

A Study of the Economic Impact of Interstate Highway 20 On Merkel, Texas

by

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on Selected Areas in Texas

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The opinions, findings, and conclusions expressed in this publication are those of the author 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 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.

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. A report on three areas was submitted to the Bureau of Public Roads at that time. Since then, final reports have been published on the Austin, Temple and Rockwall areas. Also, final reports have been written on the Merkel, Waxahachie and Houston areas. By September 1, 1966, final reports will have been written on the Huntsville, Conroe, and Chambers County (Anahuac) area.

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Summary of Findings

The economic effects of the new route (IH 20) on Merkel were measured and analyzed in terms of changes in land values, land uses, business activities, travel habits, and general community development.

The results of these findings are as follows:

1. Over all land values in the Merkel study area increased between the "before" and "after" periods.

2. Land values experienced a greater increase north of old U. S. Highway 80 in the vicinity of IH 20 than was experienced south of the old route.

3. Significant commercial and residential land use changes occurred abutting or near the new by-pass facility. Significant changes also occurred some distance from the facility.

4. As a whole, traffic and nontraffic serving businesses experienced a significant increase in gross sales between the "before" and "after" years. However, there was a reduction in the rate of increase after construction of the new facility. Businesses housed in the newest and best quality buildings accounted for most of the gross dollar gains between 1958 and 1962. The new highway

adversely affected old traffic serving businesses located on the old highway.

5. The travel habits of Merkel residents (interviewed) have changed considerably since IH 20 was completed. After construction of the new facility, the respondents made significantly more trips on IH 20 in 1963 than in 1959. Fifty-four percent of the 1963 respondents said they saved a significant amount of travel time using the new highway.

6. More than two-thirds of the 1963 respondents thought relocation of the new highway has been an overall advantage to their town.

7. Other economic indicators showed percentage increases between the "before" and "after" years, and suggested continued general community development of Merkel. Such economic growth is partly due to the new Interstate Highway.

Thus, the economic effects of IH 20 on Merkel, as measured by changes in each of the above areas of activity, have been significant. Since the whole town was studied, this conclusion can be given more weight than such conclusions reached in the other areas where only part of the affected town was studied.

Introduction

Purpose of Study

This study was designed to determine the economic changes that occurred in the small town of Merkel as a result of constructing Interstate 20 around the principal residential and commercial areas. The results of the study may be used in anticipating the economic effects of the Interstate Highway System upon comparable small towns.

The principal objectives were to determine the effects of the Interstate System upon:

1. Land values
2. Land uses
3. Business activity
4. Travel habits, and
5. General community development

Merkel Area

Merkel is a small town in the Western Plains of Texas, 17 miles west of Abilene and 26 miles east of Sweetwater. Situated in Taylor County, Merkel had a population of 2,312 in 1960, down slightly from 2,338 in 1950. According to the U. S. Census, the median income of Taylor County residents had grown from \$2,976 in 1950 to \$5,246 in 1960. The labor force had grown from 25,136 in 1950 to 36,104 in 1960. The percent of the labor force employed was 97.5 in 1950 and 94.8 in 1960. Unfortunately, no figures are available for Merkel alone, except that 59 of the retail businesses employed an average of 174 full time and 51 part time employees in 1962.

Merkel is served by one major highway, Interstate 20, which is an east-west facility connecting Fort Worth to the east and El Paso to the west. Only a farm-to-market road extends north and south out of Merkel. The other transportation facility serving the city is a major east-west railroad. Figure 1 shows the location of the rail and highway facilities serving Merkel.

In the past, the economy of Merkel has been based primarily on agriculture. In recent years an increasing number of Merkel residents have been earning their living through jobs in Abilene, Sweetwater, and Dyess Air Force Base, which is located four miles southwest of Abilene. Also, a considerable amount of oil activity around Merkel has helped its economy.

A drought during the 1950's and the early 1960's severely affected the economy of Merkel. During these years the cotton and grain yields were below normal. This reduced the number of migrant farm laborers used in the area during harvest season, thus reducing the extra revenue usually received by Merkel's businesses. Also, ranchers in the area were dealt a severe economic blow by the drought and sold large numbers of their breeding stock.

Despite these conditions, Merkel has been able to maintain a stable economy through the last decade. While the importance of agriculture declined in the area, Abilene grew rapidly in population and has become one of the most important industrial centers of West

Texas. According to the Texas Directory of Manufacturers, published by the University of Texas, there were a total of 92 Taylor County industries in 1962. Most of these were located in or near Abilene. These have provided employment for residents of Merkel, which has no industry, except for a cotton gin and two small grain elevators.

Method of Study

The general method of studying the economic effects of IH 20 on Merkel is the "before" and "after" comparative approach. Before and after periods were established by the dates of right of way purchase, highway by-pass construction, and official opening of the facility.

The period of study covers 13 years, from 1950 to 1962. The first six years (1950-55) immediately before the purchase of right of way began were designated as the "before" period. The 1956-58 period, when right of way purchase began and lasting to official opening date, is called the "construction" period. The next four years (1959-62) were selected as the "after" period.

The general belief was that the new by-pass facility would be beneficial to Merkel's economy, and that most of its effects could be measured by analyzing changes in land values, land use patterns, business activity, travel habits, and other economic indices. The data were appropriately tested to determine significant "before" and "after" differences. The procedures and sources of information for each objective are discussed below.

LAND VALUES

The land value analysis is based on the sale prices of property which are believed to be the best indicators of real estate value for the purposes of the study. Public and private records in Taylor County were searched for all land sales that occurred in the study area, which encompasses Merkel, during the designated periods. (See Figure 1.) Only bonafide sales prices were considered in the land value analysis. Trades, family transactions, and transfers by quit claim deed were omitted.

When the amount of consideration was not stated in the deed, Federal Revenue Stamps were used as an indication of the sale price. Each \$.55 worth of stamps represents a maximum of \$500 of consideration. The last \$.55 was divided in half in computing the total consideration to minimize estimating error. Tracts or lots selling with improvements valued high enough to influence the price significantly were classified as improved property.

Sales prices used in the body of the report were adjusted to common dollars by using the Consumer Price Index. (See explanation and schedule in the Appendix.)

To isolate the highway influence on land values in a particular area, land sales were analyzed on a north versus south of old U. S. Highway 80 basis and then on a zone basis. Land sales on the south side served as a control to determine the new highway's influence on land values on the north side.

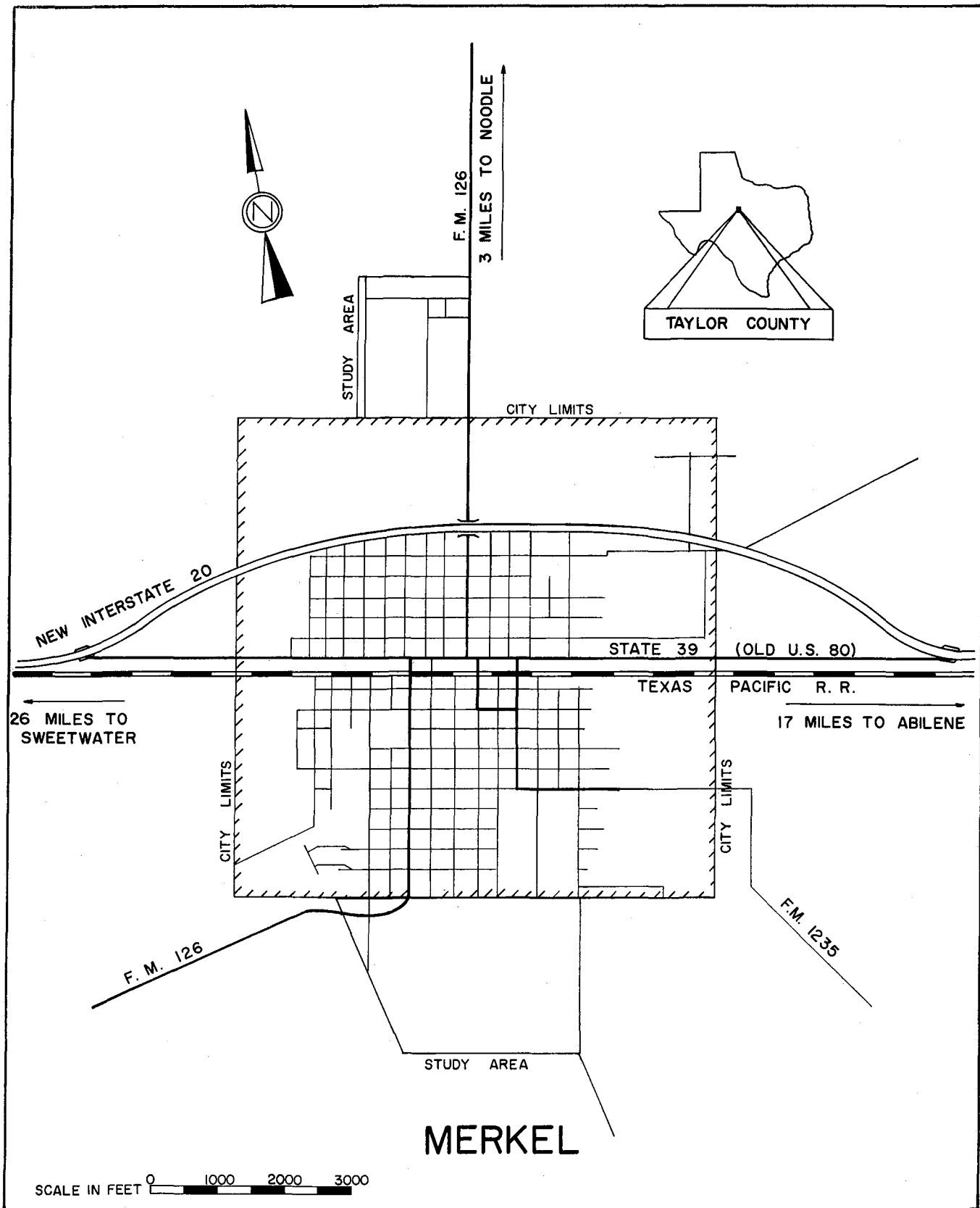


Figure 1. A map of the Merkel study area showing the layout of highways, streets, and railroad in the city.

LAND USES

Land use information for the study area was collected from the city tax records, aerial photographs, and physical inspection. The 1955 land use was accurately determined from tax appraisals conducted that year for all properties in the city. The above year was selected because it was the last year before purchase of the right of way began for the by-pass. The 1962 land use was also determined by personal inspection. City officials and property owners in the city assisted in making land use designations. Each property was assigned to one of six land uses defined in the "Definition of Terms" section.

BUSINESS ACTIVITY

Data on business activity in Merkel for 1958 and 1962 were obtained by means of personal inspection and interviews with operators of firms in the city. These years were selected for study because 1958 was the last year before the by-pass was opened to traffic, and 1962 was the last year allowed for study.

The data collected on each business consisted of the history of building and business, annual gross dollar sales, hours of operation, location in the town, and opinions of the operators concerning the by-pass effects on their businesses.

TRAVEL HABITS AND OPINIONS OF MERKEL RESIDENTS

The travel habits and opinions of Merkel residents were obtained by mail questionnaires sent to each resident in 1959 and 1963. All residents having city water meter connections during these years were sent a questionnaire. The questionnaire was designed to determine frequency of use of the old and the new routes in and out of Merkel, purpose of such travel, and opinions of the new highway's effects on respondents and the town as a whole. Changes in the answers to specific questions between 1959 and 1963 were analyzed to detect the "immediate" versus the "longer run" response to the highway improvement.

The Texas Highway Department furnished average daily traffic volume information to show the "before" and "after" volumes of traffic on the old and new routes. These volumes are compared to the changes in business volumes.

GENERAL COMMUNITY DEVELOPMENT

Information on school enrollment, assessed tax valuations, bank deposits, utility connections, and indus-

trial development were collected on an annual basis to determine the changes in the general community development of Merkel during the study period. The changes in these indicators between 1958 and 1962 were particularly revealing.

DEFINITIONS OF TERMS

Definitions of various terms used in this report are given below:

1. Before and after—a technique used for comparative purposes to measure changes in land values, land uses, gross dollar sales, and other data. One time period is designated as the before period and another the after period, both already described.

2. Area weighted figure—derived by summing all purchase prices of a number of land sales and dividing by the sum of all the land area represented by those sales.

3. Figure not area weighted—derived by summing the price per unit of a number of individual land sales transactions and dividing by the number of sales transactions involved.

4. Land held for future use—land generally considered to be held for future use rather than its present utility, but it may be farmed or grazed or used for other agricultural purposes during interim period, and may be either inside or outside the city limits.

5. Urban residential land—tract or lot used primarily as a dwelling place (house must be habitable) inside of the city limits or a part of a subdivision outside the city limits; maximum size is five acres, with larger plots becoming classed as land held for future use.

6. Commercial traffic serving land—tract used for commercial purposes and deriving more than 50 percent of its income from traffic. It is primarily nonmanufacturing in nature.

7. Commercial nontraffic serving land—tract used for commercial purposes and deriving less than 50 percent of its income from traffic. It is also primarily nonmanufacturing in nature.

8. Industrial land—tract used for manufacturing, processing, or storage of some product.

9. Institutional - municipal land—tract used as school, park, cemetery, hospital, etc., in a nonprofit-making capacity. It may be publicly or group owned and operated.

10. Acreage land—tracts which are not formally platted into lots and blocks for residential and commercial use.

Changes In Land Values

Changes in land values of properties within the study area were measured by the fluctuations in the prices of all such property selling during the 1950-62 period. The analysis is based on changes in land prices between the before and after construction periods to indicate the influence of the new highway by-pass on land values.

During the 13-year period, 753 Merkel land sales transactions usable in the study were recorded in the deed records of Taylor County. Table 1 shows the number of acreage and subdivided land sales used in the land value analysis. These are further separated into improved and unimproved categories.

The average prices used in the body of the report are adjusted to constant dollars, and they are not area weighted. The actual average prices not area weighted are in the appendix. Also, the area weighted average prices (in constant dollars) are presented in the appendix.

Whole Study Area

The sales prices of various properties were analyzed first on a whole study area basis to ascertain the between period changes in land values. As can be observed from Table 1, there were only a few acreage land sales upon which to base an analysis. Even this limited number gives a good indication of the trend in values of raw land. Most of such land is lying idle. On the other hand, there were many subdivided sales upon which to base an analysis. These are analyzed separately.

ACREAGE LAND

The results of the available acreage tract sales are presented in Table 2. There were several sales of tracts abutting the new by-pass facility in which the consideration could not be determined. These would have augmented the analysis, especially in the case of unimproved land values.

Table 2 shows that unimproved acreage land prices increased about 30 percent between the before and after

periods. All of this increase occurred during the construction period and may or may not be highway related.

Table 2 also shows the between period price changes for improved property. These prices responded similarly to those of the unimproved tracts, even though the quality of the improvements on these properties varied considerably.

SUBDIVIDED LOTS

Most of the land within the area is subdivided into lots. A total of 220 unimproved and 496 improved sales was used in the analysis of subdivided land values.

The before and after period comparison for unimproved lots, presented in Table 3, shows a 25 percent increase in prices. Prices of improved lots also increased (six percent) in value between the same periods.

North and South of Old Highway

Figure 2 shows that the land area within the study area is about equally divided north and south of old U. S. Highway 80. Since the new highway bisects the northern half of the city, it was hypothesized that this section would be more susceptible to the influences of the highway. Consequently, a north and south comparison would generally show the additional effect, if any, of the new highway on north side land values.

ACREAGE LAND

Although there were only a few usable unimproved sales, they present some indication of the extent of the new highway's additional influence on land values to the north of the old facility. All of the before period sales occurred on the south side of town and served as the base price for both groups.

Table 4 shows a probable highway influence (additional) on north side land values of \$812 per acre or 92 percent. Prices north of the old highway declined between the before and construction periods, but made a significant advance after construction was completed.

