THE CITY OF ALPINE

Capital of the Big Bend Country

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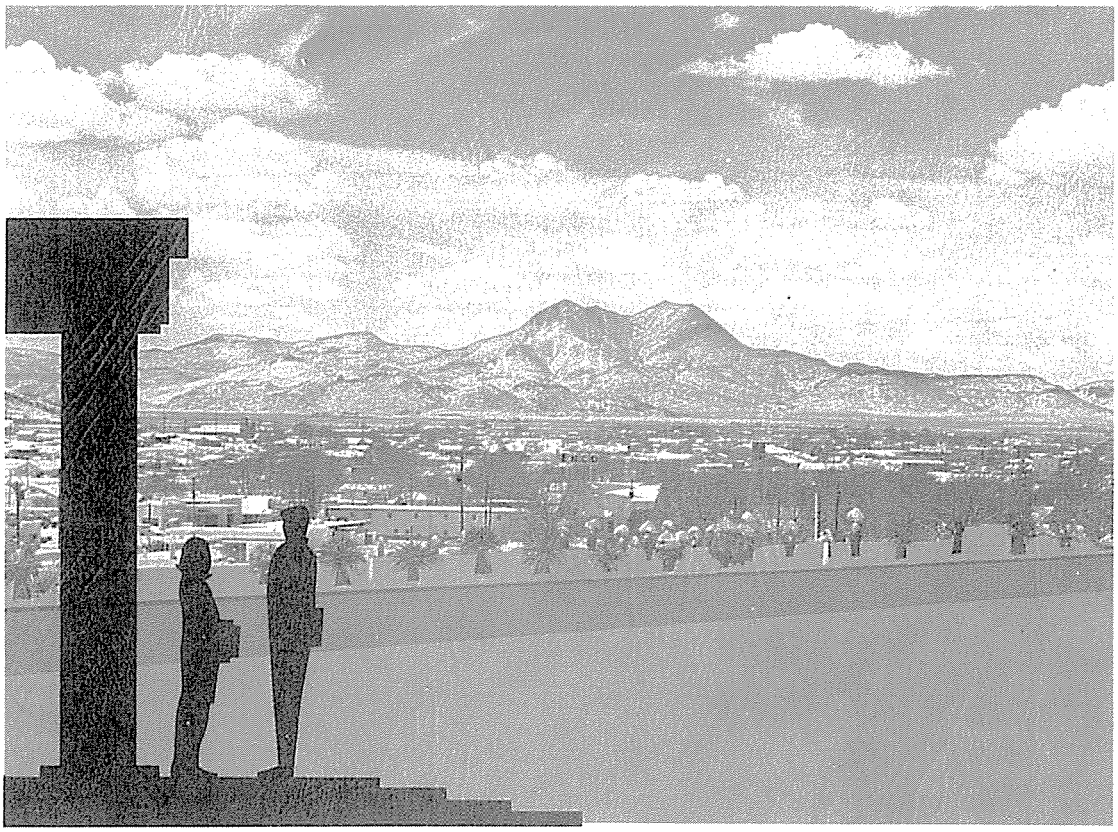

CITY SECRETARY

THE ALPINE PLAN

1966 - 1991

COMPREHENSIVE PLAN REPORT

Prepared by KENNETH E. ESMOND & ASSOCIATES ◇ CONSULTING ENGINEERS
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DRAINAGE
CITY PLANNING
PARKS & POOLS
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August 25, 1967

The Honorable Mayor and City Council
City of Alpine
Alpine, Texas

Gentlemen:

It is our pleasure to present to you this Comprehensive Plan Report, summarizing the work contained in the seven interim reports of the "Alpine Plan", which you have previously received.

This report is the culmination of more than eighteen months of intensive research, analyses, and planning activities by our staff, assisted by the members of the Alpine City Council, City employees, and your Planning Commission. A pattern of development is here presented upon which it is hoped the future Alpine may be built with order and economy. These recommendations should be periodically examined and re-evaluated in the light of constantly changing conditions and varying development trends. For this reason, the facilities proposed in the capital improvements section, and other recommendations made in the various reports, should not be considered as inflexible, but should be utilized as a general guide.

Our sincere appreciation is expressed to the governing bodies and citizens of Alpine for the invaluable assistance and cooperation given to members of our organization in the research, gathering of data, and the expression of ideas which have contributed to the development of the "Alpine Plan."

Respectfully submitted,

KENNETH E. ESMOND & ASSOCIATES
Consulting Engineers

By: Kenneth E. Esmond

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THE ALPINE PLAN

COMPREHENSIVE PLAN REPORT

A COMPREHENSIVE PLAN
for the
future development
of the

CITY OF ALPINE

BREWSTER COUNTY, TEXAS

PREPARED THROUGH THE COOPERATION OF
THE TEXAS STATE DEPARTMENT OF HEALTH

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THE ALPINE PLAN

1966 - 1991

COMPREHENSIVE PLAN REPORT

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ALPINE, TEXAS ECONOMIC SURVEY

SUMMARY AND CONCLUSIONS

Growth Potentials and Problems

The Alpine area has a number of economic advantages. The area also has problems that will tend to prevent or restrict economic growth. The more important of the local problems will be summarized here prior to a consideration of specific forecasts for individual industries and for Alpine's overall economy. Most of the conditions which are classified as problems in the following summary also were identified as problems by a significant number of the local citizens who responded in a mail survey or who were interviewed personally. However, only if independent analysis also suggested that the conditions might be genuine problems were they included in the following discussion.

In the case of Alpine-area agriculture, some of the problem conditions are basic handicaps which cannot be changed and to which local farmers and ranchers can only adjust. Other problem conditions, while correctable to a degree, tend to persist. On the other hand, some of these problems are also common in other areas and do not place agriculture in the Alpine area at any particular competitive disadvantage. The principal handicaps and other problems for the Big Bend's agricultural industry include low rainfall and rocky soils generally unsuited for large-scale dry-crop farming, the spreading of

noxious plants in grazing areas, livestock diseases, the high cost of farm land, and competition from other livestock areas. None of the agricultural problems seems to be so critical, however, as to strike a mortal blow to local agriculture within the next 25 years.

Local prospects for many types of heavy industry are limited, because of such factors as a deficiency in basic supplies of water for large industrial use; a limited local supply of available skilled workers; long distances to major markets, to most raw materials, and to large quantities of low-cost fuels; and slow transportation service to major markets and supply centers. On the other hand, there appear to be opportunities for light industries that could use comparatively low-cost unskilled or semiskilled workers.

Problems of attracting tourists, other visitors, and residents to Alpine received greater attention from local persons contacted in the study than did any other class of problems. Alpine faces a problem of competition with other locations in the Big Bend area in trying to attract tourists to the area to spend time and money in Alpine. As far as overnight lodging for the passing tourist is concerned, Alpine, with its good motels, appears to be in a favorable position. However, there seems a consensus among local citizens, an opinion which this writer shares, that there is a need for improvement of facilities in and close to Alpine in order to attract tourists and others to stay in the city longer than one or two nights.

Some of the kinds of new or improved facilities which were believed needed as of 1966 in order to attract more of such groups as tourists, new students

at Sul Ross College, and retirees were a municipal swimming pool, golf-course improvements, improved park and picnic areas, an adequate home for the local history museum, and a community-center building. Some of the uses and facilities suggested for a community center, or centers, were new chamber of commerce offices, an information center for tourists, a place for organized hobby and game activities for adults, and a public meeting room for general use. Several local businessmen also pointed out the desirability of having a nearby reservoir for recreational purposes, assuming that the construction of a reservoir would be economically feasible and that it would be sufficiently accessible to the public to be a magnet for significant numbers of visitors and newcomers. Initial steps already have been taken to provide some of the needed improvements.

