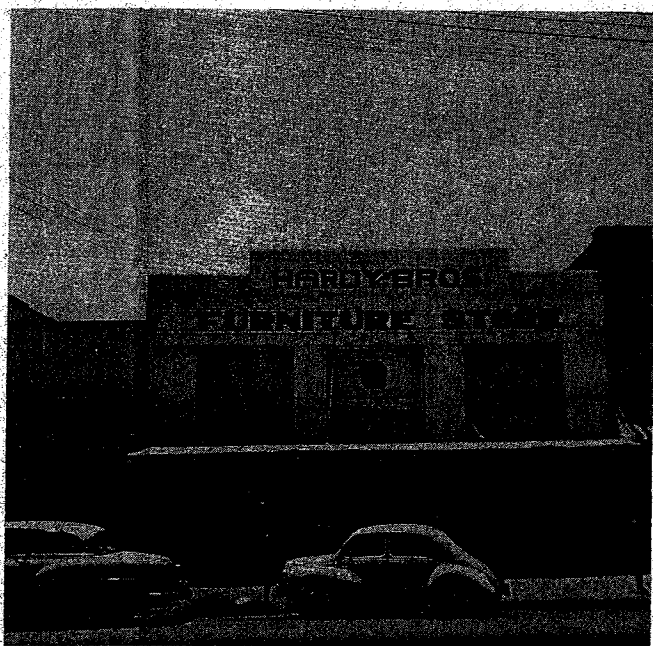
Food service establishments and motels operating along the old route US 75 before and after construction of IH 45.