Table 1
NUMBER OF LAND SALES TRANSACTIONS OCCURRING IN THE MERKEL STUDY AREA DURING THE 1950-62 PERIOD

Period	Number of Transactions				Grand Total
	Unimproved		Improved		
	Acreage	Subdivided	Acreage	Subdivided	
Whole Area					
Before Period (1950-55)	9	113	4	239	365
Construction Period (1956-58)	6	51	1	104	162
After Period (1959-62)	10	56	7	153	226
Grand Total	25	220	12	496	753
North of Old U.S. 80					
Before Period (1950-55)	0	25	2	71	98
Construction Period (1956-58)	1	17	0	35	53
After Period (1959-62)	3	19	5	34	61
Subtotal	4	61	7	140	212
South of Old U.S. 80					
Before Period (1950-55)	9	86	2	168	267
Construction Period (1956-58)	5	34	1	69	109
After Period (1959-62)	7	37	2	119	165
Subtotal	21	159	5	356	541

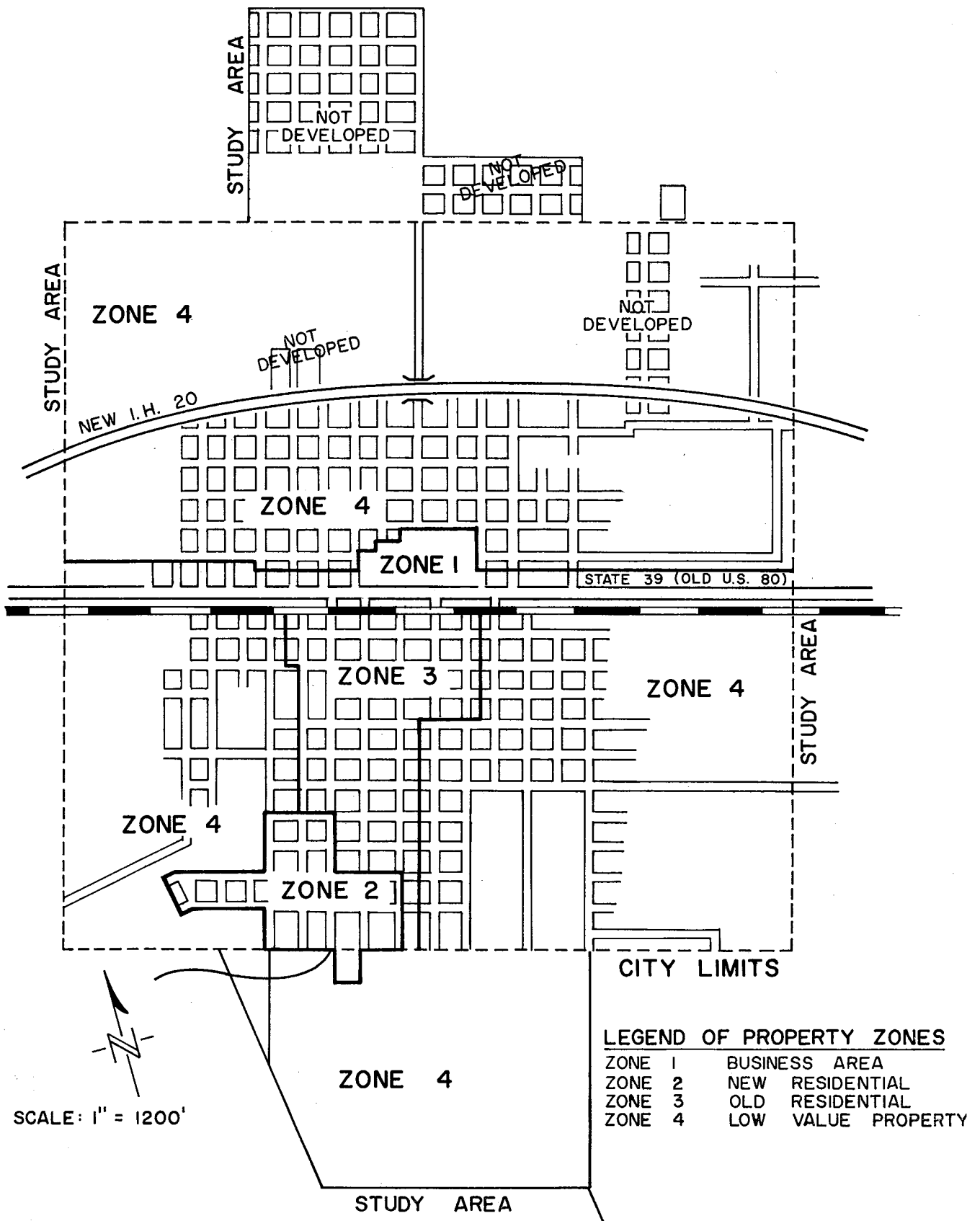


Figure 2. Map of Merkel showing the location of zones delineated on the basis of comparable properties.

Table 2
PRICES OF UNIMPROVED AND IMPROVED ACREAGE TRACTS IN THE MERKEL STUDY AREA IN CONSTANT DOLLARS (1947-49=100)

Period	Unimproved Tracts			Improved Tracts		
	Number of Sales	Price Per Acre	Standard Deviation	Number of Sales	Price Per Acre	Standard Deviation
Before Period (1950-55)	9	\$ 880	\$ 973	4	\$13,270	\$17,238
Construction Period (1956-58)	6	1,212	1,111	1	17,162	
After Period (1959-62)	10	1,144	788	7	16,765	8,854
Increase Between Periods						
Before and Construction						
Dollars		\$ 332			\$ 3,892	
Percent		38%			29%	
Construction and After						
Dollars		\$ -68			\$ -397	
Percent		- 6%			- 2%	
Before and After						
Dollars		\$ 264			\$ 3,495	
Percent		30%			26%	

Table 3
PRICES OF UNIMPROVED AND IMPROVED SUBDIVIDED LOTS IN THE MERKEL STUDY AREA, IN CONSTANT DOLLARS (1947-49=100)

Period	Unimproved			Improved		
	Number of Sales	Price Per Square Foot	Standard Deviation	Number of Sales	Price Per Square Foot	Standard Deviation
	(Number)	(Dollars)	(Dollars)	(Number)	(Dollars)	(Dollars)
Before Period (1950-55)	113	\$0605	\$08136	239	\$5418	\$49472
Construction Period (1956-58)	51	.0568	.04467	104	.4585	.33046
After Period (1959-62)	56	.0754	.05676	153	.5735	.38193
Increase Between Periods						
Before and Construction						
Dollars		-\$0037			-\$0833	
Percent		-6.1%			-15.4%	
Construction and After						
Dollars		\$0186			\$1150	
Percent		32.7%			25.1%	
Before and After						
Dollars		\$0149			\$0317	
Percent		24.6%			5.9%	

Table 4
PRICES OF UNIMPROVED ACREAGE TRACTS LOCATED NORTH AND SOUTH OF OLD U. S. HIGHWAY 80, IN THE MERKEL STUDY AREA, IN CONSTANT DOLLARS (1947-49=100)

Period	Price per Acre ¹		Difference Between Areas
	North	South	
Before Period (1950-55)	\$ 880 (9) ²	\$ 880 (9)	\$ 0 ³
Construction Period (1956-58)	414 (1)	1,371 (5)	957
After Period (1959-62)	1,712 (3)	900 (7)	812 ⁴
Increase Between Periods			
Before and Construction			
Dollars	\$ -466	\$ +491	
Percent	-53%	+56%	
Construction and After			
Dollars	\$ +1,298	\$ -471	
Percent	+314%	-34%	
Before and After			
Dollars	\$ +832	\$ +20	
Percent	+94%	+2%	
Probable Highway Influence ⁵			
Percent	92%		
Dollars	\$812		

¹Number of transactions is shown in parentheses.

²There were no sales in the before period (1950-55) for the north area. For purposes of comparison the north area was assumed to have the same sales data as the south area in the before period.

³In this instance, the north and south area average prices are the same.

⁴The standard error (S.E.) is \$422. This value is significant beyond the 98% level; t is equal to 2.79.

⁵In this particular table, since the before period prices are one and the same, the probable highway influence was obtained by taking the difference between the north and south areas' percentage increases. Likewise, the probable highway influence measured in dollars is the difference between the north and south areas' dollar increases.

Table 5

PRICES OF UNIMPROVED SUBDIVIDED LAND LOCATED NORTH AND SOUTH OF OLD U. S. HIGHWAY 80 IN THE MERKEL STUDY AREA, IN CONSTANT DOLLARS (1947-49=100)

Period	Price per Square Foot ¹		Difference Between Areas	Percent of North Before Period Price
	North	South		
Before Period	\$.0422 (25)	\$.0657 (88)	\$.0235 ²	
Construction Period	.0371 (17)	.0667 (34)	.0296	
After Period	.0572 (19)	.0847 (37)	.0275 ³	
Increase Between Periods				
Before and Construction				
Dollars	\$-.0051	\$+.0010	\$-.0061	-14.5% ⁴
Percent	-12.1%	+1.5%	-13.6% ⁵	
Construction and After				
Dollars	\$+.0201	\$+.0180	\$+.0021	
Percent	+54.2%	+27.0%	+27.2%	
Before and After				
Dollars	\$+.0150	\$+.0190	\$-.0040	-9.5% ⁴
Percent	+35.5%	+28.9%	+6.6% ⁵	
Probable Highway Influence				
Percent	-1.5% ⁶			
Dollars	-\$0.0067			

¹Number of transactions is shown in parentheses.

²The standard error (S.E.) is \$.0091. This value is significant beyond the 99 percent level; t is equal to 11.50.

³The S.E. is \$.0102. This value is significant beyond the 99 percent level; t is equal to 9.60.

⁴Assuming that property prices in the north and south 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 north area prices changed by a greater or lesser amount with the net difference shown above which is the stated percent of the north's before period price.

⁵Same assumption as Footnote 4, but based on percent changes.

⁶Average of Footnotes 4 and 5 percentage figures for before and after periods.

⁷Footnote 6 percentage figure multiplied by the north area's before period price.

SUBDIVIDED LOTS

The unimproved lot prices increased north and south of the old route between the before and after periods, as shown in Table 5. But when considering absolute and relative changes, the additional probable highway influence on north side land values was slightly negative. However, it is significant to point out that between the construction and after periods, the additional influence

was positive. Apparently there was a time lag of perhaps two years before the positive influence began to occur.

All improved lot sales shown in Table 6 indicate an additional probable highway influence on property values to the north of \$.18487 per square foot or 57.7 percent. In this case, both north and south prices decreased between the first two periods. But between the next two periods, prices in both areas increased, with prices to

Table 6

PRICES OF IMPROVED SUBDIVIDED LOTS LOCATED NORTH AND SOUTH OF OLD U. S. HIGHWAY 80, IN THE MERKEL STUDY AREA, IN CONSTANT DOLLARS (1947-49=100)

Period	Price per Square Foot ¹		Difference Between Areas	Percent of North Area's Before Period Price
	North	South		
Before Period (1950-55)	\$.3204 (71)	\$.6354 (168)	\$.3150 ²	
Construction Period (1956-58)	.2901 (35)	.5439 (69)	.2538	
After Period (1959-62)	.4791 (34)	.6005 (119)	.1214 ³	
Increase Between Periods				
Before and Construction				
Dollars	\$-.0303	\$-.0915	\$+.0612	19.1%
Percent	-9.5%	-14.4%	+4.9%	
Construction and After				
Dollars	\$+.1890	\$+.0566	\$+.1324	
Percent	+65.1%	+10.4%	+54.7%	
Before and After				
Dollars	\$+.1587	\$-.0349	\$+.1936	60.4%
Percent	+49.5%	+5.5%	+55.0%	
Probable Highway Influence ⁴				
Percent	57.7%			
Dollars	\$.18487			

¹Number of transactions is shown in parentheses.

²The S.E. of the difference between the means is .0400. This value is significant beyond the 99 percent level; t is equal to 55.85.

³The S.E. of the difference between the means is .0450. This value is significant beyond the 99 percent level; t is equal to 13.91.

⁴See Footnotes 4, 5, 6, and 7 of Table 5 for an explanation.

Table 7

PRICES OF IMPROVED AND UNIMPROVED SUBDIVIDED LOTS IN THE FOUR SAMPLE AREAS, IN THE MERKEL STUDY AREA, IN CONSTANT DOLLARS (1947-49=100)

Sample Area	Price Per Square Foot ¹			Price Changes Between the Before and After Periods	
	Before Period (1950-55)	Construction Period (1956-58)	After Period (1959-62)	(Dollars)	(Percent)
	(Dollars)	(Dollars)	(Dollars)		
Unimproved					
Area 1	\$0.1495(11)	\$0.1574 (5)	\$0.2160 (3)	\$+0.0665	+44.5%
Area 2	0.0515(45)	0.0669(10)	0.0895(22)	+0.0380	+73.8
Area 3	0.0849(21)	0.0449(12)	0.0730 (4)	-0.0119	-14.0
Area 4	0.0303(36)	0.0376(24)	0.0485(27)	+0.0182	+60.1
Improved					
Area 1	\$1.0927(19)	\$0.7658 (6)	\$0.8367(16)	\$-0.2560	-23.4
Area 2	0.8324(68)	0.7766(16)	0.8429(62)	+0.0105	+ 1.3
Area 3	0.4881(65)	0.5136(25)	0.3877(35)	-0.1004	-20.6
Area 4	0.2346(87)	0.3127(57)	0.2133(40)	-0.0213	- 9.1

¹The number of transactions is shown in parentheses.

the north of old U. S. 80 making larger gains than those to the south.

Zones in Study Area

The subdivided lot sales occurring in similar areas were analyzed to show the between period changes in prices for each area zone. Figure 2 shows the town divided into four zones, based on city-wide 1955 tax valuations. Zone 1 is primarily the commercial section of the city. Zone 2 has the newest and highest quality residences, while Zone 3 has the older high-quality residences. Zone 4, the largest zone, has the lowest quality residences and also includes considerable open land.

As can be seen in Table 7, the prices for each area, regardless of period, differ considerably. This is especially true of the improved lots. Thus, the absolute and relative changes for each area are presented separately to give the reader an idea of the extent of the changes in land values occurring in each area between

the before and after period. The north versus south comparison is also given for Zone 4.

The unimproved lot prices made considerable gains in Zones 1, 2, and 4 between the before and after periods. These increases occurred almost without regard to location, as seen in Table 7. Area 4, traversed by IH 20, and Area 2 experienced the greatest gains. Table 7 presents a more detailed examination of the before and after changes in lot prices than Table 5.

The improved lot prices were depressed in every zone except Zone 2. Most of the homes in this zone were built since 1952. Again, Zone 4 properties were not depressed as much as those of Zones 1 and 3. The new highway was probably responsible because it opened up land previously without streets and also created a demand for commercial sites.

Since Zone 4 is the only zone which had land sales north and south of old U. S. 80, it was thought that this zone would more clearly show the extent of the addi-

Table 8

PRICES OF UNIMPROVED SUBDIVIDED LAND OF SAMPLE AREA FOUR IN THE MERKEL STUDY AREA, IN CONSTANT DOLLARS (1947-49=100)

Period	Price per Square Foot ¹		Difference Between Areas	Percent of North Before Period Price
	North	South		
Before Period (1950-55)	\$0.0337 (20)	\$0.0260 (16)	\$0.0077 ²	
Construction Period (1956-58)	.0371 (17)	.0389 (7)	.0018	
After Period (1959-62)	.0557 (18)	.0341 (9)	.0216 ³	
Increase Between Periods				
Before and Construction				
Dollars	\$+.0034	\$+.0129	\$-.0095	-28.2%
Percent	+10.1%	+49.6%	-39.5%	
Construction and After				
Dollars	\$+.0186	\$-.0048	\$+.0234	
Percent	+50.1%	-12.3%	+62.4%	
Before and After				
Dollars	\$+.0220	\$+.0081	\$+.0139	+41.2%
Percent	+65.3%	+31.2%	+34.1%	
Probable Highway Influence ⁴				
Percent	37.7%			
Dollars	\$0.0127			

¹Number of transactions is shown in parentheses.

²The S.E. of the difference between the means of the north and south areas is \$.0284. This value is significant beyond the 21 percent level; t is equal to .27.

³The S.E. of the difference between the means of the north and south areas is \$.0170. This value is significant beyond the 80 percent level; t is equal to 1.27.

⁴See footnotes 4, 5, 6, and 7 of Table 5 for explanation.

tional influence of the new facility on land values to the north than would the all sales north versus south comparison. Actually, the wide variation in the quality of improvements is reduced considerably by analyzing this area alone. The results of the Zone 4 analysis do show an additional highway influence on land values to the north for both unimproved and improved lots. Table 8 shows that the additional highway influence amounted to \$.0127 per square foot on unimproved lots. This is

quite different from the results obtained in Table 5. Table 9 shows an additional highway influence amounting to \$.0533 per square foot on improved lots in Zone 4. This is a more conservative figure than that observed in Table 6 which contains all zones.

Thus, the conclusion is that property values, acreage, and subdivided land did receive a positive influence from construction of the new highway. Land to the north of old U. S. 80 was influenced more than land to the south.