Other suggestions for increasing the attractiveness of Alpine to newcomers and for increasing the city's retail business generally were to provide good low-cost housing for sale or rent to retirees coming to Alpine, to renovate the downtown business area, to beautify the city generally, and to make greater efforts to advertise and to promote the attractions of the city. Specific recommendations made in connection with the proposed renovation of downtown Alpine were to refront business establishments, to widen downtown streets, and to clean up junk piles. Some persons suggested, perhaps in the absence of downtown improvements, a need for a major shopping center.

Sul Ross State College has problems of competition with other colleges for students and for state funds and a need for additional student housing. Additional housing for students is planned, and the fund raised by the Alpine Chamber of Commerce should help Sul Ross compete with other colleges.

It seems inevitable that there will be a continuing concern in a relatively arid region such as this one over the adequacy of water for agricultural, industrial, and municipal requirements. A significant number of persons contacted in Alpine were concerned about this problem. Published records do show some fall in the underground water table, but this appears to be related to a cyclical decline in rainfall, and it may not represent a basic trend. Furthermore, the local city administration is intensely interested and active regarding the problem of municipal water supplies and has scheduled an expansion of supplies by establishing wells in new areas.

Various other public facilities and services may be in need of expansion or improvement. Some feel that vocational training programs conducted by the local public schools should be expanded and perhaps coordinated with an expanded program of advanced vocational training at Sul Ross College. Others point also to a need for public housing for low-income groups. Better water-drainage facilities are cited by others as an important need. Changes in local government regulations might be the means of achieving some civic improvements. Suggestions made by local citizens in the course of the study included a proposal for the improvement of building standards through the adoption and enforcement of a strict building code and through the establishment of minimum standards for existing buildings. However, according to information received since the survey of local citizens, such codes have now been adopted by the city of Alpine. There is everywhere the perennial problem of local government finance and the need to avoid unnecessary duplication of government operations (such as city and

county government operations) and to maintain adequate and equitable tax assessments for all citizens within the taxing jurisdictions.

Many of the suggested problems and needed improvements are not unique to the city of Alpine. Some, upon more intensive investigation, might be found to entail remedies which would create problems more serious than those being corrected. In any event, most of the problems that relate to economic activities in which Alpine has some basic advantages, such as tourism and higher education, can be remedied largely through strong, stable, and progressive civic leadership and by the persevering hard work of business and civic groups.

The Forecast Model

One of the principal objectives of this study was to forecast Alpine population 25 years into the future. The analytical framework or model used in making the forecast is the same one that has been used by the Bureau of Business Research in other similar studies over a period of several years. The theory of economic development underlying the forecast model places emphasis on the export sales of local industries and individuals. Included in the export sales category are all revenues received from outside the city, such as the sales revenue for goods sold outside the city, tourist revenues, and local expenditures by the state and federal governments. All other sales and economic activity within the city are considered to be a function of the export sales. For a small area, such as a city, it seems reasonable to expect that export sales will provide the greatest opportunities for rapid, independent changes in the demands confronting local industries. Sales

to local buyers will be limited by the size of the local market, and this market can grow only in step with the local economy. Thus, any significant growth or decline in the economy of a small area will be dominated by the changes in export sales.

An important consequence of continuing sizable gains in export sales will be the attraction of additional labor, capital, and various supplies to the area to help meet the expansion of aggregate demands. Similarly, declines in export sales will be followed be decreases in labor and capital and other inputs. Labor, for example, will be attracted away from the area in such a situation. Consequently, the size of the local population over the long run is dependent more on local employment opportunities than on local birth and death rates.

The forecast model used here makes use of employment data to express the various relationships. The export sales of local industries are measured in terms of the basic employment required to produce the export sales. All other employment is dependent and is employed in producing for local final demands or to supply the export industries. In order to avoid the costs and complications of determing the precise relationships between dependent employment and the basic employment of particular industries through the use of standard input-output analysis, a simple technique is used to approximate the dependent-basic employment ratios. The dependent employment total, which can be determined fairly accurately, is broken down, and the shares are distributed with approximate accuracy to the types of basic employment upon which they are assumed to be ultimately dependent. The distribution of the dependent workers is in

accordance with the relative size of total basic worker payrolls in each industry. Then a ratio between dependent workers and basic workers is computed for each industry. The ratios, with or without further adjustment for assumed trends in the relationships over time, are used to derive dependent employment forecasts based upon independent forecasts of basic employment by industry.

Since the principal objective of this model is to forecast total employment and, from that, total population, the approximate nature of the estimated dependent-basic ratios for the individual industries is not a serious weakness. One would expect individual errors to be partly offsetting and that forecasts of total dependent employment relative to forecasted basic employment would not be subject to any appreciable error because of the approximate manner in which the individual dependent-basic ratios were determined.

Forecasts of Employment and Population

The forecast of dependent employment in Alpine in 1991 and some of the steps involved in the forecast are shown in Table 1. This table contains a summary by industry group of the basic employment forecasts from which the forecast of dependent employment was derived. The individual forecasts of basic employment by industry group are judgment forecasts. Table 2 shows in a somewhat more revealing way the present and expected contributions of the different kinds of basic employment to total employment in Alpine. The derivation of the forecast of Alpine population based on the forecasts of basic and dependent employment is presented in Table 3.

Table 1

BASIC AND DEPENDENT EMPLOYMENT, ALPINE, 1966 AND PROJECTED TO 1991

Industry group	Total employment 1966	Basic employment[a] 1966	Basic income[b] (dollars) 1966	Percent of all basic income 1966	Dependent workers supported by basic workers[c] 1966	Ratio: dependent to basic 1966	Basic employment 1991	Ratio: dependent to basic 1991[d]	Dependent employment 1991
Agriculture	105	91	21,840	8.25	81.1	0.88	79	0.88	70
Mining	40	40	14,200	5.37	52.8	1.32	40	1.32	53
Contract construction	45	8	1,352	.51	5.0	0.63	17	0.63	11
Manufacturing	60	46	11,742	4.44	43.6	0.95	87	0.93	81
Transportation, communication, and utilities	90	37	13,957	5.27	51.8	1.40	55	1.38	76
Trade									
Wholesale	80	36	11,952	4.52	44.4	1.23	59	1.23	73
Tourist-related retail[e]	160	96	15,624	5.90	58.0	0.60	226	0.60	136
Other retail	245	52	16,316	6.16	60.6	1.17	86	1.14	98
Finance, insurance, and real estate	40	16	6,144	2.32	22.8	1.43	32	1.43	46
Services									
Lodging and recreation	60	50	8,332	3.15	31.0	0.62	117	0.62	72
Personal services	45	7	1,323	0.50	4.9	0.70	13	0.70	9
Business and repair services	50	11	2,640	1.00	9.8	0.89	20	0.89	18
Professional and related services	115	46	13,892	5.25	51.6	1.12	92	1.12	103
Private household workers	150	0	0	0.00	0.0	0.00	0	0.00	0
Government									
Federal	25	4	1,936	0.73	7.2	1.80	4	1.80	7
State	270	257	117,706	44.47	437.2	1.70	663	1.70	1,127
Local	220	20	5,700	2.16	21.2	1.06	35	1.06	37
Total	1,800	817	264,656	100.00	983.0	1.20	1,625	1.24	2,017

[a] Based mainly on proportion of industry revenues received from outside the city as determined by survey.