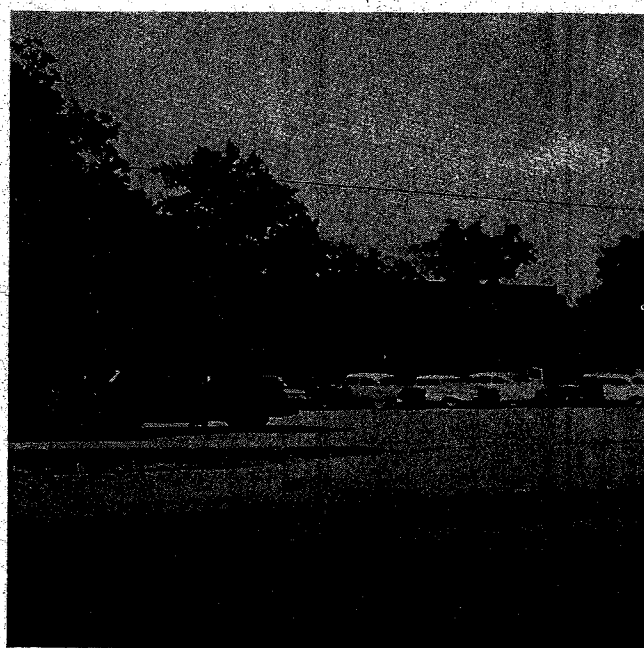
Automobile Supplies



Dry Goods

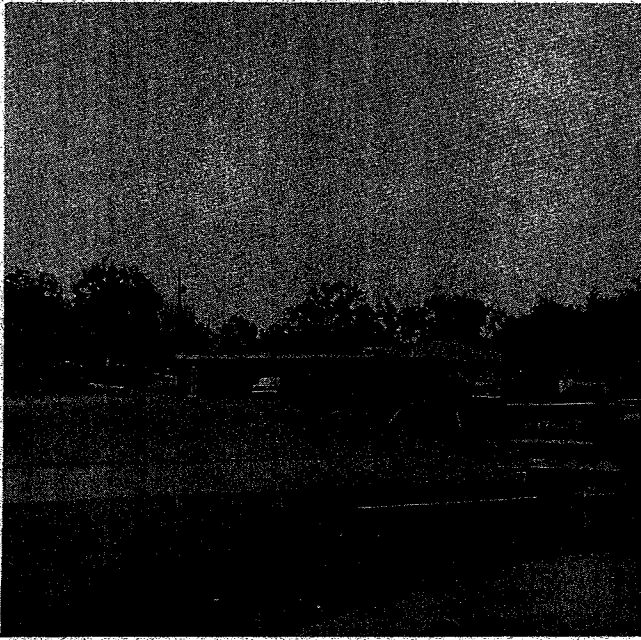


Furniture

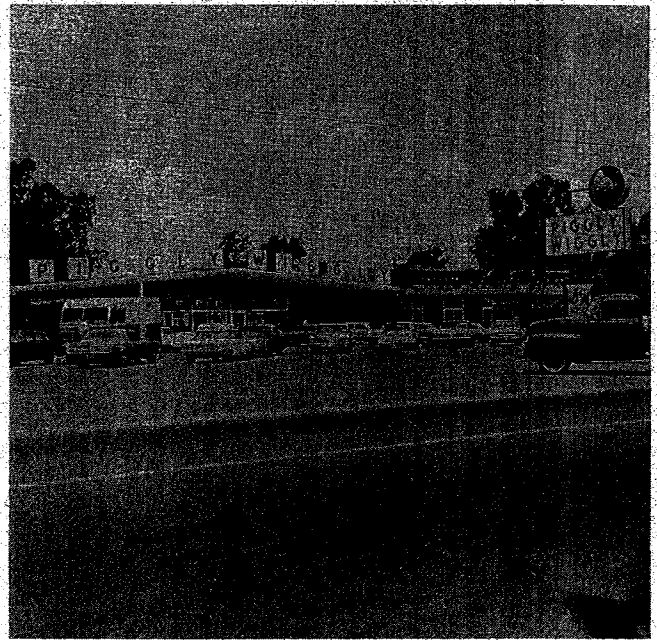


Food

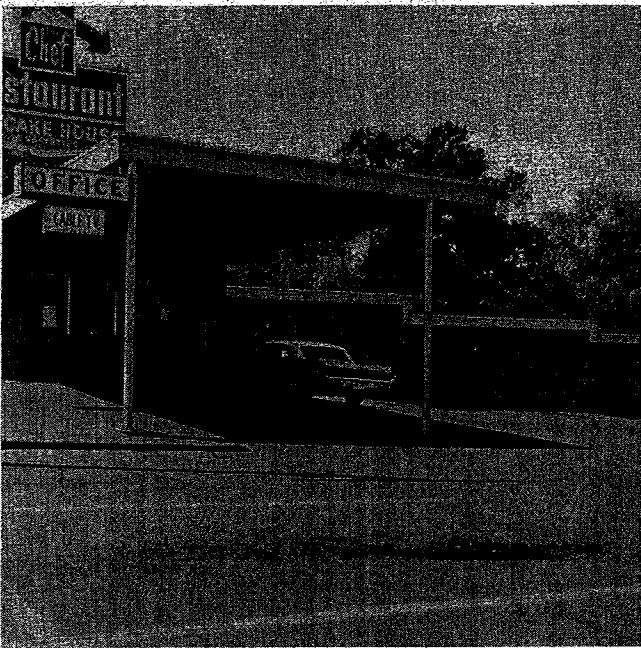
Nontraffic serving businesses which have continued in operation along the old route US 75 before and after construction of IH 45.