Table 9
PRICES OF IMPROVED SUBDIVIDED LOTS OF SAMPLE AREA FOUR, IN THE MERKEL STUDY AREA, IN
CONSTANT DOLLARS (1947-49=100)

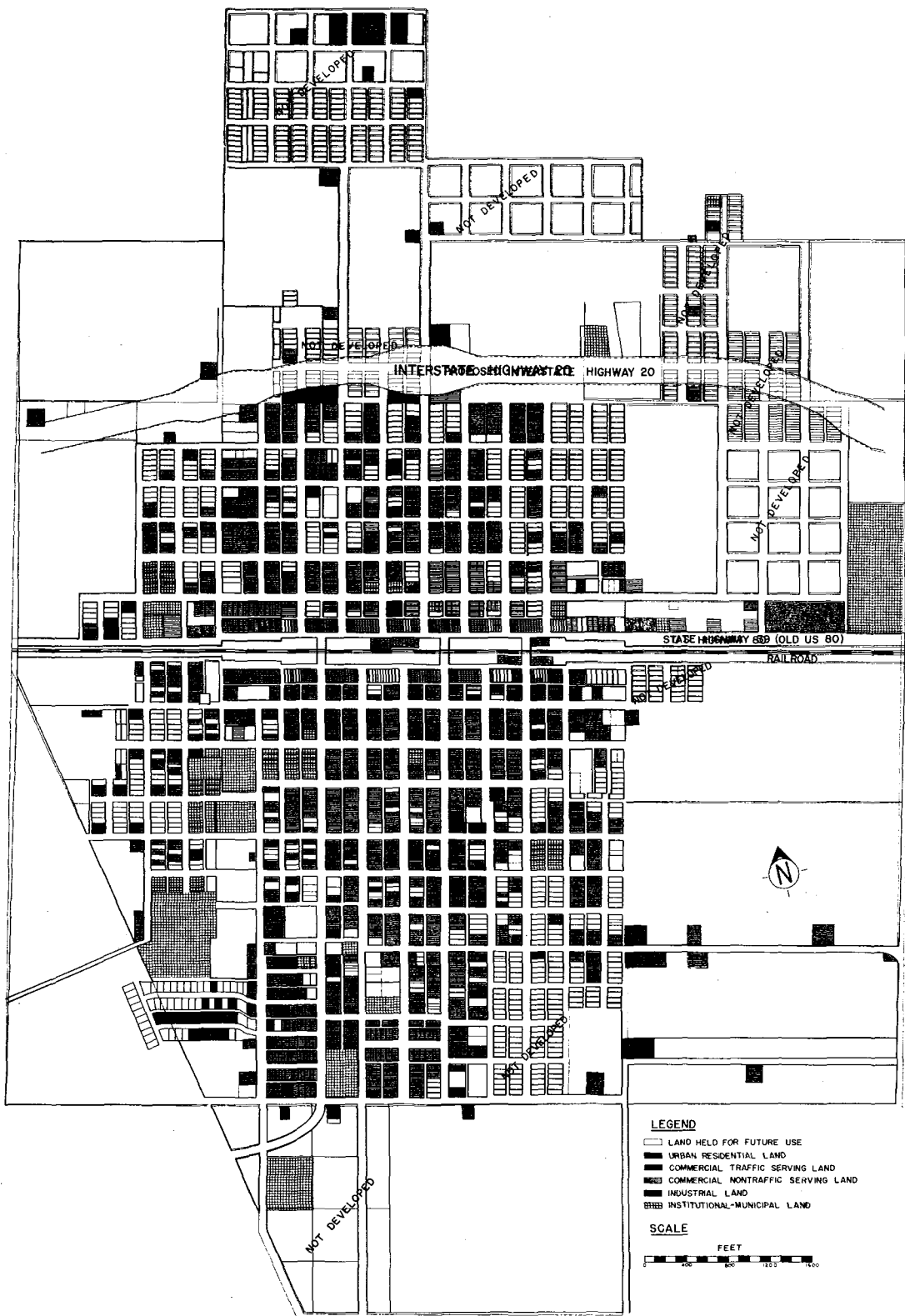
Period	Price per Square Foot ¹		Difference Between Areas	Percent of North Area's Before Period Price
	North	South		
Before Period (1950-55)	\$.2250 (59)	\$.2550 (28)	\$.0300 ²	
Construction Period (1956-58)	.2780 (33)	.3604 (24)	.0824	
After Period (1959-62)	.2259 (21)	.1995 (19)	.0264 ³	
Increase Between Periods Before and Construction				
Dollars	\$+.0530	\$+.1054	\$-.0524	-23.3%
Percent	+23.6%	+41.3%	-17.7%	
Construction and After				
Dollars	\$-.0521	\$-.1609	\$.1088	
Percent	-18.7%	-44.6%	+25.9%	
Before and After				
Dollars	\$+.0009	\$-.0555	\$.0564	25.1%
Percent	+0.4%	-21.8%	+22.2%	
Probable Highway Influence ⁴				
Percent	23.7%			
Dollars	\$.0533			

¹Number of transactions is shown in parentheses.

²The S.E. of the difference between the means is \$.0411. This value is significant beyond the 54 percent level; t is equal to .73.

³The S.E. of the difference between the means is \$.0530. This value is significant beyond the 38 percent level; t is equal to .50.

⁴See Footnotes 4, 5, 6, and 7 of Table 5 for an explanation.



OVERLAY MAP OF BIRMINGHAM SHOWING LAND USE CHANGES BETWEEN 1955 BEFORE AND AFTER CONSTRUCTION OF I.H. 20
 FIGURE 33B



Changes In Land Use

Changes in land use within the study area of Merkel were determined before and after the new highway bypass was constructed. As mentioned earlier, 1955 was the last year before construction of the facility, and 1962 was the last year of study after construction of the new facility.

Land Use as of 1955

Land use as of 1955 is shown by Figure 3A. It indicates that most of the land within the study area was platted into subdivisions. This land is coded as urban residential property. However, several large areas plat-

ted before 1931 and located on the outer fringes of the city have never been developed with streets and utilities. Also, many vacant lots are sprinkled throughout the city. These are identified on the before land use map and coded as land held for future use.

The non-subdivided land in the study area was either improved with a residence, in no productive use, or being cultivated for agricultural purposes. This land is coded as residential or land held for future use.

Almost all the commercial development is clustered together on properties abutting or just north of the old

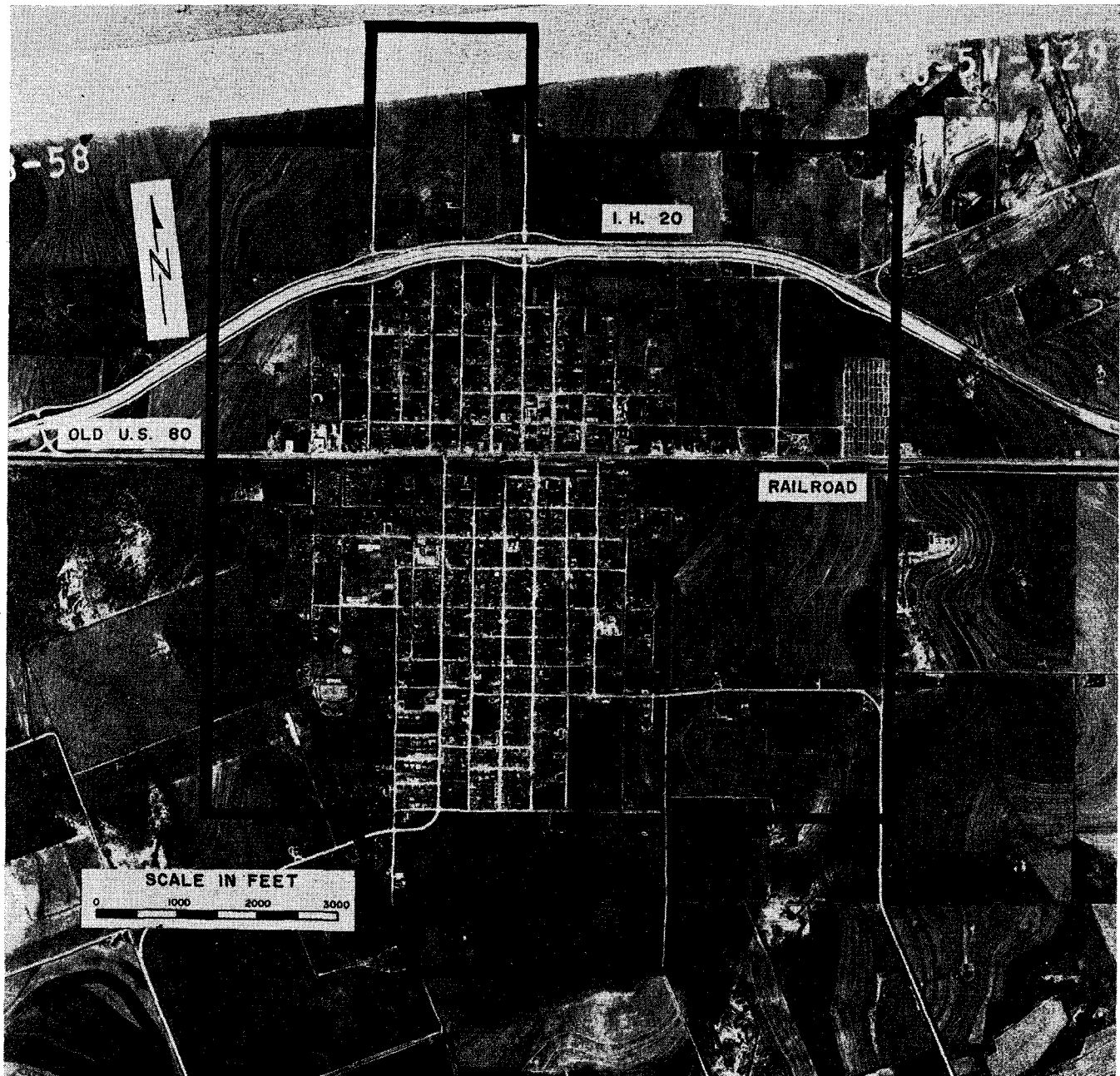


Figure 4. An aerial photograph of Merkel taken in 1958.



Figure 5. An aerial photograph of Merkel taken in 1965.

highway in Zone 1. This property is coded either commercial traffic serving or commercial nontraffic serving.

One cotton gin and two grain elevators make up the land area coded in industrial use in the city. The grain elevators are located along the railroad and old highway. The cotton gin is on the north side of the old highway.

Figure 4, an aerial photograph of Merkel taken in 1958, shows the location of the new highway and other new improvements at that time. The new highway was almost completed by then. The photograph also shows the outlying areas within the study area. These were under cultivation at that time.

The schools and hospital are located south of the railroad and old route. They are near the old residential section and are designated as being in institutional land use.

In 1955, the few new homes that existed were located near the southern fringes of the city, or in Zone 2. The better quality older homes were south of the old route, and in the central core area or Zone 3. The low quality homes were either on the west or east side of the core area, or Zone 4, and extending north and south of the old route.

Between 1950 and 1955, one new subdivision was platted in Zone 2. From a building space standpoint there was little absolute need for such since many vacant lots were available for residential construction. It was the first new area developed in Merkel since World War II and appealed to those desiring to build in an area free of old or lower quality residences.

Land Use Changes during 1956-62 Period

Figure 3B shows only the changes in land use which took place after 1955; that is, during the construction and after periods. This is a seven year period, including four years after construction of the by-pass facility.

During the 1956-62 period, some fairly significant land use changes occurred, especially for a small town such as Merkel. Most of the land changing use was abutting the new by-pass, involving commercial development, or in the southwestern end of the city, involving residential development. This can be clearly seen on Figure 3B. Also, Figure 5, a 1965 aerial photograph, shows these improvements.

Commercial development occurred in three quadrants of the northern interchange of Kent Street (only street crossing IH 20) and IH 20. This is the only

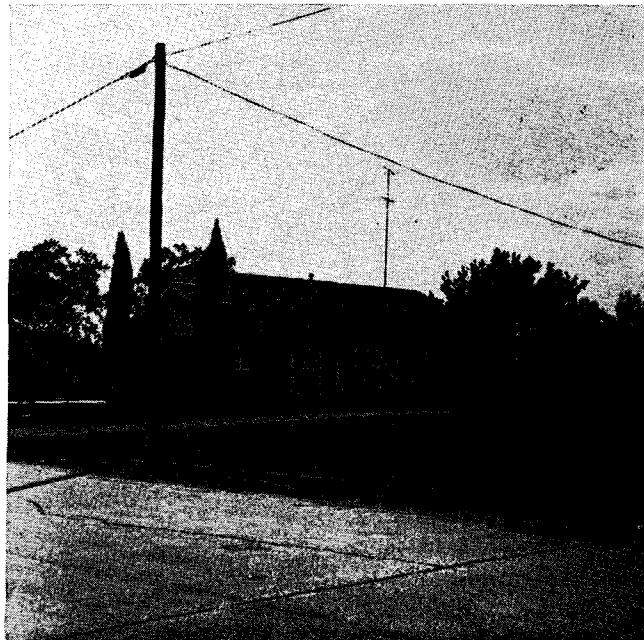
interchange in the city limits of Merkel. The three resulting commercial tracts were formerly vacant lots in a sparsely settled residential area. Further to the west along the by-pass, several vacant lots were assembled into another commercial tract, housing two businesses. Also, a commercial business was located on a residential lot abutting Kent Street. Last, two other commercial businesses were located on residential lots north and south of old U. S. 80.

Near the new facility, one and one-half city blocks of vacant lots were improved with government apartments for low income families. In the southwestern end of town, two new subdivisions were platted, one fully

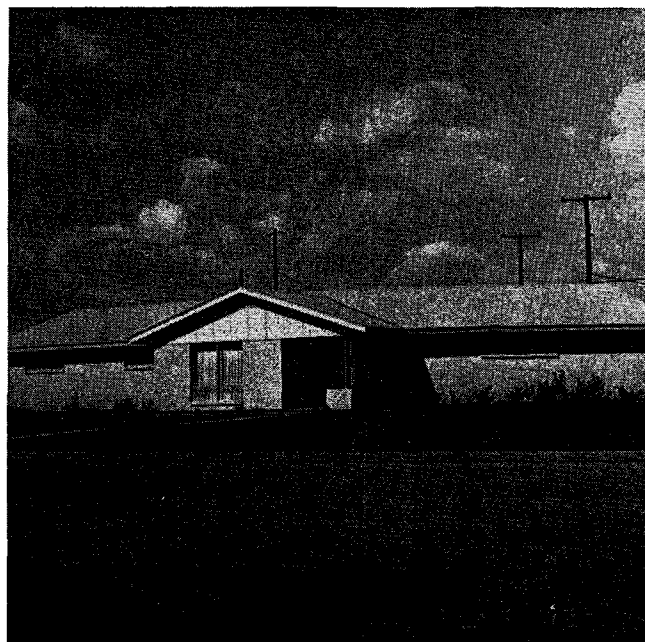
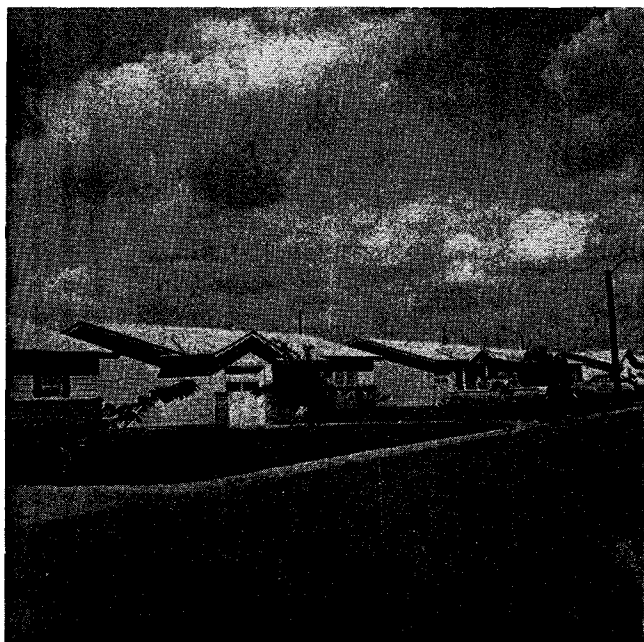
developed with streets and utilities. By the end of the study period, about half of the lots in the fully developed subdivision were improved with brick homes. Several new homes were constructed on vacant lots scattered through the old residential section and on acreage tracts nearby.

A new addition to one of the grain elevators was constructed on nearby property. This is the only change involving industrial land use.

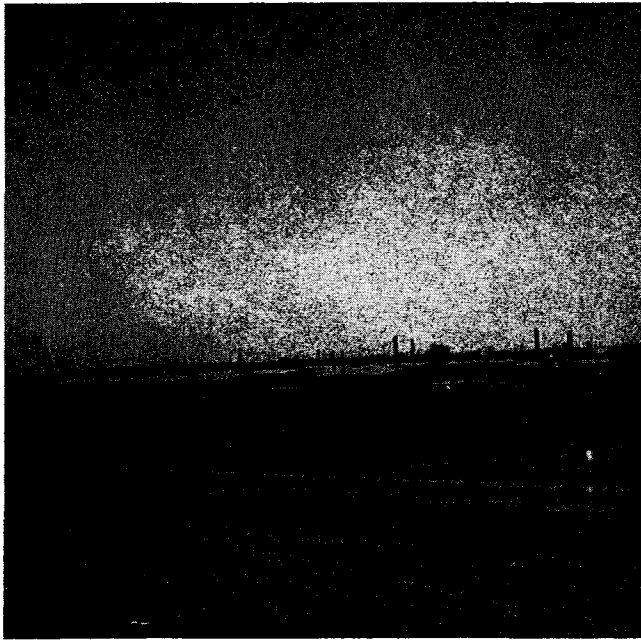
Many of the 1956-62 land use changes can be attributed to construction of the by-pass route which apparently stimulated new commercial, residential, and industrial construction even along the old route.