[b] Basic employment times industry's average monthly wages per basic employee.

[c] Total dependent (nonbasic) employment allocated according to percentage distribution in preceding column.

[d] Changes from corresponding 1966 ratios reflect no changes in the dependent-basic ratios for the components of the industry groups but changes in the relative importance of the components.

[e] Eating and drinking places and service stations.

Reflected in the basic employment forecasts is the expectation that Sul Ross College and the tourist trades and services will show both the highest percentage gains and the largest absolute increases in basic employment. These categories, through their direct increases and their effect on dependent employment, also will account for the largest increases in total employment, as is indicated by the data in Table 2.

Considering the basic employment of each industry group in the order of its listing in the accompanying tables, it is first evident that basic employment in agriculture, while one of the most important kinds of basic employment in 1966, is expected to decline both absolutely and in relative importance from 1966 to 1991. Agriculture in the area has shown declines during recent years not only in employment but also in land in farms and in farm sales. The projected decline in basic agricultural employment in Alpine represents an expected continuation of the past downward trend in total agricultural employment in the area but at a slower rate of decline than the nearly 50 percent reduction shown by agricultural employment in Brewster County from 1940 to 1966. The revival in sales of cattle and calves by area ranchers over the last 10 to 15 years indicates that stronger demands for this type of agricultural production might provide some offset to further weakness in area sheep, lamb, and wool sales and some offset also to the continuing downtrend in the ratio of agricultural workers relative to agricultural production.

Mining workers residing in Alpine are all considered to be in the basic category. The 1991 projection of mining employment at the same level as

Table 2

CONTRIBUTIONS OF DIFFERENT KINDS OF BASIC EMPLOYMENT TO TOTAL EMPLOYMENT, 1966 AND PROJECTED 1991, AND TO TOTAL CHANGE, 1966 TO 1991

Industry group of basic employment	1966		1991		Change in employment, 1966 to 1991	
	Basic and dependent employment	Percent of total	Basic and dependent employment	Percent of total	Basic and dependent employment	Percent of total change
Agriculture	172	9.6	149	4.1	- 23	- 1.2
Mining	93	5.2	93	2.6	0	0.0
Contract construction	13	0.7	28	0.8	15	0.8
Manufacturing	90	5.0	168	4.6	78	4.2
Transportation, communication, and utilities	89	4.9	131	3.6	42	2.3
Trade	347	19.3	678	18.6	331	18.0
Wholesale	80	4.4	132	3.6	52	2.8
Tourist-related retail[a]	154	8.6	362	9.9	208	11.3
Other retail	113	6.3	184	5.1	71	3.9
Finance, insurance, and real estate	39	2.2	78	2.1	39	2.1
Services	211	11.7	444	12.2	233	12.6
Lodging and recreation	81	4.5	189	5.2	108	5.9
Personal services	12	0.7	22	0.6	10	0.5
Business and repair services	21	1.2	38	1.0	17	0.9
Professional and related services	98	5.4	195	5.4	97	5.3
Private household workers	0	0.0	0	0.0	0	0.0
Government	746	41.4	1,873	51.4	1,127	61.2
Federal	11	0.6	11	0.3	0	0.0
State	694	38.6	1,790	49.1	1,096	59.5
Local	41	2.3	72	2.0	31	1.7
Total	1,800	100.0	3,642	100.0	1,842	100.0

[a]Eating and drinking places and service stations.
Note: Detail may not add to totals shown because of rounding.

estimated for 1966 represents little more than a conservative assumption in a highly unstable and speculative situation. Mining employment in Brewster County is down considerably from 25 years ago but is higher than in 1950. Although exploratory work in the county's mercury mines was under way in 1966 and there was wildcat drilling in search of oil or gas in the county, no announcement regarding firm production potentials and plans had been made, and none of the mineral companies contacted would make a definite forecast of an increase or decrease in their Brewster County employment over the next few years.

The contract-construction industry accounts for a relatively small number of basic workers in Alpine. Although the outlook for construction activity in the city is good, the growth of this activity and of local construction employment will be largely dependent on the growth of basic employment in other industries.

Total manufacturing employment in the Alpine area doubled from 1940 to 1966, with a large part of the increase occurring since 1960. A slightly slower rate of growth is forecast for basic manufacturing employment in Alpine from 1966 to 1991. This projection is based on a recognition of the area's present disadvantages for most heavy industry. However, the possibility of further increases in light industry, as exemplified by food processing, printing and publishing, apparel manufacturing, and drug manufacturing, is also recognized.

Basic employment in Alpine's transportation, communication, and utilities industries is expected to be nearly one-half again as large as its 1966 level by 1991. While this forecasted growth rate is below the approximate doubling forecast for all basic employment and total employment in Alpine over the next

25 years, it is better than the decline shown for the employment in this industry group in the county over the 1940-1966 period. As was true over the past quarter-century, communication and utilities employment trends are expected to be stronger than those for transportation employment. The modest gain projected for the latter component is expected to be led by trucking and other highway transportation employment.

Trade industry basic employment in Alpine can be expected to make a major contribution to the growth of total employment in the city over the years. Basic employment in tourist-related retail trade (eating and drinking places and service stations, primarily) should account for the greatest share of the trade industry's contribution to total growth. The specific assumptions underlying the forecast for tourist-related retail trade are discussed below in connection with the forecast for lodging and recreation services. The levels of basic employment in Alpine's wholesale and other retail trade industries are forecast to increase at rates near those shown by total county employment in these industries over the past 25 years or so, but this would represent a moderate decline in the relative contributions that wholesale and other retail trade make to the city's total employment.

Finance, insurance, and real estate employment in the area in 1966 was two and one-half times its 1940 level. Basic employment in this industry group in Alpine is forecast to double by 1991. State and national employment trends in finance, insurance, and real estate indicate strong, steady gains, and the industry forecast for Alpine is comparable to projections which have been made for the industry group in the state as a whole.

The service industries in Alpine make an important contribution to the city's total employment, largely because of the basic character of a large share of the local employment in lodging and recreation services and in professional and related services. The contribution of the service industry group to total employment is expected to increase, mainly because of the expected growth of basic employment in lodging and recreation services.

Considering Alpine's tourist-related retail trade and its lodging and recreation services together, the forecasts of basic employment in both the trade and the service categories of the local tourist industry are for increases of 135 percent from 1966 to 1991. This expected rate of growth is second only to that forecast for basic employment at Sul Ross State College. Available historical data for Brewster County show that total combined employment in eating and drinking places and in lodging and recreation services in the county rose about 100 percent from 1940 to 1966, or more slowly than the forecasted rate. Within the group, employment in eating and drinking places rose 150 percent, lodging services estimated employment rose somewhat less than 100 percent, while employment in amusement and recreation services actually declined. Employment data for gasoline service stations, another tourist-related category, are not available for this past period. However, published sales data indicate that the area's service station business has grown about in step with other tourist-related business in the area over the past quarter-century and, in fact, at a somewhat faster rate in the latest 15-year period.

Dollar sales data available for Brewster County show that tourist-related retail sales, after adjustment to exclude the effect of the rise in average retail prices, rose about 150 percent over the 24-year period from 1939 to 1963. This represents an increase of nearly 4 percent per year. In comparison, the forecasted growth of basic employment in Alpine's tourist industries is at a rate of about 3.5 percent per year.