Drive-In Grocery



Supermarket

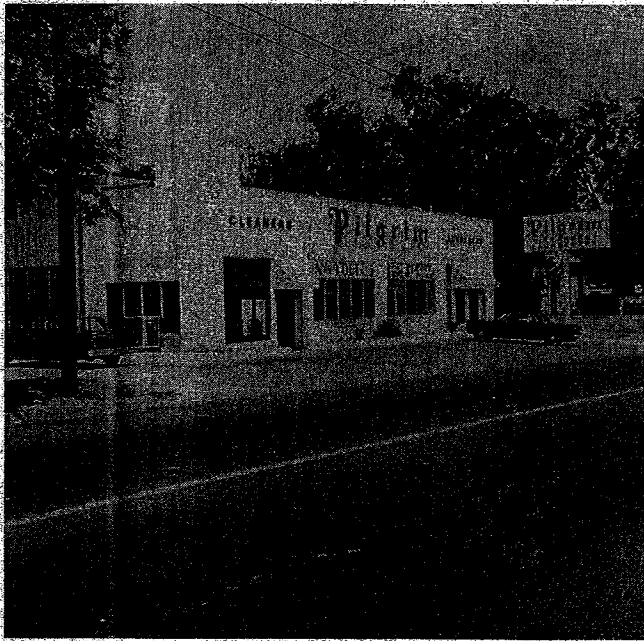


Restaurant and Motel

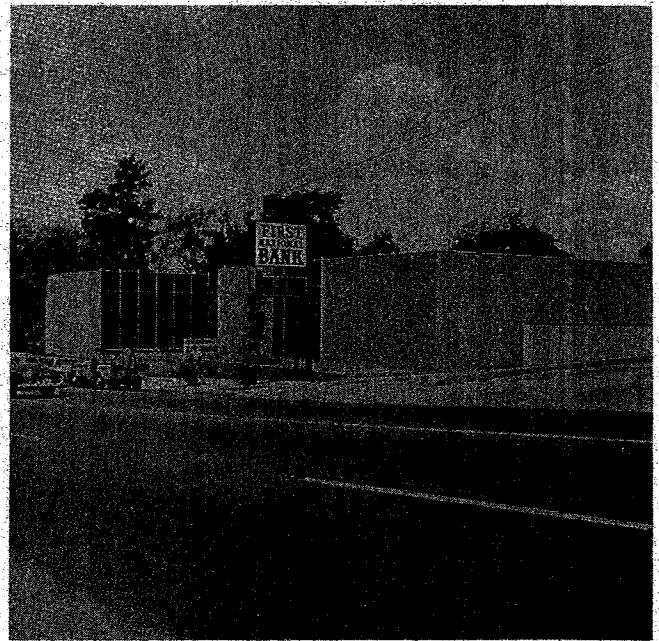


Automobile Dealership

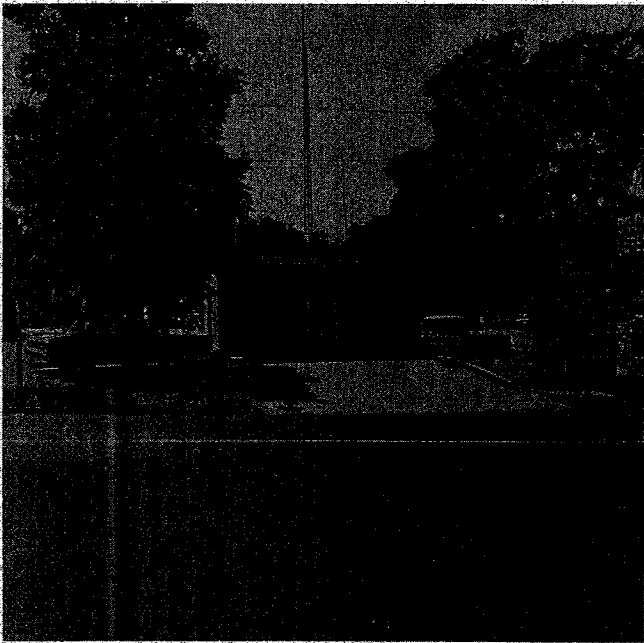
Various new businesses operating along old route US 75 after construction of IH 45.