Homes existing in old section of city before highway construction



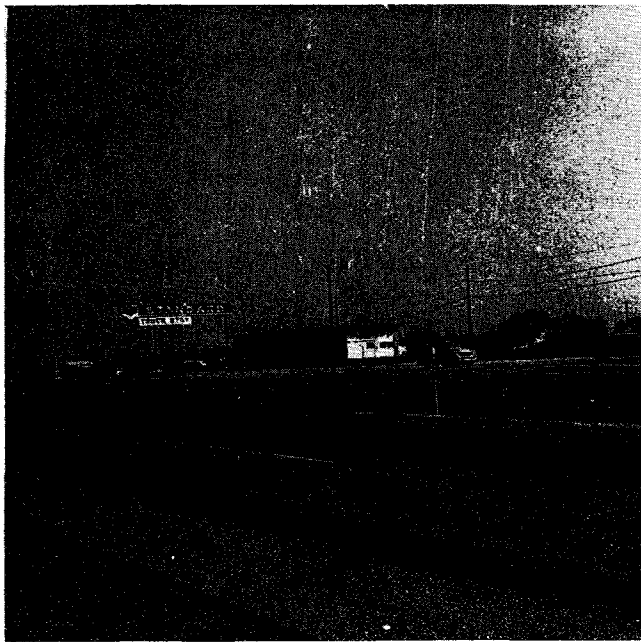
Homes built in new section of city after highway construction



Government Housing Project



Restaurant



Service Station



Office Building

Land along the new highway bypass has been developed into higher uses

Business Activity

To fulfill the major objective of determining the economic effect of the by-pass facility on business activity in Merkel, a survey was made of the retail businesses in 1959 and again in 1963. All businesses within the whole city were studied to determine the over all change in business activity. Businesses not located on either route (old U. S. 80 or IH 20) were considered as controls for those on a route.

Changes in average daily traffic volumes on the old and new routes were observed, because some businesses are affected, to some extent, by such changes. Traffic counts taken before and immediately after opening of the by-pass indicate that the average daily volume on the old route declined 66 percent on the east side and 82 percent on the west side of Merkel. From the initial drop, traffic volume on the old and new routes increased by 20.5 percent and 17.3 percent respectively between 1959 and 1962. Between 1958 and 1962, the overall traffic volume (both routes) has increased about 22 percent. (See table in appendix.)

Table 10 shows the number of various types of businesses existing in 1959 and 1963. A total of 61 businesses was involved in the study. Data collected from these businesses are further separated on the basis of their location (old route, new route, or neither route). Businesses were also classified into two major groups based on the extent of dependency on traffic for sales. Within each of these groups, specific types of businesses are isolated.

Gross dollar sales for 1956, 1957, 1958 and 1962 were collected from each retail business. Only four refused to divulge this information and it is believed that the data produced give highly accurate answers concerning the effect of the by-pass on gross sales. Although 1956 and 1957 gross sales were collected and compared with 1958 data, the formal analysis used only 1958 and 1962 data to establish before and after gross dollar changes.

Changes in Gross Dollar Sales

Service stations, food service establishments, and motels were considered the traffic serving businesses in Merkel. There were 25 of these involved in the study: 15 service stations, six food service establishments, and four motels. For the numbers of these businesses located on each route, see Table 10.

TRAFFIC SERVING BUSINESSES

The changes in gross sales of traffic serving businesses by type are presented in Table 11. These sales are not adjusted to constant dollars because other data

Table 11
ACTUAL GROSS DOLLAR VOLUME OF 25 TRAFFIC SERVING BUSINESSES OPERATING IN MERKEL DURING 1958 AND/OR 1962

Type of Business	Gross Dollar Volume ¹		Change Between	
	1958	1962	1958 and	1962
	(Dollars)	(Dollars)	(Dollars)	(Percent)
15 Service Stations	\$404,162	\$626,841 ²	+\$222,679	+55.1%
6 Food Service	73,048	124,859 ³	+ 51,811	+70.9
4 Motels ⁴	16,605	5,537	- 11,068	-66.6
Total, 25 Businesses	\$493,815	\$757,237	+\$263,422	+53.3%
Average per Business ⁵	\$ 27,434	\$ 37,862		
Standard Deviation	\$ 31,637	\$ 38,145		

¹The totals in each category include gross sales for all businesses in that particular group, whether the business closed before 1962, opened after 1958, or was open both study years.

²This figure includes two new route businesses.

³This figure includes one new route business.

⁴One motel was converted to a nursing home before 1962.

⁵The averages for the 13 businesses which reported actual sales were tested by the paired t test, and found significantly different at the 99 percent level.

Table 10
TOTAL NUMBER OF MERKEL BUSINESSES IN OPERATION DURING 1958 AND/OR 1962

Type of Business	BUSINESSES							
	On Neither Route			On Old Route			On New Route	
	Open 1958 and 1962	Closed Before 1962	Opened by 1962	Open 1958 and 1962	Closed Before 1962	Opened by 1962	Open 1958 and 1962	Opened by 1962
	(Number)	(Number)	(Number)	(Number)	(Number)	(Number)	(Number)	(Number)
Traffic Serving								
Service Stations	2	0	1	5	3	2	0	2
Food Service	1	0	1	2	1	0	0	1
Motels	1	0	0	2	1	0	0	0
Total Traffic Serving	4	0	2	9	5	2	0	3
Nontraffic Serving								
Grocery Stores & Drive-ins	3	0	1	1	0	0	0	0
Automotive Sales & Repair	2	0	0	5	0	0	1	0
Service	11	0	0	1	0	1	0	0
Other Retail	10	2	1	4	1	0	0	0
Total Nontraffic Serving	26	2	2	11	1	1	1	0
Total All Businesses	30	2	4	20	6	3	1	3

Table 12
ACTUAL GROSS DOLLAR SALES OF TRAFFIC SERVING BUSINESSES ALONG THE OLD AND NEW ROUTES
VERSUS THOSE ALONG NEITHER ROUTE DURING 1958 AND/OR 1962

Businesses	Number of Businesses	Gross Dollar Volume		Change Between 1958 and 1962	
		1958	1962	Dollars	Percent
Old and New Routes					
In Operation Both Years	9	\$294,354	\$259,910	\$ - 34,444	-11.7%
In Operation Only					
During 1958	5	80,589	NA	- 80,589	NA
During 1962	5	NA	357,581	+ 357,581 ¹	NA
Total Old and New Route Businesses	19	\$374,943	\$617,491	\$ + 242,548	+ 64.7%
Neither Route					
In Operation Both Years	4	\$118,872	\$ 76,528	\$ - 42,344	- 35.6%
In Operation Only					
During 1962	2	NA	63,218	+ 63,218	NA
Total Neither Route Businesses	6	\$118,872	\$139,746	\$ + 20,874	+ 17.6%
Whole Town					
All Traffic Serving Businesses	25	\$493,815	\$757,237	\$ + 263,422	+ 53.3%

¹Figure includes sales volume of three new route businesses.

used for comparative purposes are reported in actual dollars. It includes the volumes of new, as well as old businesses. The new businesses are those which located in Merkel after 1958. Between 1958 and 1962 the gross sales of the 25 businesses increased 53.3 percent. Motels were the only group which experienced a decline in gross sales. All of these motels had substandard physical facilities.

Old and New Route—The changes in actual gross dollar sales of 19 businesses located along the old and new routes combined are presented in Table 12. The performance of those businesses in operation during both years, as well as those in operation only in 1958 or 1962, are shown. The new businesses (three on the by-pass route) account for all of the 64.7 percent increase in sales of the traffic serving group of businesses. Old businesses, as a group, experienced losses.

Neither Route—Table 12 also shows the same information for the traffic serving businesses located on neither route. Again, the volume of the new businesses more than offset losses of the old ones and accounted for all of the increase for the group.

Old and New Routes versus Neither Route—Traffic serving businesses located along the old and new routes experienced a greater increase in over all gross sales than did such businesses located on neither route. The old and new route businesses in operation both years showed a lesser decline in sales than those on off-route locations. Also, the new businesses along the routes performed better than those on neither route.

NONTRAFFIC SERVING BUSINESSES

Changes in gross sales for the 44 old and new non-traffic serving businesses in the city are presented in Table 13. Gross sales for four noncooperating businesses were estimated on the basis of the performance of like businesses between 1958 and 1962. Between the before and after years, the gross sales of all nontraffic serving businesses increased 13.1 percent. All five groups experienced an increase in sales, with the automotive sales and repair group having the greatest increase. The latter group received some highway customer trade.

Old and New Route—Actual and estimated gross sales of 14 businesses along the old and new routes com-

Table 13
ACTUAL AND ESTIMATED GROSS DOLLAR VOLUME OF 44 NONTRAFFIC SERVING BUSINESSES OPER-
ATING IN MERKEL DURING 1958 AND/OR 1962

Business	Gross Dollar Volume ¹		Change From	
	1958	1962	1958	1962
	(Dollars)	(Dollars)	(Dollars)	(Percent)
5 Grocery Stores & Drive-Ins	\$1,044,047	\$1,119,001	\$ + 74,954	+ 7.2%
8 Automotive Sales & Repair ²	1,072,207	1,315,998	+ 243,791	+ 22.7
13 Service Businesses	102,893	136,560	+ 33,667	+ 32.7
18 Other Retail Businesses	721,134	753,452	+ 32,318	+ 4.5
Total, 44 Businesses	\$2,940,281	\$3,325,011	\$ + 384,730	+ 13.1%
Average per Business ³	\$ 71,714	\$ 81,098		
Standard Deviation ³	\$ 145,831	\$ 174,371		

¹The totals in each category include gross sales for all businesses in that particular group, whether the business closed before 1962, opened after 1958, or was open both study years. Estimated sales for uncooperative businesses were based on the average percentage increase of the same type of businesses reporting actual gross sales for study years.

²Includes one new route business.

³Based on actual volume of 41 businesses. The averages for the 34 businesses which reported actual sales were tested by the paired t test and found significantly different at the 99 percent level.

Table 14
ACTUAL AND ESTIMATED GROSS DOLLAR SALES OF NONTRAFFIC SERVING BUSINESSES ALONG THE OLD AND NEW ROUTES VERSUS NEITHER ROUTE DURING 1958 AND/OR 1962

Businesses	Number of Businesses	Gross Dollar Volume		Change Between 1958 and 1962	
		1958	1962	Dollar	Percent
Old and New Routes					
In Operation Both Years Reporting 1958 and 1962 Data	11	\$1,278,917	\$1,560,304	\$ + 281,387	+ 22.0%
Reporting only 1958 Data	1	7,000	8,589 ¹	+ 1,589	+ 22.7
In Operation Only During 1958	1	5,919	NA	5,919	NA
1962	1	NA	45,240	45,240	NA
Total Old and New Route Businesses	14	\$1,291,836	\$1,614,133	\$ + 322,297	24.9%
Neither Route					
In Operation Both Years Reporting 1958 and 1962 Data	23	\$1,603,139	\$1,597,233	\$ - 5,906	- 0.4%
Reporting Only 1958 Data	1	4,105	3,645 ¹	- 460	- 11.2
Reporting Only 1962 Data	2	38,701 ¹	39,000	+ 299	+ 0.7
In Operation Only in 1958	2	2,500	NA	- 2,500	NA
In Operation Only in 1962	2	NA	71,000	+ 71,000	NA
Total, Neither Route Businesses	30	\$1,648,445	\$1,710,878	\$ + 62,433	+ 3.8%
Whole Town					
Total, All Nontraffic Serving Businesses	44	\$2,940,281	\$3,325,011	\$ + 384,730	+ 13.1%

¹Estimated. See Footnote 1 under Table 13 for an explanation.

binized increased by 24.9 percent, as shown in Table 14. Gross sales are estimated for only one business. The table shows the performance of those businesses in operation during both years and those in operation only during 1958 or 1962. The one new business obtained a volume which more than offset the loss resulting from the closed old business.

Neither Route—Table 14 also presents the same information for the 30 nontraffic serving businesses located on neither route. Again, two new businesses gained enough gross sales to overcome the losses of the old businesses and were responsible for all of the 3.8 percent increase.

Old and New Route versus Neither Route—A comparison can be made of the performance of nontraffic serving businesses located along both routes versus neither route by referring to Table 14. Businesses located off the highway routes failed to increase their gross sales as much as those on a route. Thus, those on a route account for most of the total gain in sales of the nontraffic serving group.

TRAFFIC SERVING AND NONTRAFFIC SERVING BUSINESSES

A comparison of the changes in gross sales for 25 traffic versus 44 nontraffic serving businesses is shown in Table 15. The percentage increase of former group was about four times that of the latter group. With most of the traffic serving businesses being by-passed, this was a spectacular performance for that group. Even though several marginal businesses were adversely affected by construction of the by-pass, this facility was the essential ingredient in the excellent gains of the traffic serving group. Seven of the 10 new businesses in the town were traffic serving. Also, five of the eight which closed were traffic serving businesses.

The nontraffic serving businesses, as a whole, suffered some losses in sales due to increased competition from an Abilene shopping center to the west on the new Interstate Highway 20. But, of these businesses, those abutting the old route in Merkel experienced an increase in sales nearly seven times that of those businesses not on a route, indicating the former received less adverse effects from out of town competition than the latter.

Table 15
ACTUAL AND ESTIMATED GROSS DOLLAR SALES OF RETAIL BUSINESSES LOCATED IN MERKEL DURING 1958 AND/OR 1962

Businesses	Number of Businesses	Gross Dollar Volume		Change Between 1958 and 1962	
		1958	1962	Dollars	Percent
Traffic Serving					
Old and New Route	19	\$ 374,943	\$ 617,491	\$ + 242,548	+ 64.7%
Neither Route	6	118,872	139,746	+ 20,874	+ 17.6
Total Traffic Serving	25	\$ 493,815	\$ 757,237	\$ + 263,422	+ 53.3%
Nontraffic Serving					
Old and New Routes	14	\$1,291,836	\$1,614,133 ¹	\$ + 322,297	+ 24.9%
Neither Route	30	1,648,445 ²	1,710,878 ¹	+ 62,433	+ 3.8
Total Nontraffic Serving	44	\$2,940,281	\$3,325,011	\$ + 384,730	+ 13.1%
Total All Businesses	69	\$3,434,096	\$4,082,248	\$ + 648,152	+ 18.9%

¹Gross sales estimated for one business. See Footnote 1 under Table 13 for explanation.

²Gross sales estimated for two businesses. See Footnote 1 under Table 13 for explanation.

All 69 businesses experienced an 18.9 percent increase in gross sales between 1958 and 1962: this is a gross sale increase of 4.7 percent per year.

As a whole, Merkel's businesses experienced a greater increase in gross sales than those in Abilene. According to the Bureau of Census, U. S. Department of Commerce, Abilene had a 12 percent increase between 1958-63 compared to Merkel's 19 percent (from this study) between 1958-62.

Characteristics of Merkel Businesses

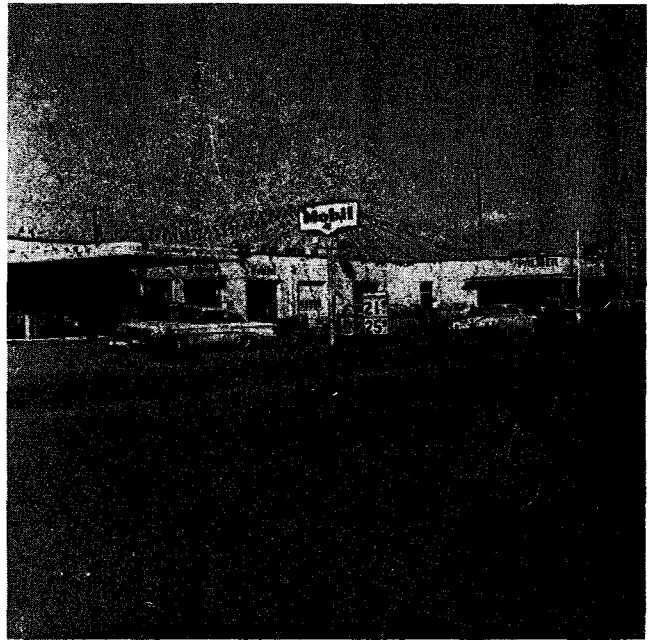
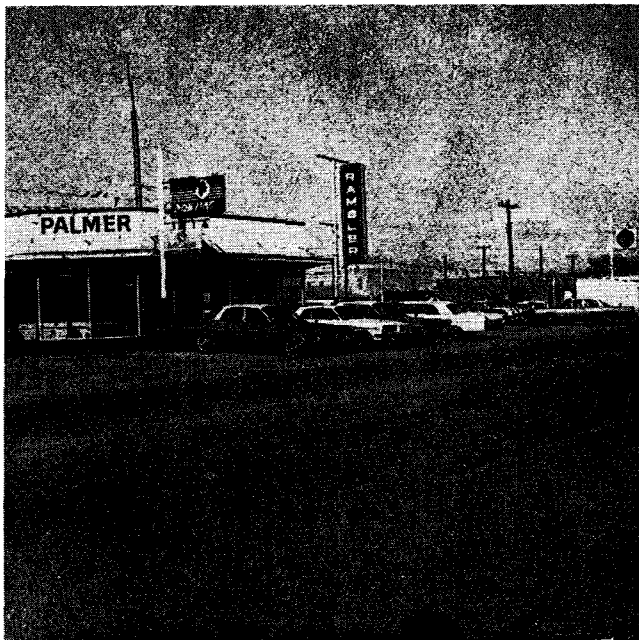
The physical and managerial characteristics of all the businesses were obtained at the time of interview.