Another important factor to consider in forecasting the number of basic workers in Alpine's tourist industries is the past and potential rates of growth in the number of tourists visiting the area. Fragmentary data on past trends in tourist numbers are available extending back for about 15 years for at least one area location, the Big Bend National Park. Tourist attendance at the park rose an average of slightly more than 6 percent per year over the 1950-1965 period. Incidentally, tourist-related retail sales in the county rose about 4.5 percent per year, valued at constant prices, during the roughly comparable period of 1948 to 1963. And, from 1950 to 1966, total county employment in eating and drinking places and in lodging and recreation services increased about 2.5 percent per year. Officials at the park expect attendance over the next several years to increase at an average rate of between 5 percent to 10 percent per year. Higher growth rates for attendance at new and improved tourist attractions in the Fort Davis area are forecast for the next few years, but this represents the normally high increase in visitors expected after the establishment of new facilities. These gains should slow after a time to around the average growth rate expected at the Big Bend Park. Based on the indicated past

relationships between growth rates for tourist-industry employment and numbers of tourists, the projected increase in basic workers in Alpine's tourist industries would appear to be consistent with the expected growth in numbers of tourists visiting in the general area.

The basic employment in Alpine industries identified as tourist industries, that is, tourist-related retail trades and lodging and recreation services, supported an estimated 13 percent of Alpine's total employment in 1966, and this category is expected to support about 15 percent of the total in 1991. The contribution to the increase in total employment during the 1966-1991 period is expected to be even greater, or 17 percent of the total increase. This makes the tourist business one of the most important contributors to the economy of Alpine now and during the next 25 years, second in importance only to Sul Ross College, according to this study. And, it is quite possible that more complete information on tourist sales by all Alpine businesses would show the impact of tourist and other visitors on the Alpine economy to be even greater than is suggested by the data presented here.

Personal services and business and repair services basic employment in Alpine will increase about 80 percent between 1966 and 1991 according to the forecasts in this study. This is a greater rate of increase than indicated for area employment in these industries during a comparable span of time in the past. Professional and related services basic employment in Alpine is forecast to double over the next 25 years. The past rate of growth in this industry appears to have been well above the high rate of gain forecast for the future. Other factors

which make the high forecast for the industry seem creditable are the importance of medical services in this group and the likelihood that these services to outsiders and newcomers will grow at a high rate as Alpine increases in importance as a medical center for the region and as a retirement center. Professional and related services are already an important contributor to the Alpine economy, and this importance is expected to be maintained.

Government, principally the Sul Ross State College, has been in the past and probably will continue to be in the future the local industry group with the greatest employment gains and the greatest impact on the Alpine economy. Federal government and local government in Alpine are expected to continue to have a relatively small direct influence on total employment in the city, although an expansion of revenues from state and federal sources to support various city government programs should cause a fairly high percentage increase in the basic employment of local government.

State government basic employment in Alpine is essentially the basic employment attributable to Sul Ross State College. As such, it is forecast to show the highest growth rate of any group of basic workers in the city, or an average rate of over 3.75 percent per year, to reach a 1991 level more than 2.5 times the 1966 level. This group is also forecast to show the largest absolute increase in number of basic workers by 1991, or an increase of more than 400 basic workers, to account for one-half the increase forecast for all basic employment in the city.

The state government basic employment forecast is based on an assumed growth in the enrollment at Sul Ross State College from about 1,800 students in the fall of 1966 to 6,000 by the fall of 1991. Such an increase would make the 1991 enrollment about 3.3 times what it was in 1966 and would correspond to an average annual increase of about 5 percent per year. This enrollment forecast may seem high in view of the low population density of the region surrounding Alpine and the competition of other colleges in West Texas for students. However, the forecast is conservative when compared with past enrollment growth at Sul Ross College and the projected increases in the number of Texas young people who will be seeking a college education in the coming years. Thus far during the 1960's, Sul Ross College enrollment has increased at an average rate of over 10 percent per year, or about double the projected 5 percent growth rate. The projected enrollment to 1991 is based partly on an extension of the lower of two projections for the college which were published by the state's planning body for higher education, the Coordinating Board of the Texas College and University System. This projection by the authorities, which was for ten years into the future, showed the enrollment at the Alpine college increasing at nearly 7 percent per year, compared with the 5 percent average growth assumed in the present study for the next 25 years. The present study's growth projection for Sul Ross enrollment allows for some decrease in the school's relative share of the total enrollment of competing West Texas colleges. It is expected that there will be an increase in the ratio of students to college staff, and the forecasted 3.75

percent per year increase in state government basic employment in Alpine is believed to be consistent with the 5 percent per year projected rise in Sul Ross enrollment.

The present and potential importance of Sul Ross State College to Alpine is shown by the fact that basic state government employment in Alpine is estimated to support nearly 40 percent of all employment in the city now and is forecast to support nearly one-half by 1991. Approximately 60 percent of the forecasted increase in total employment in the city during the next 25 years is attributed to this category of basic employment. Besides the large numbers of basic workers employed at the college, another factor accounting for the large economic impact of these state government employees is the estimated high ratio of dependent workers supported for each of the state workers. The dependent-basic worker ratio for this industrial classification, at 1.7 dependent workers per 1 basic worker, is one of the highest in Alpine and compares with an overall average dependent-basic ratio for the city of 1.2.

The forecast of the total population of Alpine is shown in Table 3 and Figure 1. The forecast of 11,000 persons living in the city by 1991 is based on the employment forecasts which have been discussed above.

Underlying assumptions which were made in calculating the projected 1991 population total from the projected employment total included the following: (1) the city's unemployment rate would show a further moderate decrease, and (2) the ratio of population to the total number of persons in the labor force would hold close to levels which have prevailed in the past. The latter assumption recognizes