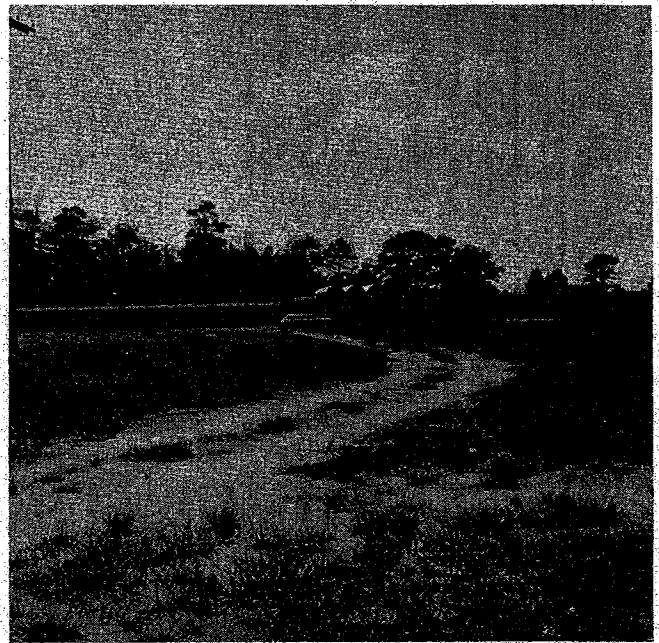
Cleaners



Bank

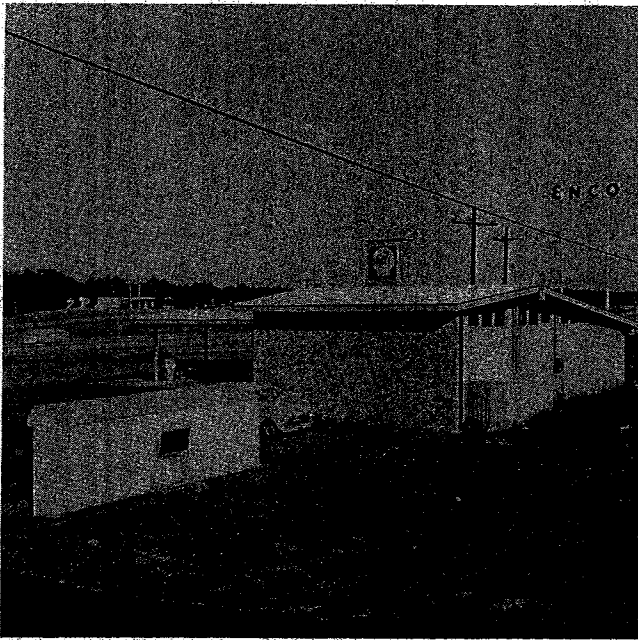


Cable TV

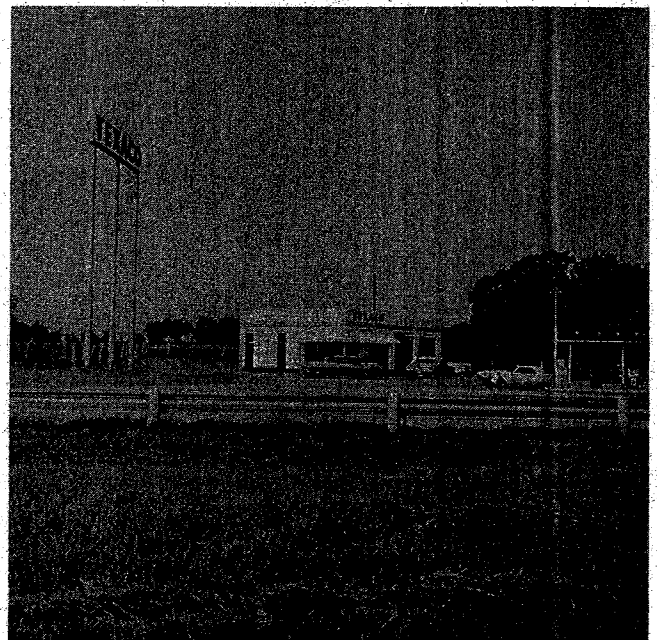


Nursing Home

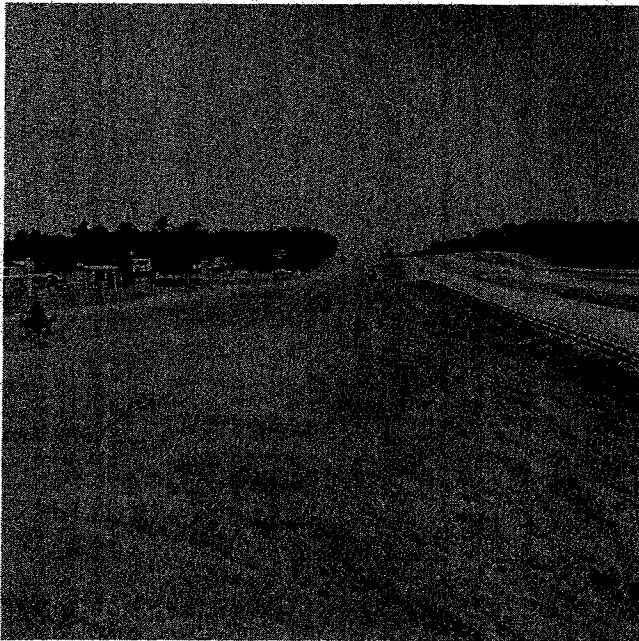
Other new businesses operating along the old route US 75 after construction of IH 45.



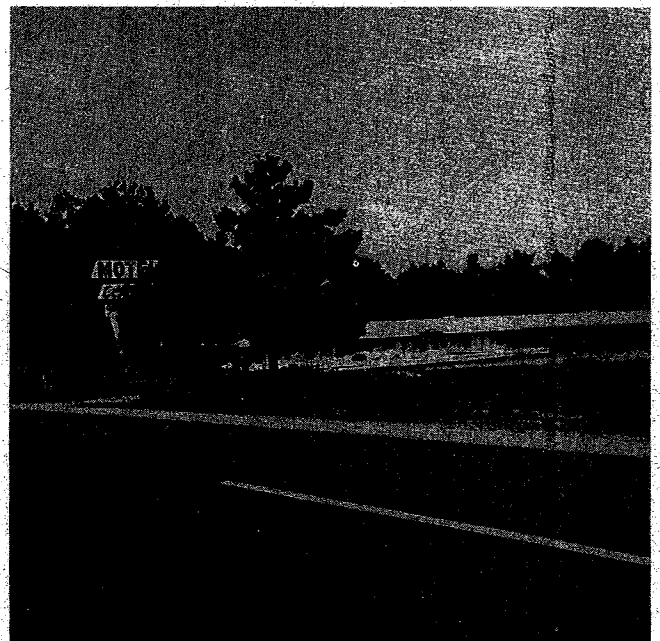
Service Station



Service Station



Service Station, Motel and Food Service



Motel

New traffic serving businesses which have begun operating along IH 45 in the study area.



# Travel Patterns

A limited study was made of the travel patterns on the highways serving Huntsville before and after completion of the IH 45 by-pass. Information in tabular form reflects the changes in the average daily traffic volumes on these highways according to the Texas Highway Department's traffic counts. Also, an analysis of the local versus through traffic is presented.

## US 75 Versus IH 45 Traffic

Table 15 shows the 1958 and 1964 average daily traffic volumes at selected points on US 75 and on IH 45 for 1964. The combined traffic of the two routes, north and south of town, showed an increase of over 50 percent between these years. However, the old route experienced an over-all volume decline of more than 40 percent. The old route has recovered some volume since the initial decline which occurred just after opening

traffic to IH 45, and it is due primarily to increased local traffic.

Between 1958 and 1964, traffic volumes also increased on the other highways leading into Huntsville. State Highway 30 experienced over a 100 percent increase west of its IH 45 intersection. Most of this increase in volume is probably due to the extension of SH 30 to College Station.

## Local Versus Through Traffic

The decline in through traffic volumes along the old route (US 75) undoubtedly had some negative economic effect on old route traffic serving businesses, primarily motels and service stations. Many of the through traffic customers were lost as a result of the new highway. However, growth in the number of local customers, as projected in Table 16, offset much of loss of through traffic trade.

Table 15  
AVERAGE DAILY TRAFFIC VOLUMES ON IH 45, US 75, US 190, SH 19, AND SH 30 SERVING HUNTSVILLE, TEXAS BETWEEN 1958 AND 1964

Location	Annual ADT Count <sup>1</sup>		Change Between 1958 and 1964	
	1958	1964	Number	Percent
<b>US 75 and IH 45 Combined</b>				
North of Northern Interchange	4,520	6,920	+2,400	+ 53%
South of Southern Interchange	5,170	8,820	+3,650	+ 71
<b>US 75 North</b>				
South of IH 45 Interchange	5,510	3,130	-2,380	- 43
<b>US 75 South</b>				
North of IH 45 Interchange	6,350	2,530	-3,820	- 60
<b>IH 45 North</b>				
South of US 75 Interchange		5,940	5,940	NA
<b>IH 45 South</b>				
North of US 75 Interchange		6,470	6,470	NA
<b>US 190 East of Huntsville</b>	2,530	3,370	+ 840	+ 33
<b>SH 19 East of Huntsville</b>	3,540	4,180	+ 640	+ 18
<b>SH 30 West of IH 45</b>	860	1,740	+ 880	+102

<sup>1</sup>Annual Average 24 hour traffic of all types of motor vehicles, published by the Texas Highway Department.