Changes in these characteristics of each business between 1958 and 1962 were analyzed collectively to ascertain differences. Also, the characteristics of the businesses were compared to the changes in gross sales between 1958 and 1962. The Chi-square test criterion was used to test the hypothesis of independence of several "two variable" comparisons discussed in this and other sections of the report.¹

¹An explanation of the application of the Chi-square test criterion in testing the hypothesis of independence between two variables is presented in Rober G. D. Steel and James A. Torrie, *Principles and Procedures of Statistics* (New York: McGraw-Hill Book Co., Inc., 1960), pp. 366-68.



Two businesses relocated along the new bypass facility



These businesses continue to operate along the old route

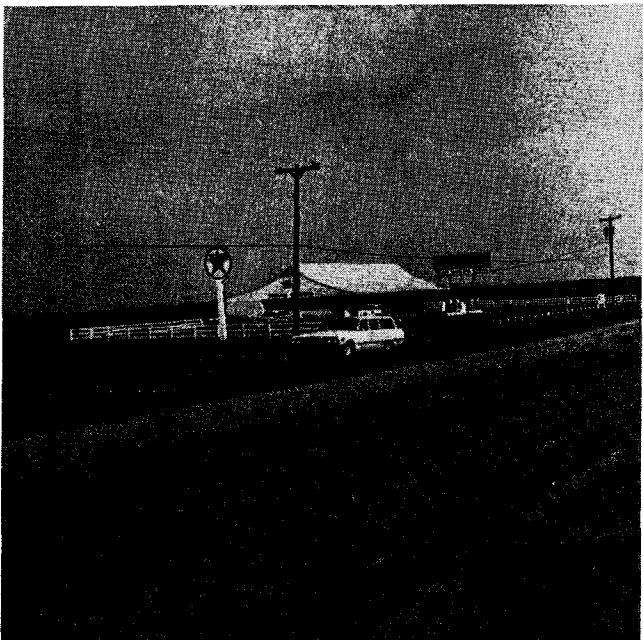
Some of the observed characteristics of each business were as follows: age, type, condition, and location of buildings; ownership of buildings; age and ownership of business; and time under present management. The first four are considered physical and the last four managerial.

CHARACTERISTICS OF BUILDINGS

Table 16 shows the physical characteristics of the Merkel businesses in 1962, except for those closing before that year (in which case 1958 data were used). The number and percent of the businesses possessing a particular characteristic are shown for old and new busi-



An addition to a grain elevator was constructed in after period



Competing new businesses were located along the new highway about one mile east of Merkel in the after period

nesses separately. In addition, the old businesses are broken down into those open in 1958 and 1962 and those closed in 1962.

At the 95 percent level of probability, the 1958 businesses were not significantly different in character from businesses which closed. But as high as the 90 percent level, site location was significantly different between the two groups. Thus, of the old businesses, those which closed tended to be in the oldest and lowest quality buildings and located on the least desirable sites—inside lots. But the physical characteristics of these businesses were quite different from the new businesses which were housed primarily in relatively new buildings of better quality construction, and located on corner lots.

CHARACTERISTICS OF OWNERSHIP AND MANAGEMENT

Table 17 shows the characteristics of ownership and management of the Merkel businesses. Although not significantly different from all the 1958 businesses, the old businesses which closed before 1962 were housed primarily in rented buildings and may have been under less efficient management. In contrast, half of the new businesses were housed in buildings owned by the operators and were under fairly efficient management. In most respects, the new businesses had an ownership and management which were at least as stable as the older businesses remaining in operation in 1958 and 1962.

CHANGES IN CHARACTERISTICS OF EXISTING OLD BUSINESSES

Table 18 shows selected changes in the physical and ownership characteristics of businesses in operation during 1958 and 1962. There was very little change in the type of buildings housing the businesses, but their condition was slightly upgraded between 1958 and 1962. Also, there was a shift from predominantly rented buildings to those owned by the management. A smaller percentage of the businesses changed ownership during the four years after construction of the by-pass than

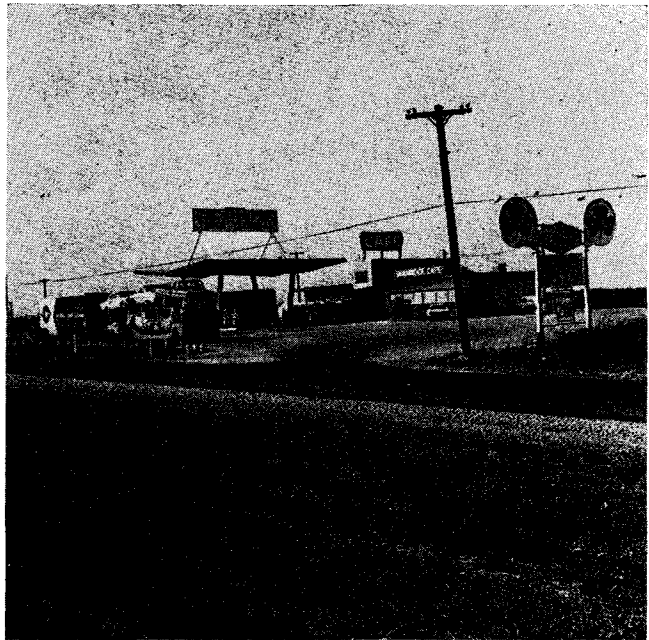


Table 16
SELECTED PHYSICAL CHARACTERISTICS OF THE BUSINESSES IN MERKEL

Characteristics	Old Businesses						New Businesses	
	Open in 1958 & 1962		Closed in 1962 ¹		Total Old Businesses		Open in 1962	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Age of Buildings in 1962								
Under 4 years	3	6%	0	0	3	5%	7	70%
4 to 8 years	3	6	0	0	3	5	0	0
8 to 12 years	5	10	1	12	6	10	1	10
12 to 16 years	4	8	0	0	4	7	0	0
16 and over	35	70	4	50	39	68	2	20
Not applicable or determined	0	0	3	38	3	5	0	0
Type of Buildings in 1962								
All Brick and Masonry	33	66	5	63	38	66	8	80
Part Brick and Masonry	6	12	1	12	7	12	1	10
Frame	8	16	2	25	10	17	1	10
Other Material	3	6	0	0	3	5	0	0
Conditions of Buildings in 1962								
Excellent	4	8	0	0	4	7	7	70
Good	19	38	2	25	21	36	2	20
Fair	19	38	4	50	23	40	1	10
Poor	8	16	2	25	10	17	0	0
Site Location in 1962								
Corner Lot	17	34	0	0	17	29	6	60
Inside Lot	33	66	8	100	41	71	4	40

¹Based on 1958 data.

during the 10 years before construction. However, the above characteristics of the two groups of businesses were not significantly different at the 95 percent level.

The new highway appears to have encouraged the local merchants to make physical improvements of their buildings in order to keep local trade.

CHANGES IN GROSS SALES RELATED TO CHARACTERISTICS OF BUSINESSES

Changes in gross sales of businesses reporting actual sales in 1958 and 1962 were compared to the physical, ownership, and management characteristics of these busi-

nesses. They were divided into two major groups—traffic and nontraffic serving businesses.

Table 19 shows the extent of the relationship existing between gross sales and physical characteristics of these businesses. For the traffic serving group, the greatest decline in gross sales generally occurred among businesses which were housed in buildings only in fair to poor condition (regardless of age and type) and at a corner site location. The latter was an unexpected occurrence. The gross sales of the nontraffic serving group declined most for those housed in lower quality structures and in poor condition. However, there are

Table 17
OWNERSHIP AND MANAGEMENT CHARACTERISTICS OF THE BUSINESSES IN MERKEL

Characteristics	Old Businesses						New Businesses	
	Open in 1958 & 1962		Closed in 1962 ¹		Total Old Businesses		Open in 1962	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Date Business Established								
1960 and After	0	0%	0	0	0	0%	7	70%
1950-59	17	35	3	37	20	35	3	30
1940-1949	18	36	3	38	21	36	0	0
1930-1939	9	18	1	13	10	17	0	0
1938 and Before	6	12	1	12	7	12	0	0
Ownership of Buildings in 1962								
Owned	29	58	3	38	32	55	5	50
Rented	21	42	5	62	26	45	5	50
Changes in Ownership of Business After Bypass Opened								
None	40	80	0	0	40	69	8	80
1	7	14	0	0	7	12	1	10
2	3	6	0	0	3	5	1	10
3	0	0	0	0	0	0	0	0
Not Determined	0	0	8	100	8	14	0	0
Time Under Present Management								
Under One Year	6	12	0	0	6	10	6	60
1 to 3	4	8	0	0	4	7	3	30
3 to 6	6	12	0	0	6	10	1	10
6 and over	34	68	0	0	34	59	0	0
Not Applicable	0	0	8	100	8	14	0	0

¹Based on 1958 data.

Table 18
**CHANGES IN CHARACTERISTICS OF 47 BUSINESSES
 IN OPERATION DURING 1958 AND 1962 WHICH
 FURNISHED GROSS SALE INFORMATION**

Characteristics	In 1958		In 1962	
	Number	Percent	Number	Percent
Type of Building				
All Brick and Masonry	25	53%	30	66%
Part Brick and Masonry	12	26	6	13
Frame	8	17	7	15
Other Material	2	4	3	6
Condition of Building				
Excellent	4	9	9	19
Good	16	34	14	30
Fair	18	38	18	38
Poor	9	19	6	13
Ownership of Building				
Owned	19	40	27	57
Rented	28	60	20	43
Changes in Ownership of Business¹				
None	35	74	38	81
1	3	7	6	13
2	1	2	3	6
3	3	7	0	0
4	2	4	0	0
5	1	2	0	0
6	1	2	0	0
7 and Over	1	2	0	0

¹1958 represents a 10-year period before by-pass was constructed, and 1962 represents a four-year period after construction of by-pass.

no significant differences between the physical characteristics of the two groups (traffic versus nontraffic) of businesses.

Table 20 shows the changes in gross sales related to the ownership and management characteristics of the two groups of businesses. The gross sales of both groups were fairly insensitive to the length of time the business was established, but they were very responsive to the other characteristics. Generally, for both groups, businesses in rented buildings which had changed ownership

at least once since the by-pass opened and that were under present management less than one year experienced the greatest decline in gross sales. However, except for time under present management, there are no significant differences between the ownership and management characteristics of the two groups of businesses.

There is a strong indication that the new highway has forced changes in ownership of buildings and businesses, management, and the quality and condition of the buildings. As a result, it appears that the Merkel businesses were in a better position to compete with the Abilene stores in 1962 than in 1958, especially businesses in new or remodeled buildings.

Changes in Hours of Operation

Changes in the total weekly hours of operation of businesses operating during 1958 and 1962 are shown in Table 21. These are presented for each type of business within the traffic and nontraffic serving groups.

Both traffic and nontraffic serving businesses, as a group, reduced their hours of operation between 1958 and 1962, but the traffic serving group reduced their's considerably more. The traffic serving group, having several businesses that experienced at least a 20 percent decrease in gross sales, made a considerable reduction in its hours of operation to bring labor and other variable costs more in line with gross sales.

Considering each of the above groups separately, there are no significant differences in hours of operation between type of business and year of operation. But for traffic versus nontraffic, there was a significant difference.

Advantages and Disadvantages of By-pass as Expressed by Owners of Businesses

Each owner of the businesses studied was asked to express his opinion concerning any advantages or disadvantages of by-passing the central business district

Table 19
**GROSS SALES RELATED TO PHYSICAL CHARACTERISTICS OF TRAFFIC AND NONTRAFFIC SERVING
 BUSINESSES REPORTING SALES IN 1958 AND 1962**

Characteristics	13 Traffic Serving		34 Nontraffic Serving	
	Number of Businesses	Percent Change In Gross Sales	Number of Businesses	Percent Change In Gross Sales
Age of Buildings in 1962				
Under 4 Years	0	0%	3	- 9%
4 to 8	0	0	2	+ 3
8 to 12	1	-49	4	-11
12 to 16	2	-37	2	+46
16 and Over	10	-16	23	+ 3
Type of Building in 1962				
All Brick and Masonry	6	-26	25	+14
Part Brick and Masonry	2	- 8	4	- 6
Frame	4	+36	3	-15
Other Materials	1	-53	2	- 8
Condition of Buildings in 1962				
Excellent	1	-25	8	- 2
Good	4	-19	10	+29
Fair	7	-34	11	+12
Poor	1	-35	5	-13
Site Location in 1962				
Corner Lot	6	-21	11	+14
Inside Lot	7	- 2	23	+ 1

Table 20
GROSS SALES RELATED TO OWNERSHIP AND MANAGEMENT CHARACTERISTICS OF TRAFFIC AND NON-TRAFFIC SERVING BUSINESSES REPORTING SALES IN 1958 AND 1962

Characteristics	13 Traffic Serving		34 Nontraffic Serving	
	Number of Businesses	Percent Change In Gross Sales	Number of Businesses	Percent Change In Gross Sales
Date Business Established				
1960 and After	0	0%	0	0%
1950-1959	2	-39	11	-2
1940-1949	5	-22	12	+31
1930-1939	4	-12	5	+4
1938 and Before	2	-28	4	-6
Ownership of Building, 1962				
Owned	7	-3	20	+14
Rented	6	-30	14	-17
Changes in Ownership of Business After By-pass Opened				
None	8	-7	30	+16
1	4	-38	2	-15
2	1	+14	2	-18
Time Under Present Management				
Under 1 year	4	-38	2	-51
1 to 3	2	-17	1	-14
3 to 6	4	-11	2	+4
6 and Over	3	+54	29	+15

Table 21
TOTAL WEEKLY HOURS OPEN OF TRAFFIC AND NONTRAFFIC SERVING BUSINESSES IN MERKEL DURING 1958 AND 1962

Type of Business	Number of Weekly Hours Open		Change Between 1958 and 1962	
	In 1958	In 1962	(Number)	(Percent)
Traffic Serving ¹	(Number)	(Number)	(Number)	(Percent)
6 Service Stations	575	431	-144	-25%
2 Food Service	205	150	-55	-27
Total 8 Businesses	780	581	-199	-26%
Nontraffic Serving				
3 Grocery	157	158	+1	+1
5 Automotive Sales & Repair	307	297	-10	-3
9 Service Businesses	549	543	-6	-1
14 Other Retail Businesses	889	872	-17	-2
Total, 31 Businesses	1,902	1,870	-32	-2%
Total, 39 Traffic and Nontraffic Serving Businesses	2,682	2,451	-231	-9%

¹Since the motels theoretically remained open on a 24-hour basis, they were excluded from this table.

Table 22
ADVANTAGES AND DISADVANTAGES OF THE IH20 BY-PASS AS REFLECTED BY THE OWNERS OF STUDY AREA BUSINESSES

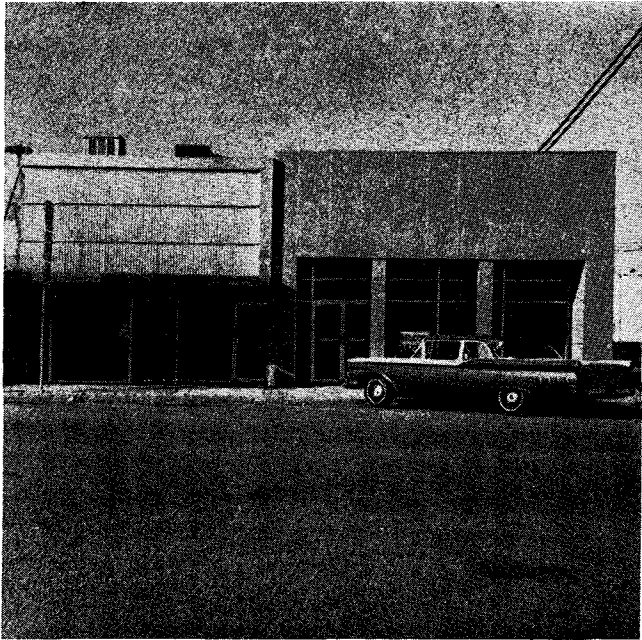
Item	Traffic Serving Businesses	Nontraffic Serving Businesses	Total, All Businesses
	(Number)	(Number)	(Number)
Advantages of By-pass			
Safer to Drive Downtown	15	25	40
Less Traffic Congestion	7	26	33
Safer for Children	8	9	17
Increase of Within-Town Business	3	10	13
Less Noise	3	6	9
Easier to Park		5	5
Creates New Business	1	3	4
Increase of New Route Property Values		1	1
Increase of Population		1	1
Disadvantages of By-pass			
Loss of Gross Sales by Old Route Traffic Serving Businesses	20	30	50
Loss of Gross Sales by Town Businesses as a Whole	8	9	17
Narrow Exits and Entrances	1	9	10
Old Route Property Less Valuable		3	3
Decrease in Town Population		2	2

with the new highway. Table 22 shows the opinions of traffic and nontraffic serving businesses separately, as well as combined.