Table 3

EMPLOYMENT, POPULATION, AND RELATIONSHIPS, ALPINE, SELECTED YEARS 1940-1966, AND PROJECTED TO 1991

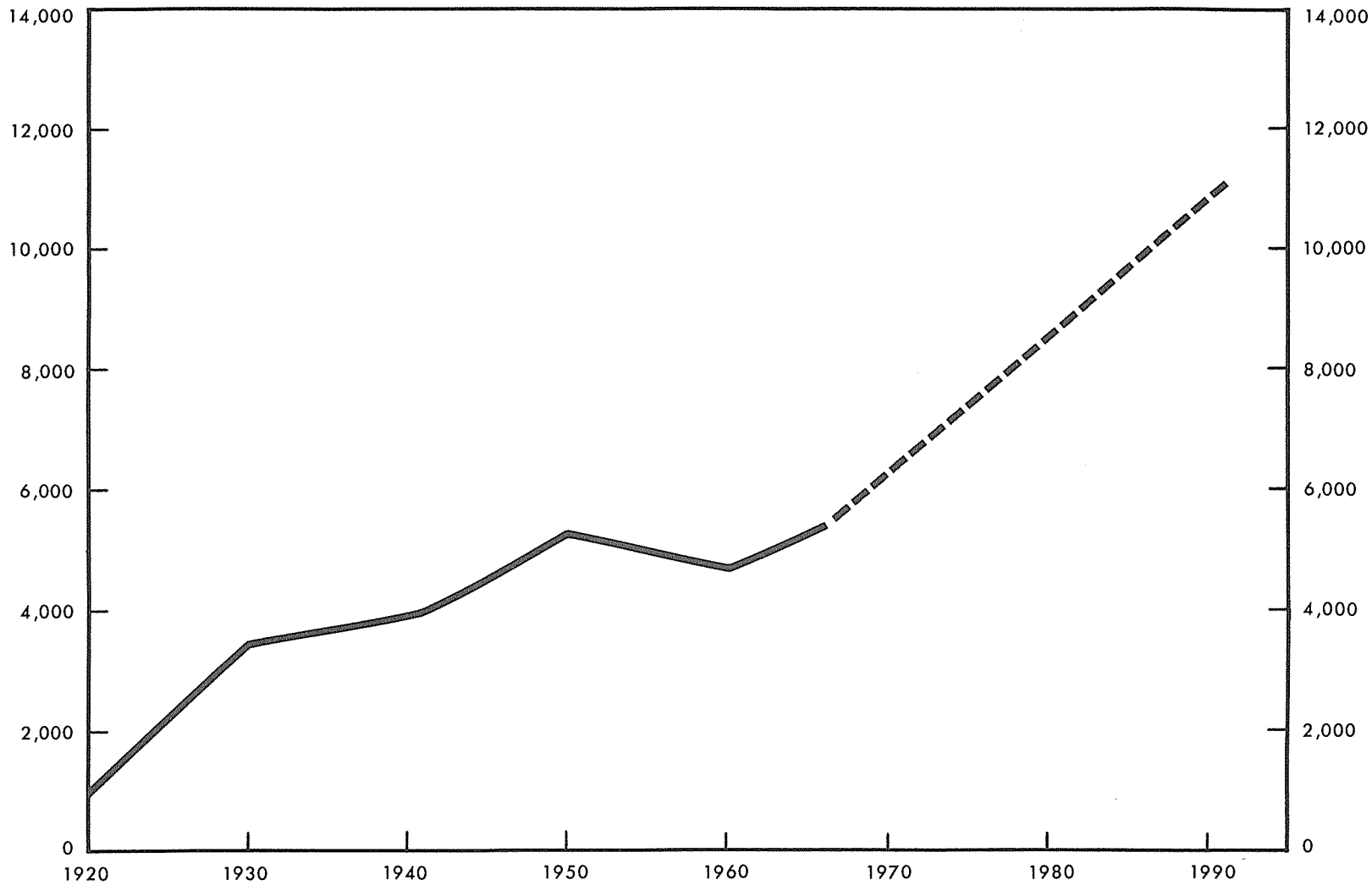
Item	1940	1950	1960	1966	1991
Basic employment	n.a.	n.a.	n.a.	817	1,625
Dependent employment	n.a.	n.a.	n.a.	983	2,017
Total employment	1,139	1,596	1,513	1,800	3,642
Unemployment percent of labor force	16.1	8.2	6.9	4.5	4.2
Unemployment	219	142	113	85	158
Labor force	1,358	1,738	1,626	1,885	3,800
Population/labor force	2.85	3.03	2.92	2.86	2.89
Population	3,866	5,261	4,740	5,400	11,000

n.a.: Not available.
Source: 1940-1960, U. S. Bureau of the Census.

the possibility of important changes which would tend to change the population-labor force ratio, but it is believed that the effects of these changes will be largely offsetting. A downtrend in average family size in Alpine is considered likely, and this would tend to reduce the population-labor force ratio. On the other hand, the expected rapid growth in Sul Ross College enrollment could tend either to increase or decrease the city's population-labor force ratio depending on whether the student population-student worker ratio is above or below the population-labor force ratio for the rest of the Alpine population. It is assumed that the effect of the growing student enrollment will be to cause some increase in the total population-labor force ratio for the city.

Figure 1

POPULATION, ALPINE
SELECTED YEARS 1920-1966 , AND PROJECTED TO 1991



Sources: Tables 1 and 32.

It should be pointed out that this study follows the practice of the U.S. Bureau of the Census in counting college students as part of the population of the town in which they live while attending college. Therefore, the total population forecast shown in Table 3 consists of student and nonstudent components. The student component of the total population is forecast to rise from about 1,400 persons in 1966 to around 5,000 in 1991. These and the other population figures are for the spring of each year, and the 5,000 student figure for the spring of 1991 would be consistent, based on normal seasonal differences and other expected influences, with the forecast presented earlier of a Sul Ross enrollment of 6,000 students by the fall of 1991. The nonstudent population of Alpine is forecast to increase from approximately 4,000 in 1966 to around 6,000 in 1991.

The forecasted growth in total Alpine population from 5,400 in 1966 to 11,000 in 1991 represents an increase of more than 100 percent in the 25-year period. This projected growth rate exceeds by significant margins both the past growth of the city (the 40 percent increase from 1940 to 1966, for example) and projected growth rates for both the state and the nation. Extensions to 1991 of medium-range population projections made by the U.S. Bureau of the Census for selected years up to 1985 indicate probable population increases of around 50 percent over the 1966-1991 period for both Texas and the nation. However, the expected growth of Alpine's nonstudent population at a rate of approximately 50 percent over the next 25 years is in line with the average rate expected for the nation as a whole.

The fact that a large share of the projected population increase for Alpine is expected to be made up of students should not lead one to the conclusion that the projected total population gain is a great deal less significant economically than it would be otherwise. The students bring in new income and provide additional markets for Alpine businesses. At the same time, the students who are in the local work force also add to the production and income potential of the community. Total employment in the city, a measure of local economic activity, is still forecast to increase by more than 100 percent from 1966 to 1991.

The forecasted Alpine population growth to 1991 is charted in Figure 1 as a straight line on an arithmetic scale, rather than on a ratio or logarithmic scale, to reflect the assumption that during the next 25 years the city's population will more likely increase each year by a given number of persons (about 224 per year) than by a constant percentage. Or, put another way, it is expected that the annual percentage rate of population growth in Alpine will tend to decrease over the coming 25 years. This expectation is based largely on projected decreases over the years in the annual rates of gain for such important economic variables as Sul Ross College enrollment and the numbers of tourists visiting the region.

Prospects for the growth of Alpine's employment and population appear to be very good in comparison with past local trends and the prospects for future state and national growth. The forecasts in this study are believed to reflect a prudent and conservative appraisal of the area's economic potential. In fact, these forecasts might be regarded as representing a lower range of Alpine's

growth possibilities if state and federal government policies continue in the future, as they have in the past, to support Sul Ross State College and the development of parks and other tourist attractions in the area.