Table 16  
LOCAL AND THROUGH AVERAGE DAILY TRAFFIC VOLUMES ON IH 45 AND US 75, US 190, SH 19 AND SH 30 SERVING HUNTSVILLE, TEXAS

Location	Average Daily Traffic Volumes <sup>1</sup>									Percent of 1952 Volume	
	Local Volumes			Through Volumes			Total Volumes			Local	Through
	1952	1958	1964	1952	1958	1964	1952	1958	1964		
<b>US 75 and IH 45 Combined<sup>2</sup></b>											
North of Northern Interchange	1,443	1,823	2,789	2,137	2,697	4,131	3,580	4,520	6,920	40.3%	59.7%
South of Southern Interchange	1,922	2,156	3,678	2,688	3,014	5,142	4,610	5,170	8,820	41.7	58.3
<b>US 190 East</b>	1,362	2,140	2,851	248	390	519	1,610	2,530	3,370	84.6	15.4
<b>SH 19 East</b>	1,966	2,513	2,968	804	1,027	1,212	2,770	3,540	4,180	71.0	29.0
<b>SH 30 West</b>	771	713	1,442	159	147	298	930	860	1,740	82.9	17.1

<sup>1</sup>The 1958 and 1964 local and through volumes were estimated, based on the 1952 percentages from an origin and destination survey conducted by the Texas Highway Department.

<sup>2</sup>IH 45 was opened to traffic after 1958.

# General Community Development of Huntsville

The collection and analysis of certain economic data from secondary sources gives some indication of the extent of the general economic development of Huntsville and Walker County. How much the construction of IH 45 through Walker County and around Huntsville has affected community development will never be known. It is reasonable to assume, however, that it has aided such development as has expansions of the prison system and Sam Houston State Teachers' College.

Table 17 presents the changes in selected primary indicators of economic development in Walker County as compared to Texas for the 1958-64 period. It shows that Walker County's total population, urban population, per capita income, and total value of minerals produced increased much more than Texas as a whole. On the other hand, the number of total paid employees of retail trade and manufacturing firms declined in Walker County while increasing in Texas. The total value added by manufacture also declined, but it increased in Texas.

In Huntsville, total employment increased 20.4 percent between 1950 and 1960. This compares favorably to a 20.3 percent increase for Texas. In the last decade, the Census Bureau reported that employment gains in professional and related services, public administration, entertainment and recreational services, and construction more than offset the employment losses in agriculture and forestry, mining, manufacturing, transportation,

communication, and other public utilities, wholesale and retail trade, and business and personal services.

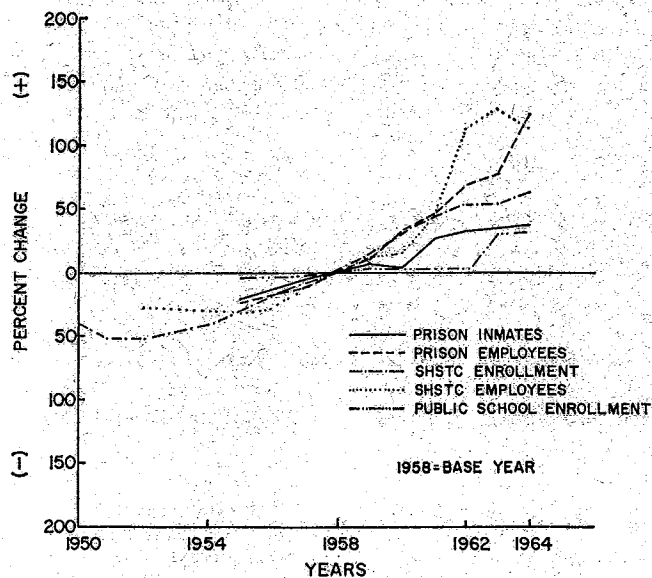


Figure 8. Trends in the number of prison inmates, institutional employees, and students enrolled in Huntsville, 1950-64. Source: Texas Department of Corrections, Sam Houston State Teachers' College, and Huntsville Public Schools.

Table 17

## PERFORMANCE OF SELECTED PRIMARY INDICATORS OF ECONOMIC DEVELOPMENT IN WALKER COUNTY, TEXAS, 1958 AND 1964

Indicator	Percent Change Between 1958 and 1964	
	Walker County	Texas
Total Population <sup>1</sup>	+ 23%	+ 10%
Urban Population <sup>1</sup>	+ 60	+ 16
Per Capita Income <sup>1</sup>	+ 68	+ 2
Total Paid Employees <sup>2</sup>		
Retail Trade	- 11	+ 3
Selected Services	+ 16	+ 13
Wholesale Trade	Nil	+ 15
Manufacturing	- 17	+ 22
Total Payroll Costs		
Retail Trade	+ 27	+ 25
Selected Services	+ 38	+ 40
Wholesale Trade	+ 24	+ 38
Manufacturing	+ 3	+ 29
Total Retail Sales	+ 16	+ 18
Total Receipts by		
Selected Services	+ 25	+ 35
Total Value Added		
by Manufacture	- 16	+ 40
Total Value of Minerals Produced <sup>3</sup>	+448	+ 9
Total Motor Vehicle Registrations <sup>3</sup>	+ 22	+ 32

<sup>1</sup>From Sales Management Magazine's "Survey of Buying Power" 1959 and 1965 editions.