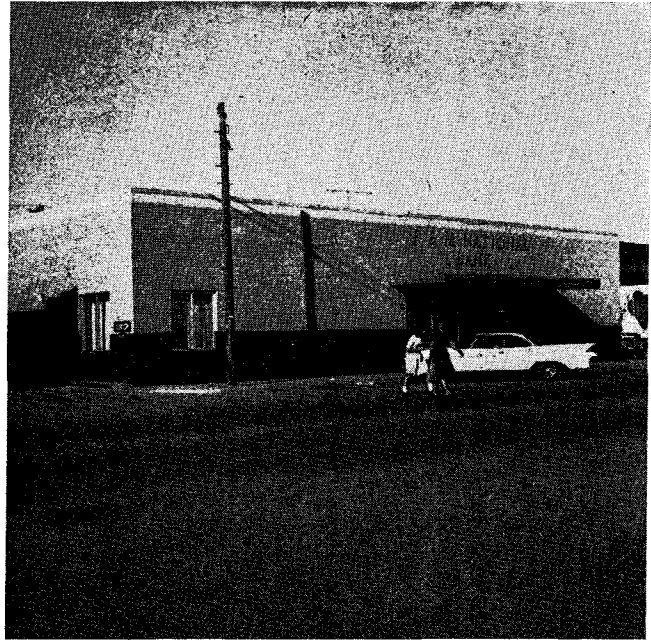
Of the advantages attributed to the by-pass, "safer to drive downtown" and "less traffic congestion" were most mentioned by both groups combined. Loss of gross sales by old route traffic serving businesses and by town businesses as a whole, in this order, were noted as the most frequent disadvantages of the by-pass. The number of advantages listed almost doubled the number of disadvantages. Surprisingly, the nontraffic serving group mentioned more disadvantages than the traffic serving

group. But there are no significant differences between the number of businesses by type and advantage or disadvantage, considered together or separately.

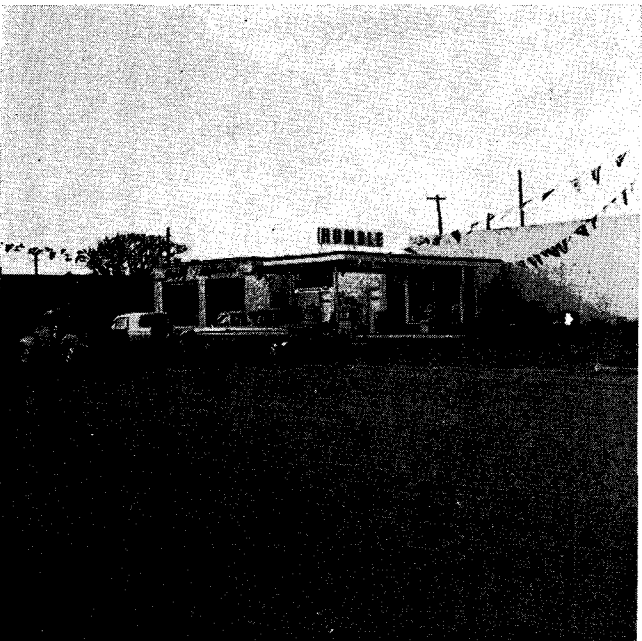
When the owners were interviewed in 1959, many were upset and very pessimistic of future prospects once the by-pass was completed. In 1963, when the same owners were interviewed, very few retained the same point of view as expressed in 1959. Several said the negative economic impact of the by-pass had not been nearly so severe on their businesses as was expected. Others were openly optimistic and expected future business to be even better.



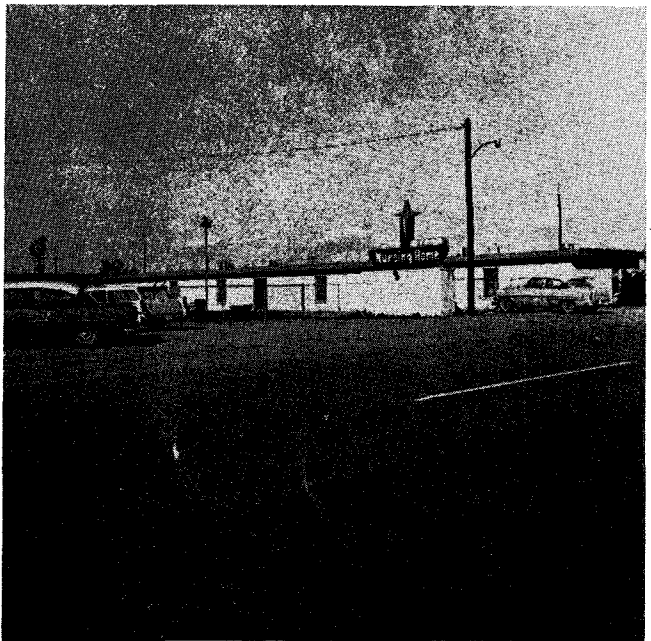
Office Building



Bank Building



Service Station



Converted Motel

New construction occurred along the old route after the new bypass facility opened

Travel Habits and Opinions of Merkel Residents

In order to determine the general impact of the new highway improvement on the travel habits of Merkel residents, a survey was made by mail questionnaire.

A total of 650 questionnaires were mailed in 1959 and 771 were mailed in 1963. From these mailings, 355 and 290 usable questionnaires were returned in 1959 and 1963, respectively. About 50.7 percent of the 1963 respondents also answered the questionnaire in 1959.

Some of the more important responses are discussed here. Additional supporting tables can be found in the Appendix. These responses have to do with relating the number of monthly household trips, by type and by commodity purchased, made on the new highway to other characteristics of the respondent.

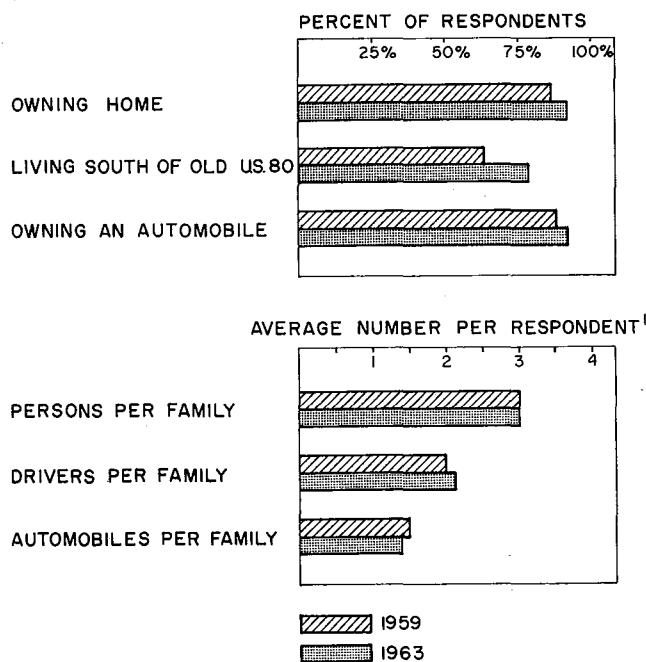
Characteristics of Respondents

Characteristics of the 1959 and 1963 respondents were compared to determine if any significant differences existed between them. Figure 6 shows that the two groups had highly similar characteristics, with no significant differences at the 95 percent level of confidence.

Characteristics of 1963 respondents which could not be compared with 1959 respondents are presented in Table 23.

Use of the New Facility

The type and extent of use of the new facility is presented primarily on the basis of the number of respondents making weekly or monthly (1963 only) trips



¹ BASED ON NUMBER OF RESPONDENTS ANSWERING QUESTIONS.

Figure 6. Selected characteristics of Merkel residents returning a completed questionnaire in 1959 and 1963.

on the new highway and the number of trips made by these respondents for various purposes or to purchase specific commodities (1963 only). Also, answers are presented to questions concerning the respondent's frequency of travel to Abilene and Sweetwater and whether a significant amount of time was saved (1963 only) after opening the new highway.

PURPOSE OF TRAVEL

During Study Week—Figure 7 shows the percent of the respondents who made the trips on the new highway for various purposes in 1963 versus 1959. Some of the trips were dual purpose. Over all, a greater percentage of the 1963 respondents made trips to shop and for other purposes than in 1959. There was a slight drop in the percentage of respondents making trips to work. For every trip type, the 1963 respondents traveled more frequently than those of 1959.

Both the number of various types of trips and number of persons making these trips were significantly different between 1959 and 1963, with the latter respondents using the new facility significantly more than the former. The immediate versus longer run response to the new highway improvement can be seen in Figure 7.

During Study Month—On the 1963 questionnaire, respondents were asked how many trips they made for various purposes during the whole study month (January). An additional type of trip (entertainment) was added which was not asked on the 1959 questionnaire.

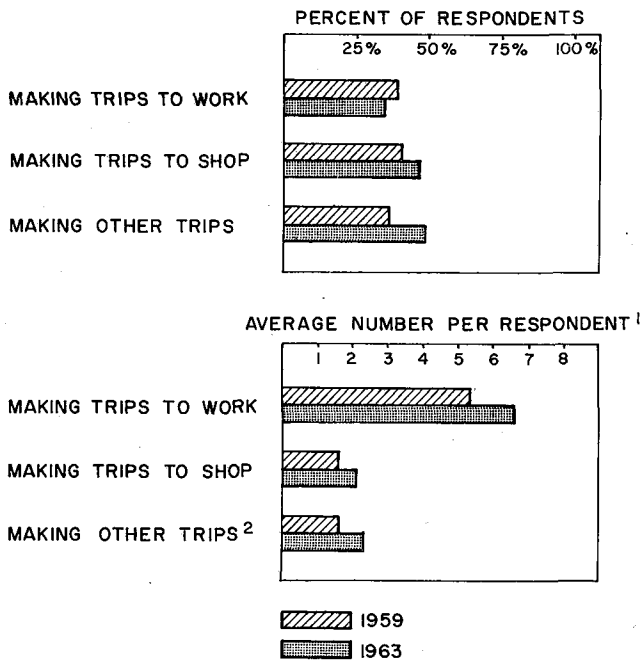
Figure 8 shows the percent of respondents who made trips on the new facility to work, to shop, for entertainment, or for other purposes. Shopping trips involved the largest percentage of respondents for the four types of trips. But, for those using the facility, the average number of trips made to work far exceeded the number made for any other purpose.

Table 24 indicates the relative importance of various commodities purchased on shopping trips, in terms of the percent of the total number of respondents making shopping trips. The highest percentage of the shopping respondents' trips was for the purpose of purchasing clothing. But the highest average number of trips made by these respondents was for building materials and for groceries.

Table 23
OTHER CHARACTERISTICS OF MERKEL RESIDENTS RETURNING A COMPLETED QUESTIONNAIRE IN 1963

Characteristics	Quantity	
	Percent of all Respondents	Average Number ¹
Age of Head of Household (years)	97.6%	55.4
Lived in Merkel (years)	99.7	23.8
Lived in Merkel in 1959	78.6	NA
Lived at Present Address (years)	95.5	14.3

¹Based on number of respondents answering questions.

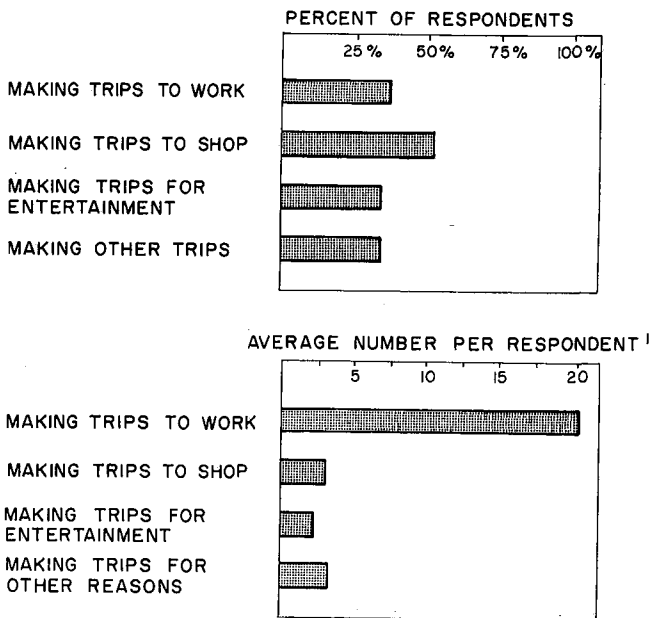


¹ BASED ON NUMBER OF RESPONDENTS ANSWERING QUESTIONS.

² OVER HALF OF THESE TRIPS WERE FOR ENTERTAINMENT IN 1963.

Figure 7. Use of new highway by Merkel residents for various purposes during the study week in 1959 versus 1963.

The above data indicate that the Merkel residents used the new facility rather extensively, especially to commute to work. Over 100, or 34 percent, of the respondents commuted to work during the study month. In terms of the total number of trips, the 1963 respondents used the new facility more for all purposes than



¹ BASED ON NUMBER OF RESPONDENTS ANSWERING QUESTIONS.

Figure 8. Use of new highway by Merkel residents for various purposes during the study month in 1963.

Table 24
USE OF THE NEW HIGHWAY BY MERKEL RESIDENTS TO PURCHASE VARIOUS COMMODITIES IN OTHER CITIES DURING THE 1963 STUDY MONTH

Items Purchased	Percent of All Respondents Making Shopping Trips	Respondent's Average Number of Shopping Trips Made
Clothing	30%	2.7
Drugs and Cosmetics	19	2.3
Groceries	14	3.3
Small Appliances and Hardware	9	1.9
Building Materials	6	3.4
Large Appliances and Furniture	4	1.8
Cars, Trucks, and Tractors	1	1.2
Others	17	3.1

the 1959 respondents. Apparently the new facility has been a factor in encouraging increased regular out of town travel to work and shop in larger communities.

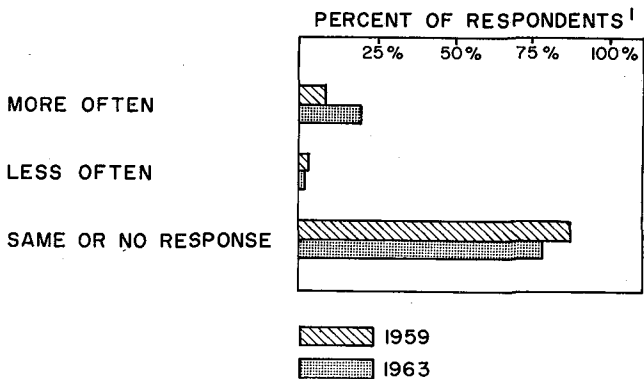
FREQUENCY OF TRAVEL TO ABILENE AND SWEETWATER

Abilene and Sweetwater are the nearest cities on either side of Merkel. All residents were asked whether members of their household traveled to these cities more, less, or the same amount after construction of the new facility. Figure 9 shows that a higher percentage of respondents made trips more often than before the new facility was opened. There is a significant difference in the number of answers of each type between the two years; again, the immediate versus longer run responses can be observed.

Much of the increased use of the new highway was travel to the above two cities. This is logical, since these communities offer jobs and good shopping facilities that can be reached safer and more quickly than before.

TRAVEL TIME SAVED

The 1963 respondents living in Merkel before the new facility opened were asked if they saved a significant



¹ THE 1963 DATA EXCLUDES RESPONDENTS NOT LIVING IN MERKEL BEFORE NEW HIGHWAY WAS OPENED.

Figure 9. Merkel residents making trips, to Abilene and Sweetwater before and after construction of IH 20, based on 1959 and 1963 data.

amount of travel time using the new highway compared to the old facility. Fifty-four percent said yes, five percent said no, and forty-two percent did not respond.

Those who answered yes to the above question were asked to explain how much time was saved on specific trips. Very few specified the round trip distances, but many estimated the amount of time saved on such trips. The results are as follows:

	NUMBER OF RESPONDENTS	PERCENT OF TOTAL
No response	95	42%
Saved no time	11	5%
Saved time, but stating no amounts	19	8%
Saved from 10 to 15 minutes	37	16%
Saved from 15 to 20 minutes	17	7%
Saved 20 or more minutes	49	22%
Totals	228	100%

A high percentage of those that signified that they saved no significant time on the new facility made comments about its safeness and convenience to the user. Several made remarks such as: "It's not a hard trip anymore to Abilene—saves wear and tear on nerves."

Respondents' Opinion of New Highway's Effect on Merkel

The residents were asked their opinions concerning the effect of the new highway and by-pass on them and their city with respect to driving conditions on the old and new facilities, general appearance of the city and property values. Only the responses from the 1963 respondents who lived in Merkel before the new facility opened were compared with the responses of the 1959 respondents.

EFFECTS OF SELECTED FACTORS

Of the selected factors asked about, Table 25 shows that a high percentage of the respondents of both years felt that the new highway and by-pass was an improvement for them and the city. The respondents indicated that the factors receiving the greatest improvement were:

traffic congestion in Merkel, convenience of driving in Merkel, safety of transit traffic and of local residents, and driving conditions on trips to Abilene or Sweetwater. Over 75 percent of the respondents checked "improved" as their answer for all of the above factors.

On the other hand, only one factor received a "made worse" answer from over 20 percent of the respondents of either year. This concerned the value of property located on the old highway. About 45 and 47 percent of the 1959 and 1963 respondents respectively, thought that the by-pass had lowered the value of such property. In contrast, a higher percent of the respondents felt that new route property values had improved.