LAND USE AND NEIGHBORHOOD ANALYSIS

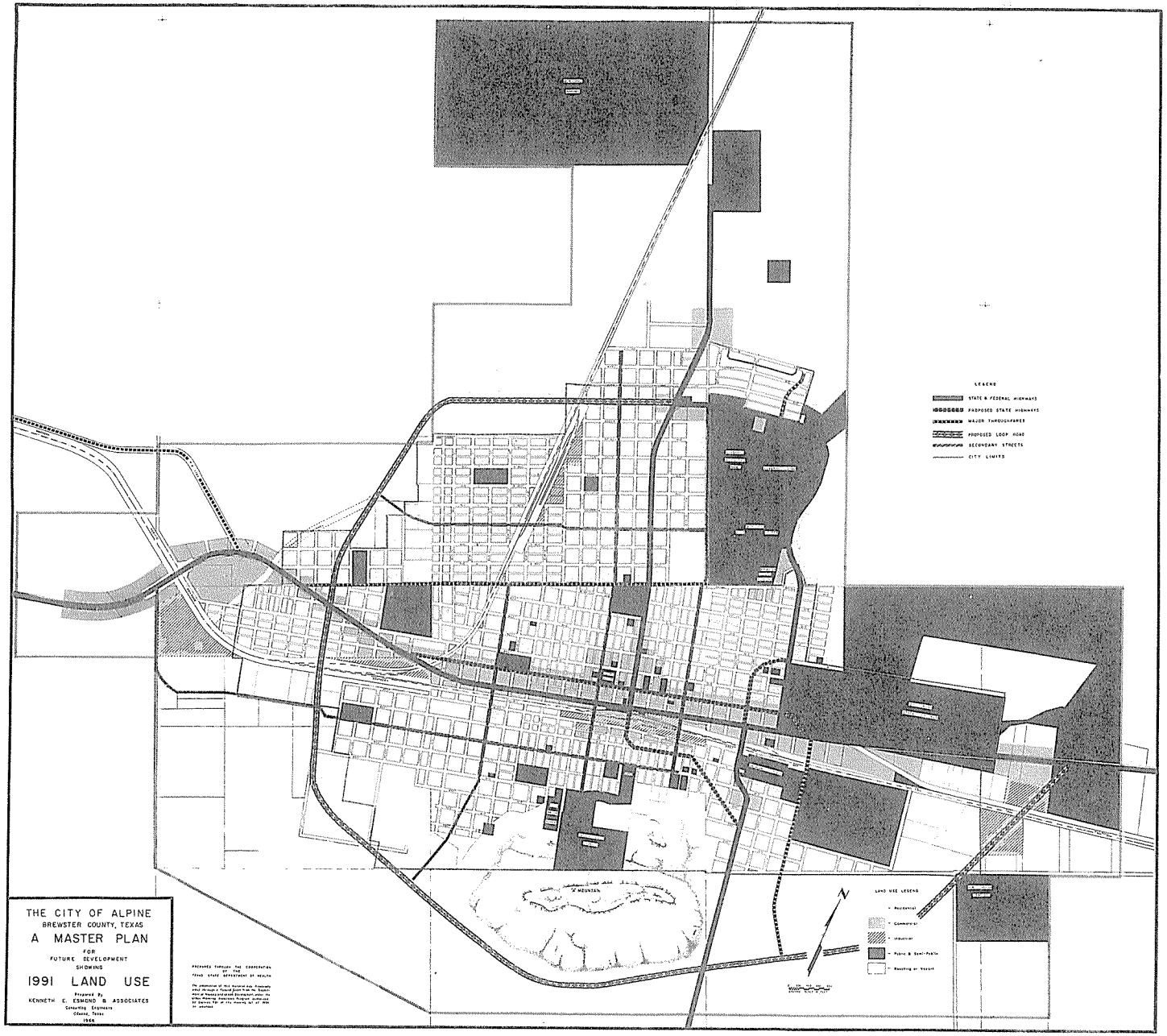
SUMMARY AND CONCLUSIONS

LAND USE

Inventory of Present Uses

The initial movement in the study of land use is a survey and inventory of the uses presently being made of the land within the planning area. The results of this survey in Alpine indicate that, while most of the areas of different use are fairly well defined and correlated, there are a number of instances in which one type of usage infringes into another. This is particularly true in the area south of the Southern Pacific railroad tracks, where commercial establishments are scattered intermittently among residences.

The total acreage within the city limits of Alpine is 2,063.68 acres. Of this, 955.15 acres, or 53.72%, are vacant. The largest amount of land devoted to any use in Alpine is that allocated for streets and roads, 20.45% of the total acreage within the city limits. This is more than usual, and reflects the large number of vacant lots within the City. It does, however, allow for free and easy movement of traffic, and will permit growth for many years before streets become congested. The areas of different uses are delineated on the map on page L1, and the total acreage occupied by each use is listed on page L2.


THE CITY OF ALPINE
BREWSTER COUNTY, TEXAS
A MASTER PLAN
FOR
FUTURE DEVELOPMENT
SHOWING
1991 LAND USE
Prepared By
KENNETH E. ESMOND & ASSOCIATES
Consulting Engineers
Odessa, Texas
1966
LEGEND
STATE & FEDERAL HIGHWAYS
PROPOSED STATE HIGHWAYS
MAJOR THROUGHFARES
PROPOSED LOOP ROAD
SECONDARY STREETS
CITY LIMITS
LAND USE LEGEND
Residential
Commercial
Industrial
Public & Semi-Public
Reading or Vacant
N

Land Use Ratios

The number of acres of land needed for any purpose is determined by the number of people expected to use it. This relationship between land and population is referred to as a land use ratio, and is expressed as the number of acres occupied by each category of use for every 100 persons residing in the town. By combining this ratio with other factors which affect community growth, it is possible to make a rational estimate of the land area needed for the 11,000 persons expected to live in Alpine by 1991. The present and estimated future ratios and the total number of acres of land used for each category are shown on page L3.

Residential Uses

The 5.81 acres of land per each 100 persons presently being used for residential purposes is a larger ratio than exists in many towns. This is mainly due to the availability of land in the area, where single family residences have spacious yards, many using two or more lots. Future population is expected to continue this type of development; however, 6,000 of the forecast 11,000 persons in Alpine by 1991 will be college students who reside in dormitories or apartment houses, using a comparatively small amount of land. This, and the development of low-cost public housing projects, is expected to lower the ratio somewhat in the coming years.

Only a few of the dwelling units in Alpine are duplex, and as

this type of construction has declined in popularity during the past years, it is not expected that many additional dwellings of this sort will be built. There are approximately 35 multi-family dwellings or apartment houses in the City, and more of these are expected to be built in the future, both for purposes of housing student population and because of their increasing popularity as full-time residences.

Student housing facilities are presently inadequate for the number of students enrolled at the college, and as enrollment increases, so will the need for housing. Undoubtedly, several facilities will be constructed for this purpose in the coming years.

Commercial Land Use

Alpine has a relatively high ratio of land in commercial use, 0.92 acres per 100 persons, as compared to the average West Texas town ratio of 0.50 to 0.75 acres per 100 persons. This is partly explained by the lot widths in the downtown area, which vary from 46 to 55 feet with the majority being 55 feet wide. Many cities provide only 25-foot lot widths in the downtown area. Another contributing factor is the tourist trade which comprises a sizeable portion of the Alpine economy, and the ranchers and other persons who live in the area outside Alpine, but who do their trading in the City. These contribute to the commercial activity without adding to the population. College student population also generates some additional commercial needs.

This ratio is expected to rise slightly during the coming years, as efforts are made to increase tourist attractions, and college

enrollment rises. More businesses will be needed to serve these people, and as there is very little vacant area or buildings in the present downtown commercial district, more land will be needed for this purpose. The present trend in the construction of new businesses is to provide for customer parking. This will push the ratio even higher, and it is expected that by 1991, it will be approximately 0.95 acres per each 100 persons.

Industrial Land Use

The present amount of land being used for industrial purposes is fairly small, 11.83 acres, or a ratio of 0.22 acres per 100 persons. Such factors as the distance from raw material supplies and a relatively limited labor market have prevented the development of major industrial operations in the City. Several forms of "light" industry, such as food processing, textile manufacturing and printing, have successfully located here, and current efforts to attract other such activities are being made.

The chief growth of the City is expected to be from increased college enrollment and additional tourist trade, and these two factors should be kept in mind in the solicitation of industry to the area. Care should be taken in the selection of industrial processes, so that no waste is discharged into streams, and smoke, smog and other pollution of the air is avoided. Nothing should locate in the area which would make it less desirable as a stopping place for the tourist or a location point for the college student.

For these reasons, it is expected that industrial growth in Alpine will approximately parallel the population growth, and that the land use ratio will remain about the same. The total acreage used for this purpose in 1991 is expected to be approximately double the present amount.