<sup>2</sup>Except for the last two items in the table, all other data are from the 1958 and 1963 "Census of Business," Bureau of Census, U.S. Department of Commerce.

<sup>3</sup>From the Dallas Morning News' "Texas Almanac" 1961-62 and 1965-66 editions.

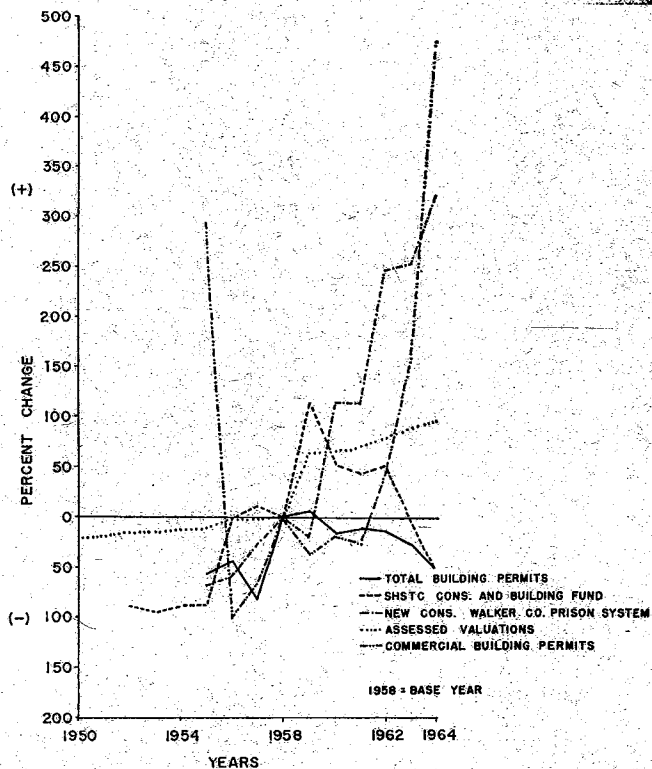
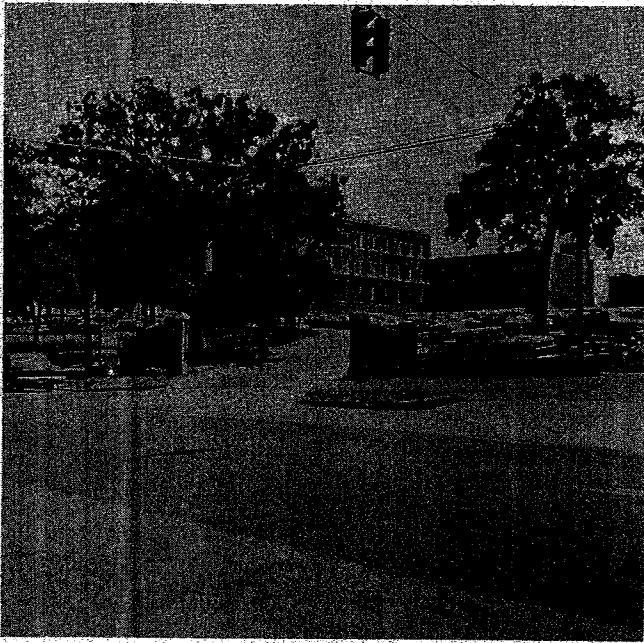
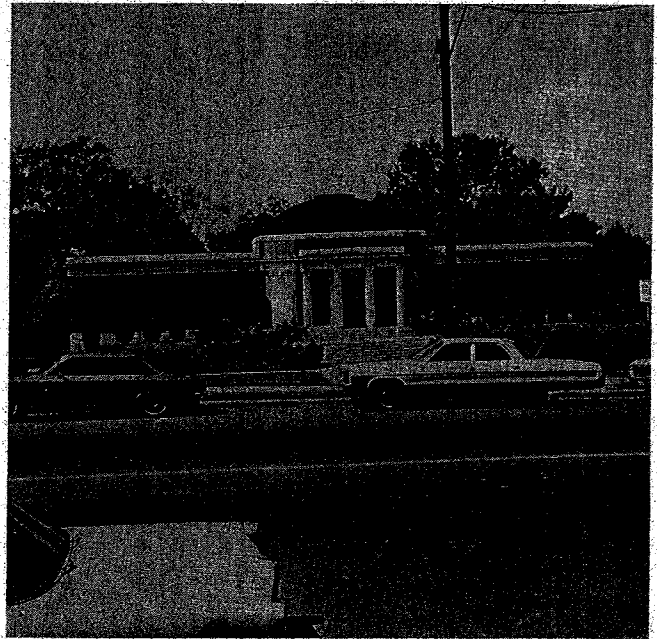


Figure 9. Trends in building construction and assessed valuations in Huntsville, 1950-64. Source: City of Huntsville, Sam Houston State Teachers' College, and Texas Department of Corrections.