The "improved" answers between 1959 and 1963 were not significantly different. But the "made worse" answers were significantly different. The greatest change in opinion between years involved: Ease of entering and leaving Merkel on old U. S. 80; general appearance of town; and value of other property in Merkel. In all of these, a smaller percent of the 1963 respondents answered "made worse" than did the 1959 respondents.

OVERALL EFFECTS

Residents were asked to take all factors into consideration and state whether, in their opinion, relocation of the new highway has been an advantage or disadvantage to their town. The response was as follows:

	PERCENT OF RESPONDENTS	
	1959	1963
Advantage	56%	68%
Disadvantage	31	18
Don't know or no response	13	14

A majority of the respondents, regardless of year, thought that the new facility was an overall advantage to the city of Merkel. Four years after opening the facility, a higher percent of the 1963 respondents felt that the facility was an advantage than was indicated by 1959 respondents. There was a statistically significant difference in the respondents' answers between years. The immediate response to the highway improvement was not as favorable as the longer run response.

Table 25
OPINIONS OF THE MERKEL RESIDENTS CONCERNING THE EFFECTS OF THE NEW HIGHWAY AND BY-PASS ON THEM AND THEIR CITY, 1959 VERSUS 1963¹

Factor	Percent of Respondents							
	Improved		Made Worse		No Change		No Response	
	1959	1963	1959	1963	1959	1963	1959	1963
Traffic Congestion in Merkel	82%	82%	2%	1%	7%	7%	9%	10%
Convenience of Driving in Merkel	83	78	1	1	9	11	7	11
Safety of Local Residents	76	75	3	1	12	12	8	12
Safety of Transit Traffic	81	79	3	0	5	7	12	14
Parking Conditions in Downtown Merkel	50	57	1	1	42	28	7	14
Ease of Entering or Leaving Merkel on U. S. 80	60	63	19	8	13	15	8	14
Driving Conditions on Trips to Abilene or Sweetwater	81	80	3	0	8	8	8	12
Noise Caused by Highway Traffic	70	66	3	2	16	14	11	18
General Appearance of Town	33	34	12	8	41	35	13	23
Value of Property Located on Old Highway	6	6	45	47	10	12	39	35
Value of All Other Property in Merkel	8	17	16	7	36	37	40	39
Value of Property Located on By-Pass		72		1		1		26
Possibility of Town Moving North on Either Side of New Highway		50		3		6		41

¹Includes only the 1963 respondents who lived in Merkel before the new facility was opened.

General Community Development of Merkel

There are economic changes not specifically covered in other sections of this report which are reflective of general community development in Merkel. Selected indicators are presented to show the changes in overall economic well being of Merkel between 1958 and 1962.

Figure 10 shows the year-to-year fluctuations in public school enrollment, utility connections, bank deposits, and assessed tax valuations experienced by the city between 1955 and 1963. Using the last year before the new by-pass facility was completed as a base (1958 = 100 percent), all these indicators have increased to some degree since that time. Table 26 shows the extent of absolute and relative change which occurred in each indicator between 1958 and 1962. The percent changes ranged from an increase of 2.5 to 17.5 percent.

Although the United States Census reports that the population of Merkel remained virtually the same over the last decade, it is believed that the population has increased two or three hundred persons in the last two years (1961 and 1962) of the study period. This assumption is supported by the increases in the utility connections and school enrollment.

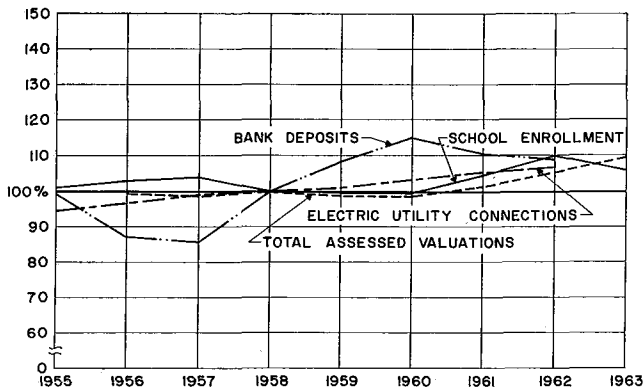


Figure 10. Changes in selected economic indicators in Merkel for 1955 through 1963 (1958=100).

The officers of the only bank in Merkel are very optimistic concerning the future of Merkel. This is reflected in their decision to construct a new modern banking facility about one year after the by-pass was constructed. Furthermore, the bank has managed to handle most of the loans for construction of business houses on the new highway.

Dyess Air Force Base, about 14 miles to the east, has affected the economy of Merkel to some extent. The school superintendent estimated that the Merkel schools enrolled about 150 children of Air Force personnel in 1960, but the number had dropped to only 50 in 1962. However, even with this fluctuation (the largest in several years) in the number of school-aged children of military personnel, the total enrollment has increased about six percent since 1960. The Chamber of Commerce estimated that from 60 to 75 families from Dyess Air Force Base were living in Merkel in 1963.

Although the city limits were not changed between 1958 and 1962, assessed tax valuations have increased due to new business construction along the new route. Additional construction, along the old route and in other parts of the city, has also increased the assessed valuations. New buildings to house a service station, automobile parts store, grain elevator, and bank are the major construction jobs occurring in the after period. Others indicated that they plan to construct buildings on the by-pass in the near future.

Bank officials claim that adverse rainfall conditions over the last two years of the study period have affected the economy of Merkel through reducing agricultural income in the area. This in turn has affected retail sales in Merkel.

Abilene, 17 miles to the east, has also had an effect on the economy of Merkel. Its population has increased from 45,570 in 1950 to 90,368 in 1960, an increase of 44,798 or 98 percent. As indicated earlier, manufacturing firms of this city have provided jobs for many Merkel residents. The Merkel Chamber of Commerce advertises the advantages of living in Merkel with only

Table 26
SELECTED ECONOMIC INDICATORS IN MERKEL BETWEEN 1958 AND 1962

Indicator	Quantity		Change In Quantity Between	
	1958	1962	1958 and 1962	
	(Number)	(Number)	(Number)	(Percent)
Enrollment in Public Schools ¹	680	720	40	5.9%
Water Connections, Residential ²	650	764	114	17.5
Electric Utility Customers ³	972	1,027	55	5.6
	(Dollars)	(Dollars)	(Dollars)	(Percent)
Value of Bank Deposits	\$3,434,297	\$3,726,340	\$292,043	8.5%
Assessed Tax Valuations ⁴				
Real Estate	2,623,290	2,793,652	170,362	6.5
Personal Property	530,270	543,330	13,060	2.5
Total	\$3,153,560	\$3,336,982	\$183,422	5.8%

¹Totals for Merkel Independent School District.

²Based on 1959 and 1963 customers.

³Includes commercial customers.

⁴No change in tax rate or evaluation since 1956.

Source: Merkel Independent School District, Merkel City Records, West Texas Utility Company, and Merchant's and Stockmen's State Bank.

a 15-minute drive to work in Abilene. No doubt, some of the Merkel retail businesses have lost sales to Abilene shopping centers, but these losses have been offset by other income sources from increased rents, taxes, and other ways.

The city of Merkel has a swimming pool, country club, nine-hole golf course, and modern school and hospital facilities. The city passed a \$400,000 bond issue in 1963 to build a larger sewage system in order

to attract industry and more effectively serve the 10,000 persons living there. This extension will more than double the capacity of the existing system.

For a small town, Merkel is showing new signs of growth. Undoubtedly part of this is due to the greatly improved highway facility connecting Merkel with Abilene and Sweetwater. Merkel has undergone a reorientation to concentrate on its new functional place in relation to the transportation facility and Abilene.

APPENDIX

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.

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

Table 27
PRICES OF UNIMPROVED AND IMPROVED ACREAGE TRACTS IN THE MERKEL STUDY AREA

Period	Unimproved Tracts			Improved Tracts		
	Number of Sales	Price Per Acre	Standard Deviation	Number of Sales	Price Per Acre	Standard Deviation
	(Number)	(Dollars)	(Dollars)	(Number)	(Dollars)	(Dollars)
Before Period (1950-55)	9	\$1,000	\$1,038	4	\$14,813	\$ 9,852
Construction Period (1956-58)	6	1,419	1,111	1	20,625	NA
After Period (1959-62)	10	1,464	1,011	7	21,364	11,191
Increase Between Periods Before and Construction						
Dollars		\$ 419			\$ 5,812	
Percent		42%			39%	
Construction and After						
Dollars		\$ 45			\$ 739	
Percent		3%			4%	
Before and After						
Dollars		\$ 464			\$ 6,551	
Percent		46%			44%	

Table 28
PRICES OF UNIMPROVED AND IMPROVED ACREAGE TRACTS, IN THE MERKEL 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)	(Number)	(Dollars)	(Dollars)	(Percent)
Unimproved					
Before Period (1950-55)	9	133.5	\$ 288	+\$ 163	+ 56.6%
Construction Period (1956-58)	6	52.7	451	+ 209	+ 46.3%
After Period (1959-62)	10	19.5	660	+ 372 ¹	+ 129.2% ¹
Improved					
Before Period (1950-55)	4	1.3	\$15,682	+\$1,481	+ 9.4%
Construction Period (1956-58)	1	0.4	17,163	- 791	- 4.6%
After Period (1959-62)	7	3.7	16,372	+ 690 ¹	+ 4.4% ¹

¹Changes between the before period (1950-55) and the after period (1959-62) for the improved and unimproved sales.

Table 29
PRICES OF UNIMPROVED AND IMPROVED SUBDIVIDED LOTS IN THE MERKEL STUDY AREA

Period	Unimproved			Improved		
	Number of Sales	Price Per Foot	Standard Deviation	Number of Sales	Price Per Foot	Standard Deviation
	(Number)	(Dollars)	(Dollars)	(Number)	(Dollars)	(Dollars)
Before Period (1950-55)	113	\$.0667	\$.0898	239	\$.5959	\$.5512
Construction Period (1956-58)	51	.0675	.0528	104	.5459	.3938
After Period (1959-62)	56	.0958	.0717	153	.7309	.4886
Increase Between Periods						
Before and Construction						
Dollars		\$.0008			-\$.0503	
Percent		1.2%			- 8.4%	
Construction and After						
Dollars		\$.0283			\$.1853	
Percent		41.9%			34.0%	
Before and After						
Dollars		\$.0291			\$.1350	
Percent		43.6%			22.7%	

Table 30
PRICES OF UNIMPROVED AND IMPROVED SUBDIVIDED LOTS, IN THE MERKEL STUDY AREA, WEIGHTED BY AREA SOLD IN CONSTANT DOLLARS (1947-49=100)

Study Period	Number of Sales	Number of Square Feet	Adjusted Price Per Square Foot	Price Changes Between Periods	
				(Dollars)	(Percent)
	(Number)	(Number)	(Dollars)	(Dollars)	(Percent)
<u>Unimproved</u>					
Before Period (1950-55)	113	1,372,631	\$0.0470	+\$0.0069	+14.7%
Construction Period (1956-58)	51	937,250	0.0539	+ 0.0179	+33.2%
After Period (1959-62)	56	1,190,725	0.0718	+ 0.0248 ¹	+52.8% ¹
<u>Improved</u>					
Before Period (1950-55)	239	2,715,079	\$0.4197	-\$0.0086	- 2.0%
Construction Period (1956-58)	104	1,026,343	0.4111	+ 0.0637	+15.5%
After Period (1959-62)	153	1,617,908	0.4748	+ 0.051 ¹	+13.1% ¹

¹Changes between the before period (1950-55) and the after period (1959-62) for the improved and unimproved sales.

Table 31
PRICES OF UNIMPROVED ACREAGE TRACTS LOCATED NORTH AND SOUTH OF OLD U. S. HIGHWAY 80 IN THE MERKEL STUDY AREA

Study Period	Price Per Acre ¹		Difference Between Areas
	North	South	
Before Period (1950-55)	\$1000(9) ²	\$1000(9)	\$0000 ³
Construction Period (1956-58)	481(1)	1607(5)	1126
After Period (1959-62)	2182(3)	1156(7)	1026 ⁴
Increase Between Periods			
Before and Construction			
Dollars	-\$ 519	+\$ 607	-\$1126
Percent	- 51.9%	+ 60.7%	- 112.6%
Construction and After			
Dollars	+\$1701	-\$ 451	+\$2152
Percent	+ 353.6%	- 28.1%	+ 381.7%
Before and After			
Dollars	+ 1182	+\$ 156	+\$1026
Percent	+ 118.2%	+ 15.6%	+ 102.6%
Probable Highway Influence ⁵			
Percent	102.6%		
Dollars	\$1026		

¹Number of transactions are shown in parentheses.

²There were no sales in the before period (1950-55) for the north area. For purposes of comparison, the north area was assumed to have the same data as the south area in the before period.

³In this instance there is no difference between the means of the north and south area.

⁴The S.E. of the difference between the means of the north and south area is \$543. This value is significant beyond the 98 percent level; t is equal to 2.74.

⁵See Footnote 5 of Table 4 for an explanation of these measurements.

Table 32

PRICES OF UNIMPROVED ACREAGE TRACTS LOCATED NORTH AND SOUTH OF OLD U. S. HIGHWAY 80 IN THE MERKEL STUDY AREA, WEIGHTED BY AREA SOLD IN CONSTANT DOLLARS (1947-49=100)

Period	Number of Sales	Number of Acres	Adjusted Price/Acre	Price Changes Between Periods	
	(Number)	(Number)	(Dollars)	(Dollars)	(Percent)
				<u>North</u>	
Before Period (1950-55) ¹	9	133.5	\$ 288	\$126	44%
Construction Period (1956-58)	1	2.6	414	771	186%
After Period (1959-62)	3	3.3	1185	897	311% ²
				<u>South</u>	
Before Period (1950-55)	9	133.5	\$ 288	\$165	57%
Construction Period (1956-58)	5	50.1	453	100	22%
After Period (1959-62)	7	16.2	553	265 ¹	92% ²

¹In absence of before period sales to the north, the before period sales to the south are used as a base for measurements.

²Changes in the before period (1950-55) and the after period (1959-62) of the north and south areas.

Table 33

PRICES OF UNIMPROVED SUBDIVIDED LOTS LOCATED NORTH AND SOUTH OF OLD U. S. HIGHWAY 80 IN THE MERKEL STUDY AREA

Study Period	Price Per Square Foot ¹		Difference Between Areas	Percent of North Before Period Price
	North	South		
Before Period (1950-55)	\$.0458(25)	\$.0727(88)	\$.0269 ²	
Construction Period (1956-58)	.0443(17)	.0791(34)	.0348	
After Period (1959-62)	.0732(19)	.1074(37)	.0342 ²	
Increase Between Periods Before and Construction				
Dollars	-\$.0015	+\$.0064	-\$.0079	-17.2%
Percent	- 3.3%	8.8%	- 12.1%	
Construction and After				
Dollars	+\$.0289	+\$.0283	\$.0006	
Percent	65.2%	35.8%	29.4%	
Before and After				
Dollars	+\$.0274	+\$.0347	-\$.0073	-15.9%
Percent	59.8%	47.7%	12.1%	
Probable Highway Influence ³				
Percent	- 3.8%			
Dollars	-\$.0017			

¹Number of transactions are shown in parentheses.

²The S.E. of the difference between the means of the north and south area is \$.0100. This value is significant beyond the 99 percent level; t is equal to 11.90.

³The S.E. of the difference between the means of the north and south area is .0130. This value is significant beyond the 99 percent level; t is equal to 9.24.

⁴See Footnotes 4, 5, 6, and 7 of Table 5 for an explanation of this type of measurement.

Table 34

PRICES OF UNIMPROVED SUBDIVIDED LOTS LOCATED NORTH AND SOUTH OF OLD U. S. HIGHWAY 80 IN THE MERKEL STUDY AREA, WEIGHTED BY AREA SOLD IN CONSTANT DOLLARS (1947-49=100)

Period	Number of Sales	Number of Square Feet	Adjusted Price Per Square Foot	Price Changes Between Periods	
	(Number)	(Number)	(Dollars)	(Dollars)	(Percent)
				North	
Before Period (1950-55)	25	344,300	\$.0421	+\$.0042	+ 10.0
Construction Period (1956-58)	17	573,100	.0463	+ .0011	+ 2.4
After Period (1959-62)	19	476,240	.0474	+ .0053 ¹	+ 12.6 ¹
				South	
Before Period (1950-55)	88	1,028,331	\$.0486	+\$.0114	+ 23.5
Construction Period (1956-58)	34	400,150	.0600	+ .0281	+ 46.8
After Period (1959-62)	37	714,485	.0881	+ .0395 ¹	+ 81.3 ¹

¹Changes between the before period (1950-55) and the after period (1959-62).

Table 35
PRICES OF UNIMPROVED SUBDIVIDED LOTS OF SAMPLE AREA FOUR IN THE MERKEL STUDY AREA

Study Period	Price Per Square Foot ¹		Difference Between Areas	Percent of North Before Period Price
	North	South		
Before Period (1950-55)	\$.0367(20)	\$.0290(16)	\$.0077 ²	
Construction Period (1956-58)	.0443(17)	.0469(7)	.0026	
After Period (1959-62)	.0713(18)	.0438(9)	.0275 ³	
Increase Between Periods Before and Construction				
Dollars	+\$.0076	+\$.0179	-\$.0103	-28.1%
Percent	+ 20.7%	+ 61.7%	- 41.0%	
Construction and After				
Dollars	+\$.0270	-\$.0031	\$.0301	
Percent	+ 60.9%	- 6.6%	67.5%	
Before and After				
Dollars	+\$.0346	+\$.0148	\$.0198	54.0%
Percent	+ 94.3%	+ 51.0%	43.3%	
Probable Highway Influence ⁴				
Percent	47.2%			
Dollars	\$.0173			

¹Number of transactions are shown in parentheses.