Public and Semi-Public Land Use

This category includes such uses as City and County buildings, parks, churches, hospitals, schools and college. For purposes of comparing the land use ratio in Alpine with that of other towns, the areas occupied by the college campus and Jackson Field are not included in the total public use acreage. Removal of the college-occupied acreage leaves a total of 61.78 acres in public use, a ratio of 1.14 acres per 100 persons. This is considerably lower than that of the "average" United States city, which is 1.83 acres per 100 persons. This low figure is primarily due to the absence of parks in Alpine. At this writing, work has commenced on the development of two parks, but as neither is yet complete, the acreage is shown in the land use inventory as vacant.

The parks and recreational facilities section of this Comprehensive Plan has made several recommendations for the development of parks, and some of these are presently being carried out. (A newly appointed parks board is active in planning these and other improvements for the City, and the outlook for the future park system is

very bright.) Land being used for parks is expected to be about 55 acres by 1991, with at least a portion of such land improved with various facilities.

Alpine churches occupy 8.17 acres of land, a ratio of 0.15 acres per 100 persons. The growth in this category is expected to approximately parallel the population growth in the future.

Public schools and athletic fields occupy 37.35 acres, a ratio of 0.69 acre per 100 persons. Existing plans for construction, plus the normal growth demanded by expanded future population, should increase the total land used for schools to about 70 acres by 1991.

Sul Ross College presently uses 118.90 acres on the main campus and 9.8 acres at Jackson Field. Present plans call for future construction of 5 new buildings, and much additional dormitory space or other housing will be needed to accommodate enrollment, which is forecast to increase from approximately 1,800 in 1967 to 6,000 in 1991. Although the present campus is spacious, the topography and slope of the land make much of it impractical for use as building sites. The college has recently acquired 14.3 acres of land contiguous with Jackson Field and extending to the east. Another 18-1/2 blocks, or about 37 acres, of flat land suitable for use as building sites, are presently in private ownership in this same area. It is recommended that the college attempt to purchase this land.

Public buildings and other semi-public uses occupy 16.36 acres. It is expected that this will increase to about 22 acres by 1991.

Street and Road Land Use

Streets and roads in Alpine occupy 421.99 acres of land, a ratio of 7.81 acres per 100 persons. This is a very high ratio, and reflects the amount of land which has been subdivided with dedicated streets, but has not yet been built upon. The "gridiron" pattern of streets also adds to the high amount of land so used, particularly in Alpine where the vara is used as the unit of land measure. Most cities with a gridiron pattern have blocks 300 feet on each side. Alpine's blocks are 100 varas, or about 278 feet per side. These smaller blocks require more streets to divide them and provide access for the residents. It is recommended that future subdivisions deviate from this pattern and follow a curvalinear design. This would permit streets to be constructed in accordance with the contours of the land, and allow the street to be used in draining runoff water from the area during heavy rains, a need which definitely exists in Alpine.

Development of land presently subdivided but still vacant, and improved street design is expected to lower the ratio of this use to about 4.1 acres per 100 persons by 1991.

There are presently a large number of blocks in the City which have no alleys serving them. This has produced a low ratio, 0.53 acre per 100 persons. This is especially low in view of the large area used for streets. It is recommended that all new subdivisions be required to provide alleys serving all blocks, at least in residential develop-

ment, for convenience in locating various utilities and providing access for such things as trash pick-up and utility line maintenance.

Vacant Land

The amount of vacant land in Alpine is almost half of the total area within the city limits: 955.15 acres out of a total of 2,063.68 acres. Many outlying areas of the City have been subdivided, served with streets and utilities, but only sparsely developed. This extension of streets and utilities to areas with little population is costly to the town. In order to keep this expense to the minimum, it is recommended that efforts be made to encourage building in vacant areas which are already served by water, sewer and paving. This policy, combined with normal population increases, should gradually fill the vacant lots and lessen this land use ratio.

Summary of All Land Uses

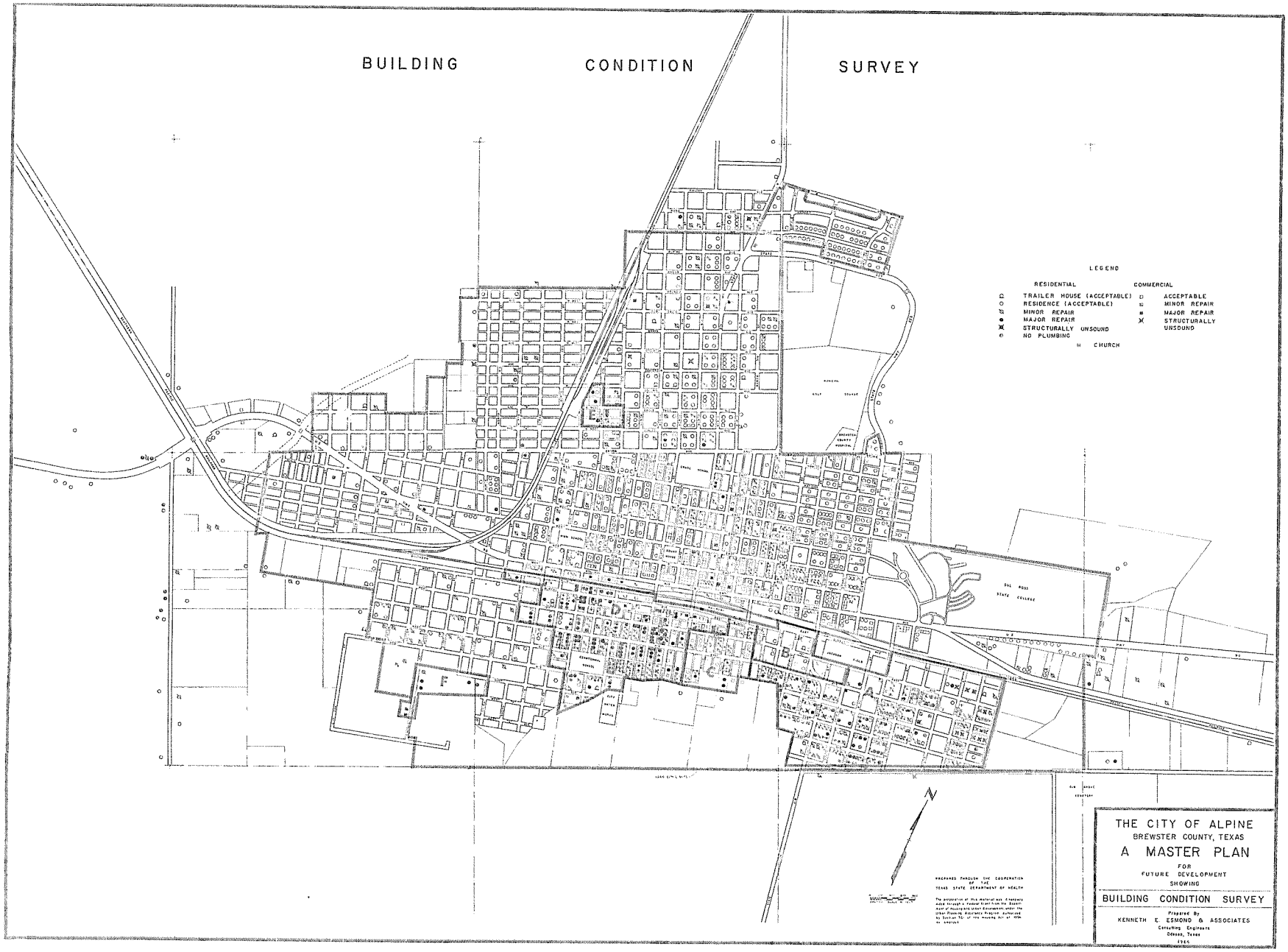
In the City of Alpine today, 1,108.53 acres, or 20.53 acres per 100 persons, are being used for all urban purposes, excluding vacant land. The anticipated future needs will require approximately 1,647 acres, a ratio of 15.0 acres per 100 persons. The expected distribution and location of the various land uses is shown on the 1991 Land Use Map on page L6.