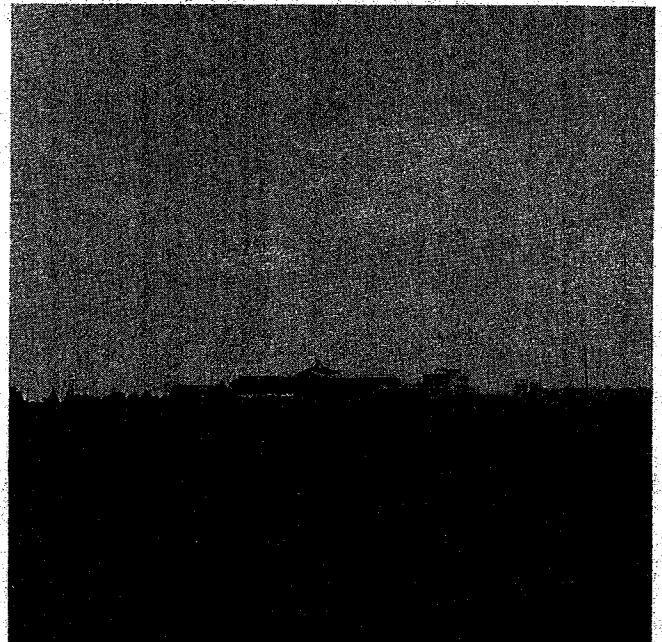
Sam Houston State Teachers' College



Sam Houston Museum



Huntsville Airport



Wynne State Prison Farm

Institutional and municipal facilities located along the old route US 75 before and after construction of IH 45.

Figures 8 through 13 give additional information of economic importance concerning Huntsville and Walker County. Most of the trends, based on annual series dating back to 1950, have been upwards. Since 1958, several of the trend lines have accelerated upwards more than was the case prior to 1958. The most significant ones were Sam Houston State Teachers' College employment, number of telephones, assessed property values, commercial building permit values, and loans made by the local financial institutions. Only two trends changed

downward and stayed that way. They were total building permit values and the Huntsville prison rodeo income.

The above data indicates that Huntsville and Walker County have made considerable progress in economic growth since 1950. After completion of IH 45, this growth has accelerated somewhat. The new highway apparently has significantly contributed to the economic growth of this community which it serves.

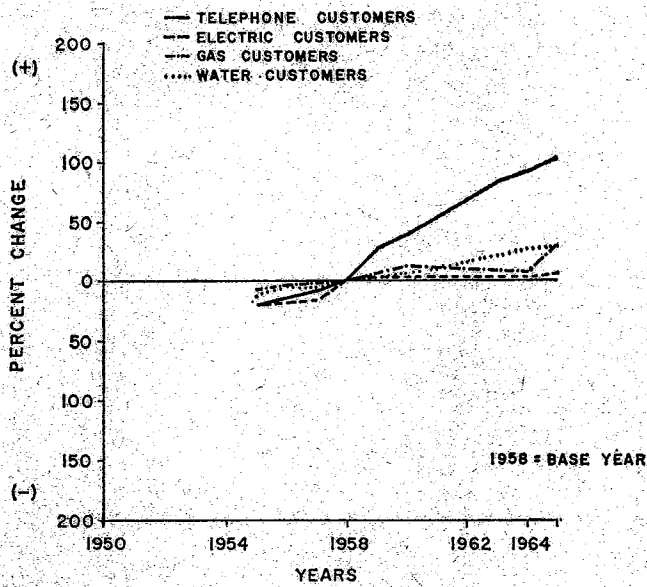


Figure 10. Trends in the number of utility customers in Huntsville, 1955-64. Source: Huntsville Chamber of Commerce.

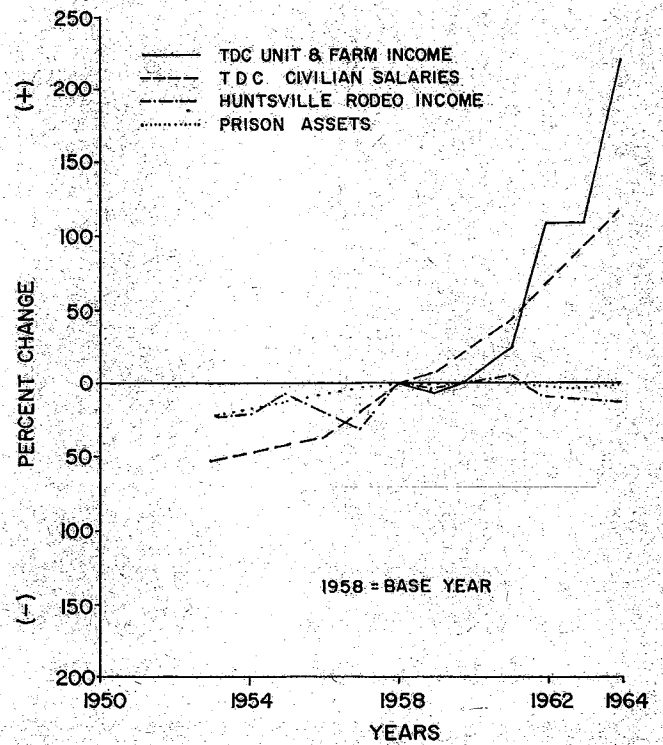


Figure 12. Trends in Texas Department of Corrections' income, salaries and assets in Walker County, 1953-64. Source: Texas Department of Corrections.