²The S.E. of the difference between the means of the north and south area is \$.0097. This value is significant beyond the 57 percent level; t is equal to .79.

³The S.E. of the difference between the means of the north and south area is \$.0247. This value is significant beyond the 75 percent level; t is equal to 1.11.

⁴See Footnotes 4, 5, 6, and 7 of Table 5 for an explanation of this type of measurement.

Table 36
PRICES OF UNIMPROVED SUBDIVIDED LOTS OF SAMPLE AREA FOUR IN THE MERKEL STUDY AREA, WEIGHTED BY AREA SOLD IN CONSTANT DOLLARS (1947-49 = 100)

Period	Number of Sales	Number of Square Feet	Adjusted Price Per Square Foot	Price Changes Between Periods	
				(Dollars)	(Percent)
	(Number)	(Number)	(Dollars)	(Dollars)	(Percent)
			North		
Before Period (1950-55)	20	303,100	\$.0365	+\$.0129	+35.3
Construction Period (1956-58)	17	537,100	.0494	- .0025	- 5.1
After Period (1959-62)	18	469,240	.0469	+ .0104 ¹	+28.5 ¹
			South		
Before Period (1950-55)	16	170,600	\$.0271	+\$.0072	+26.6
Construction Period (1956-58)	7	59,000	.0343	+ .0066	+19.2
After Period	9	156,000	.0409	+ .0138 ¹	+49.1 ¹

¹Changes between the before period (1950-55) and the after period (1959-62) of the north and south areas.

Table 37
PRICES OF IMPROVED SUBDIVIDED LOTS LOCATED NORTH AND SOUTH OF OLD U.S. HIGHWAY 80 IN THE MERKEL STUDY AREA

Study Period	Price Per Square Foot ¹		Difference Between Areas	Percent of North Before Period Price
	North	South		
Before Period (1950-55)	\$.3510(71)	\$.6993(168)	\$.3483 ²	
Construction Period (1956-58)	.3464(35)	.6467(69)	.3003	
After Period (1959-62)	.6074(34)	.7663(119)	.1589 ³	
Change Between Periods Before and Construction				
Dollars	-\$.0046	-\$.0526	+\$.0480	+13.7%
Percent	- 1.3%	- 7.5%	+ 6.2%	
Construction and After				
Dollars	+\$.2610	+\$.1196	+\$.1414	
Percent	+ 75.3%	+ 18.5%	+ 56.8%	
Before and After				
Dollars	+\$.2564	+\$.0670	+\$.1894	54.0%
Percent	+ 73.0%	+ 9.6%	+ 63.4%	
Probable Highway Influence ⁴				
Percent	58.7%			
Dollars	\$.2060			

¹Number of transactions are shown in parentheses.

²The S.E. of the difference between the means of the north and south area is .0450. This value is significant beyond the 99 percent level; t is equal to 54.51.

³The S.E. of the difference between the means of the north and south area is .0581. This value is significant beyond the 99 percent level; t is equal to 14.07.

⁴See Footnotes 4, 5, 6, and 7 of Table 5 for an explanation of this type of measurement.

Table 38

PRICES OF IMPROVED SUBDIVIDED LOTS LOCATED NORTH AND SOUTH OF OLD U. S. HIGHWAY 80 IN THE MERKEL STUDY AREA, WEIGHTED BY AREA SOLD IN CONSTANT DOLLARS (1947-49 = 100)

Period	Number of Sales	Number of Square Feet	Adjusted Price	Price Changes	
			Per Square Foot	Between Periods	
	(Number)	(Number)	(Dollars)	(Dollars)	(Percent)
North					
Before Period (1950-55)	71	901,230	\$.2289	-\$.0945	- 41.3
Construction Period (1956-58)	35	666,620	.1344	+ .2034	+ 151.3
After Period (1959-62)	34	377,895	.3378	+ .1089 ¹	+ 47.6 ¹
South					
Before Period (1950-55)	168	1,813,849	\$.5145	-\$.0107	- 2.1
Construction Period (1956-58)	69	659,723	.5038	+ .0127	+ 2.5
After Period (1959-62)	119	1,240,013	.5165	+ .0020 ¹	+ .4 ¹

¹Changes between the before period (1950-55) and the after period (1959-62).

Table 39

PRICES OF IMPROVED SUBDIVIDED LOTS OF SAMPLE AREA FOUR IN THE MERKEL STUDY AREA

Study Period	Price Per Square Foot ¹		Difference Between Areas	Percent of North Before Period Price
	North	South		
Before Period (1950-55)	\$.2480(59)	\$.2837(28)	\$.0357 ²	
Construction Period (1956-58)	.3328(33)	.4314(24)	.0986	
After Period (1959-62)	.2862(21)	.2532(19)	.0330 ³	
<u>Increase Between Periods</u>				
<u>Before and Construction</u>				
Dollars	+.0848	+.1477	-\$.0629	- 25.4%
Percent	+ 34.2%	+ 52.1%	- 17.9%	
<u>Construction and After</u>				
Dollars	-\$.0466	-\$.1782	+.1316	
Percent	- 14.0%	- 41.3%	+ 27.3%	
<u>Before and After</u>				
Dollars	+.0382	-\$.0305	+.0687	+ 27.7%
Percent	+ 15.4%	- 10.8%	+ 26.2%	
<u>Probable Highway Influence⁴</u>				
Percent	27.0%			
Dollars	\$.0670			

¹Number of transactions are shown in parentheses.

²The S.E. of the difference between the means of the north and south area is .0384. This value is significant beyond the 65 percent level; t is equal to .93.

³The S.E. of the difference between the means of the north and south area is .0669. This value is significant beyond the 38 percent level; t is equal to .49.

⁴See Footnotes 4, 5, 6, and 7 of Table 5 for an explanation of this type of measurement.

Table 40

PRICES OF IMPROVED SUBDIVIDED LOTS OF SAMPLE AREA FOUR IN THE MERKEL STUDY AREA, WEIGHTED BY AREA SOLD IN CONSTANT DOLLARS (1947-49 = 100)

Period	Number of Sales	Number of Square Feet	Adjusted Price	Price Changes	
			Per Square Foot	Between Periods	
	(Number)	(Number)	(Dollars)	(Dollars)	(Percent)
North					
Before Period (1950-55)	59	794,130	\$.1870	+.0578	+ 30.9
Construction Period (1956-58)	33	341,620	.2448	- .0657	- 26.8
After Period (1959-62)	21	269,900	.1791	- .0079 ¹	- 4.2 ¹
South					
Before Period (1950-55)	28	447,815	\$.1922	+.1119	+ 58.2
Construction Period (1956-58)	24	223,750	.3041	- .1468	- 48.2
After Period (1959-62)	19	244,380	.1573	- .0349 ¹	- 18.2 ¹

¹Changes between the before period (1950-55) and the after period (1959-62) of the north and south areas.

Table 41
PRICES OF UNIMPROVED AND IMPROVED SUBDIVIDED LAND IN THE FOUR SAMPLE AREAS OF THE MERKEL STUDY AREA

Sample Area	Price Per Square Foot ¹			Price Changes Between the Before and After Periods	
	Before Period (1950-55)	Construction Period (1956-58)	After Period (1959-62)	(Dollars)	(Percent)
	(Dollars)	(Dollars)	(Dollars)		
			<u>Unimproved</u>		
Area 1	\$0.1626(11)	\$0.1866 (5)	\$0.2730 (3)	+\$0.1104	+ 67.9%
Area 2	0.0567(45)	0.0788(10)	0.1136(22)	+ 0.0569	+100.4
Area 3	0.0935(21)	0.0535(12)	0.0920 (4)	- 0.0033	- 3.5
Area 4	0.0333(36)	0.0450(24)	0.0621(27)	+ 0.0288	+ 86.5
			<u>Improved</u>		
Area 1	\$1.2010(19)	\$0.9305 (6)	\$1.0631(16)	-\$0.1379	- 11.5
Area 2	0.9159(68)	0.9142(16)	1.0767(62)	+ 0.1608	+ 17.6
Area 3	0.5345(65)	0.6078(25)	0.4928(35)	- 0.0417	- 7.8
Area 4	0.2594(87)	0.3743(57)	0.2705(40)	+ 0.0111	+ 4.3

¹Number of transactions is shown in parentheses.

Table 42
PRICES OF UNIMPROVED AND IMPROVED SUBDIVIDED LOTS IN THE FOUR SAMPLE AREAS OF THE MERKEL STUDY AREA, WEIGHTED BY AREA SOLD IN CONSTANT DOLLARS (1947-49 = 100)

Sample Area	Price Per Square Foot ¹			Price Changes Between the Before and After Periods	
	Before Period (1950-55)	Construction Period (1956-58)	After Period (1959-62)	(Dollars)	(Percent)
	(Dollars)	(Dollars)	(Dollars)		
			<u>Unimproved</u>		
Area 1	\$0.1226(11)	\$0.1541 (5)	\$0.2307 (3)	+\$0.1081	+ 88.2
Area 2	0.0487(45)	0.0622(10)	0.0981(22)	+ 0.0494	+101.4
Area 3	0.0425(21)	0.0404(12)	0.0418 (4)	- 0.0007	- 1.6
Area 4	0.0331(36)	0.0479(24)	0.0454(27)	+ 0.0123	+ 37.2
			<u>Improved</u>		
Area 1	\$0.6733(19)	\$0.4964 (6)	\$0.7067(16)	+\$0.0334	+ 5.0
Area 2	0.8162(68)	0.7495(16)	0.7849(62)	- 0.0313	- 3.8
Area 3	0.4359(65)	0.5052(25)	0.3686(35)	- 0.0673	- 15.4
Area 4	0.1889(87)	0.2683(57)	0.1687(40)	- 0.0202	- 10.7

¹Number of sales per period is shown in parentheses.

Table 43
AVERAGE DAILY TRAFFIC ALONG THE OLD AND NEW ROUTES IN MERKEL, TEXAS¹ FOR THE BEFORE AND AFTER PERIOD

	Average Daily Traffic Volume ²		Changes in Average Daily Traffic From	
	1958	1962	1958	1962
	(Number)	(Number)	(Number)	(Percent)
<u>On East side</u>				
Old Route	5,670	1,940	- 3,730	- 65.8%
New Route	NA	5,690	5,690	NA
Total, Old and New Route	5,670	7,630	+ 1,960	+ 34.6%
<u>On West side</u>				
Old Route	5,010	880	- 4,130	- 82.4%
New Route	NA	5,210	+ 5,210	NA
Total, Old and New Route	5,010	6,090	+ 1,080	+ 21.6%

¹The data presented in this table supplied by the Highway Planning Survey Division of the Texas Highway Department.

²The average daily traffic volumes are based on 24 hour periods.

Table 44

A COMPARISON OF RETAIL SALES AS REFLECTED BY SIXTY-NINE MERKEL BUSINESSES VERSUS THAT REPORTED BY THE BUREAU OF CENSUS IN THE "CENSUS OF BUSINESS" FOR TAYLOR COUNTY, ABILENE, AND THE STATE OF TEXAS 1958 AND 1962

Item	Total Retail Sales		Changes From	
	1958	1962	1958 to 1962	
	(Dollars)	(Dollars)	(Dollars)	(Percent)
Merkel Businesses "Census of Business"	\$ 3,434,096	\$ 4,082,248	\$ 648,152	+18.9%
Taylor County	121,598,000	140,794,000	19,196,000	+15.8%
Abilene	114,346,000	127,987,000	13,641,000	+11.9%
Residual	7,252,000	12,807,000	5,555,000	+76.6%
State of Texas	\$10,792,559,000	\$12,715,376,000	\$1,922,817,000	+17.8%

This is a publication prepared by the Bureau of Census concerning retail sales on a state, county, and city basis. The Bureau of Census bases their statistics on income tax information for 1958 and 1962.

Table 45

TYPES OF TRIPS TAKEN ON IH 20 DURING STUDY WEEK VERSUS STUDY MONTH

	Week	Month
Work	651	2,176
Shopping	288	863
Entertainment	124	431
Other	200	632

χ^2 (2.314) is not significant at 75% probability level with three degrees of freedom.

Table 46

TYPES OF TRIPS TAKEN ON IH 20 BY LOCATION OF RESIDENCE

	North	South
Work	397	1,759
Shopping	178	683
Entertainment	51	380
Other	189	443

χ^2 (60.433) is significant at a 99% probability level with three degrees of freedom.

Table 47

TYPES OF TRIPS TAKEN ON IH 20 BY AGE GROUPS

	Age Groups						80 & Over	Age Not Reported
	Under 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80		
Work	290	279	611	387	346	215	0	37
Shopping	57	144	286	163	109	108	9	0
Entertainment	49	50	198	67	39	21	0	3
Other	26	98	262	157	40	25	0	16

χ^2 (259.371) is significant at 99% probability level with 21 degrees of freedom.

Table 48

TYPES OF TRIPS TAKEN ON IH 20 BY OCCUPATION

	Local Merchant	City or State Laborer	U. S. Govt. Employee	Farmer or Rancher	Salesman	Other	Retired	
Work	190	892	151	207	248	124	220	45
Shopping	43	330	53	123	83	28	120	83
Entertainment	34	199	17	40	50	24	52	7
Other	65	278	38	30	55	17	109	29

χ^2 (189.76) is significant at 99% probability level with 21 degrees of freedom.

Table 49

TYPES OF TRIPS TAKEN ON IH 20 BY TYPES OF RESIDENTS

	Old Resident	New Resident
Work	1,494	662
Shopping	598	263
Entertainment	327	104
Other	385	247

χ^2 (28.55) is significant at 99% probability level with three degrees of freedom.

Table 50

TYPES OF TRIPS TAKEN ON IH 20 BY TENURE

	Owner	Renter
Work	1,941	202
Shopping	800	48
Entertainment	347	64
Other	551	73

χ^2 (36.217) is significant at 99% probability level with three degrees of freedom.

Table 51

TRIPS TAKEN ON IH 20 FOR PURCHASES BY TENURE

	Owner	Renter
Clothing	135	16
Drugs & Cosmetics	135	15
Small Appliances & Hardware	52	6
Large Appliances & Furniture	23	0
Building Material	63	0
Cars, Trucks, or Tractors	4	0
Groceries	145	16
Others	169	14

χ^2 (9.538) is significant at 75% probability level with seven degrees of freedom.

Table 52

TRIPS TAKEN ON IH 20 FOR PURCHASES BY LOCATION OF RESIDENCE

	North	South
Clothing	47	228
Drugs & Cosmetics	29	121
Small Appliances & Hardware	8	51
Large Appliances & Furniture	0	21
Building Material	26	38
Cars, Trucks or Tractors	0	4
Groceries	43	121
Other	78	108

χ^2 (60.254) is significant at 99% probability level with seven degrees of freedom.

Table 53

TRIPS TAKEN ON IH 20 FOR PURCHASES BY AGE GROUPS

	Under 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	80 & Over	Age Not Reported
Clothing	18	37	109	63	22	18	4	0
Drugs & Cosmetics	12	24	64	18	9	15	5	0
Small Appliances & Hardware	8	5	62	11	0	7	0	0
Large Appliances & Furniture	0	4	5	0	0	0	0	0
Building Material	0	5	25	14	13	0	0	0
Cars, Trucks, or Tractors	0	0	0	3	0	0	0	0
Groceries	8	30	24	31	20	29	12	0
Other	14	12	51	75	17	5	0	0

χ^2 (213.259) is significant at 99% probability level with 49 degrees of freedom.

Table 54

TRIPS TAKEN ON IH 20 FOR PURCHASES BY OCCUPATION

	Local Merchant	City or State Laborer	U. S. Govt. Employee	Farmer or Rancher	Salesman	Other	Retired
Clothing	9	115	32	25	23	17	20
Drugs & Cosmetics	0	67	9	19	17	4	12
Small Appliances & Hardware	0	19	3	3	2	7	11
Large Appliances & Furniture	0	5	11	0	0	2	0
Building Material	0	25	0	0	3	6	0
Cars, Trucks, or Tractors	0	0	0	0	0	0	0
Groceries	0	63	9	38	19	5	15
Others	17	83	20	4	7	3	8

χ^2 (245.250) is significant at 99% probability level with 49 degrees of freedom.

Table 55

TRIPS TAKEN ON IH 20 FOR PURCHASES BY TYPES OF RESIDENTS

	Old Resident	New Resident
Clothing	198	77
Drugs & Cosmetics	90	60
Small Appliances & Hardware	51	9
Large Appliances & Furniture	17	4
Building Material	42	14
Cars, Trucks, or Tractors	3	2
Groceries	102	55
Other	125	62

χ^2 (19.620) is significant at 99% probability level with seven degrees of freedom.