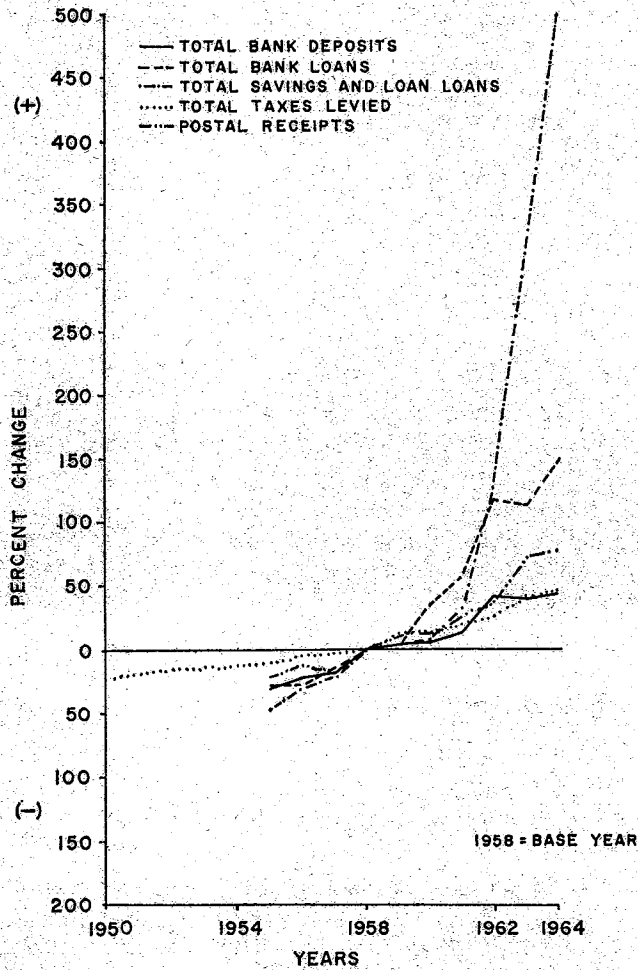


Figure 11. Trends in bank deposits and loans, taxes levied, and postal receipts in Huntsville, 1950-64. Source: Huntsville Chamber of Commerce.

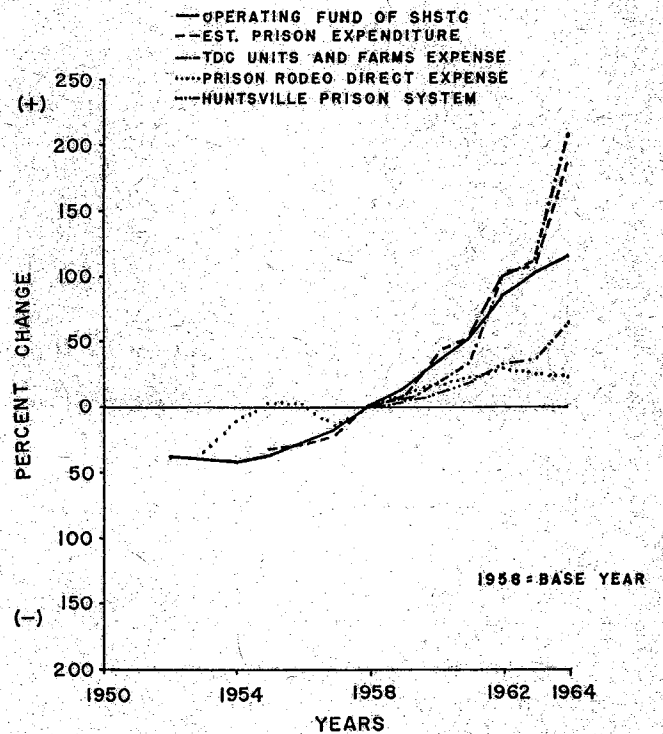


Figure 13. Trends in Texas Department of Corrections' expenditures and Sam Houston State Teachers' College operating fund in Walker County, 1952-64. Source: Sam Houston State Teachers' College and Texas Department of Corrections.

# Appendix

## CONSUMER PRICE INDEX

Below is a listing of the Consumer Price Index and its reciprocal for each year involved. The base was 1947-49 = 100.

Year	Index	Reciprocal
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
1962	129.3	0.773
1963	131.0	0.764
1964	132.6	0.754
1965	134.4	0.744

# 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) 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 values are also shown. Finally, the approximate confidence level in which these T or t values are significant is shown. The larger the observed value of T or t, the less the chance that its value is due to chance only. For example, if the observed value of T is 1.96 (based on sample means with each having 30 or more observations) at a 95 percent probability level, the interpretation is that a value of T this large would likely occur only five times out of a hundred and could not be due to chance alone.

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,

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

where  $\sigma_1$  and  $\sigma_2$  are the standard deviations of the populations of means from which sample means 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,

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

where  $\sigma_1$  and  $\sigma_2$  are the standard deviations of the populations of means from which sample means 1 and 2 come respectively. With the two  $\sigma$ 's not known, we substituted for them the standard deviations 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.