NEIGHBORHOOD ANALYSIS

Planning Districts

The City of Alpine is roughly divided by the tracks of the Southern Pacific Railway Company. About 59% of the residential development lies to the north of this line and 41% to the south. The major commercial area, which serves the entire town, is located almost entirely along U. S. Highway 90, immediately north of and parallel to the railroad. Two elementary schools serve the town, one north of the railroad and one south. All students attend the same high school, and present plans call for consolidation of the two elementary schools into one.

The population is divided into two major ethnic groups, with about 56% being Anglo whites and 43.3% being Latin American whites. Only about 0.7% of the total population are Negro. The majority of the Latin Americans reside south of the railroad, but others are scattered throughout the town. Although some cultural and economic separation of the two major groups does exist, it was not considered sufficient to merit dividing the town into more than one planning district. The geographical isolation of Alpine, plus its size, causes planning which is done for any area of the town to affect the entire town to some extent. Plans for future development of parks, schools, water and sewer systems do not observe district lines, but are planned for the entire City. It was, therefore, decided to treat the entire


BUILDING CONDITION SURVEY
LEGEND
RESIDENTIAL
TRAILER HOUSE (ACCEPTABLE)
RESIDENCE (ACCEPTABLE)
MINOR REPAIR
MAJOR REPAIR
STRUCTURALLY UNSOUND
NO PLUMBING
COMMERCIAL
ACCEPTABLE
MINOR REPAIR
MAJOR REPAIR
STRUCTURALLY UNSOUND
CHURCH
SUL ROSS STATE COLLEGE
N
THE CITY OF ALPINE
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SHOWING
BUILDING CONDITION SURVEY
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Odessa, Texas
1965

town as one planning district.

Condition of Structures

A necessary portion of a neighborhood analysis is a survey of the building structures; this was done in Alpine by visual, exterior inspection. Each structure was classified, according to its exterior appearance, as belonging to one of five categories: (1) acceptable, (2) needing minor repair, (3) structurally sound, needing major repair, (4) structurally unsound, and (5) without plumbing. The results of this survey are shown on the map on page L8.

By utilizing the survey and the map, areas containing degenerating structures were determined, and where these existed in large numbers, the area was classified as "blighted." Other reasons for assigning an area to the blighted category include (1) vacancies or deserted lots found alongside buildings in need of repair; (2) collections of wrecked or non-operable autos and machinery, old sheds, et cetera; (3) residential areas with large numbers of houses not connected to water or sewer facilities. Those areas classified as blighted, for any of the above reasons, are outlined in red on the map on page L8.

Blighted Areas

Area A: Immediately adjacent and to the south of the Southern Pacific railroad, from the easternmost developed area west to 1st Street.

The area contains about 12 commercial buildings and 240 residences,

almost half of which need major repair, or are structurally unsound. Several small lots are congested with more than one house, and many vacant lots are unkept and cluttered with wrecked autos and other debris. No building set-back lines have been observed in construction, and 3 houses appear to be infringing into dedicated street rights-of-way. More than one-third of the homes have no water and sewer connections. Streets which are paved are narrow, either 18 feet or 22 feet in width, and unpaved streets either have a caliche base or have merely been graded.

This area abuts Jackson Field, and is suitably located for expansion of the college facilities. In addition to Jackson Field, the college presently owns Blocks 30 and 32 of Hancock Addition, and Blocks 1 through 4 of Thomas Derrick Addition. It is recommended that the college attempt to acquire Blocks 5 through 20 of Derrick Addition and Blocks 42, 43 and the east one-half of Block 31, Hancock Addition. This, together with the six blocks already owned by the college, is a roughly rectangular tract of about 51 acres, with flat terrain suitable for use as a building site.

Residents in the remaining blocks of Area A should be encouraged to "clean-up, paint-up, fix-up" their property, and to connect their homes to the available water and sewer facilities. Ordinances requiring that vacant lots be kept clean and mowed have proved successful in other towns, and should be tried here, with the City lending

all possible assistance in such cleaning program. The addition of curb and gutter plus a widening of the existing paving would improve the area and cut down on maintenance problems. It is felt that this would have to be accomplished largely at the City's expense; however, as many of the area residents are in a low income bracket and could not likely afford to make needed home repairs and pay for curb and gutter, as well.

Residents occupying houses whose structural condition makes repair impractical could possibly be relocated into a low-rental housing project, or be encouraged to re-build. Local civic and government leaders should undertake the responsibility of working out a solution.

Area B: An eight block area immediately west of Area A.

This area contains only 11 residences and 3 commercial buildings, and is not considered to be blighted at present. However, cluttered vacant lots and parking of heavy industrial equipment are "eye-sores", and these blocks are located between two badly blighted areas. Immediate measures should be taken to prevent this area from degenerating further. Vacant lots should be cleaned, and indiscriminate parking of equipment should be prevented by ordinance, if necessary, in order to protect the home owners of the area and keep it desirable for residential use. Paving improvements would also enhance these blocks, and the City should make an investigation to determine whether residents here can afford paving improvements.

Area C: Eleven blocks, bounded on the north by East Murphy, east by the alley between 1st and 2nd, west by 5th Street, and south to a line approximately even with Avenue I.

This area is not blighted at this time, but is endangered by Area D to the west, the most severely blighted area in town. Indications are that degeneration is beginning here, and unless remedied immediately, the area could easily succumb to it. Cleaning of vacant lots and encouraging home owners to maintain a high standard of repair and appearance will help prevent the spreading of blight.

Area D: Bounded on the north by the Southern Pacific railroad, east by 5th Street, west by a line varying from 15th to 11th Street, and south to include all the developed area.

More than half of the 236 houses in this area need major repair, and many are structurally unsound. Of the 19 commercial buildings, 8 need major repair and 2 are considered unsound. Many lots are congested with two or more houses. About 18% of the homes are not connected to water or sewer lines. Many vacant lots scattered throughout the area are overgrown with weeds, piled with debris or wrecked cars, or are used for parking trucks and other equipment. There is no curb and gutter, and those streets which are paved are very narrow. Alpine Creek runs through the area, making portions of some lots and all of others unsuitable for building because of poor drainage.

A most thorough clean-up campaign should be undertaken here, with ordinances being used, if necessary, to enforce maintenance of vacant

lots. Such street improvements as the City can afford should be made; it is considered that the residents, for the most part, cannot afford to participate in such a program. All houses should be connected to water and sewer facilities; if needed, an ordinance should be passed prohibiting the existence and use of outdoor toilets and septic tanks within the city limits.

Home owners should be encouraged to repair their property where needed. Other residents, whose finances do not permit such action, or whose homes are considered economically impractical to repair, should be re-located into some sort of public housing, or assisted to re-build.

Area E: Three blocks bounded on the west by 12th Street and the Santa Fe railroad, north by Avenue C NW, east by North 10th Street, and south by Avenue A, NW.

These three blocks are located in an area of generally well-kept homes; yet, of the 11 houses, 4 need major repair and 1 is structurally unsound. This condition is discouraging to other residents in the area, and could easily spread to adjacent neighborhoods, causing another blighted spot in the City. Immediate action should be taken to determine the cause of the decay, and to remedy it.

Area F: Small area west of South 15th Street and south of the developed portion of the town.

This area contains 5 houses and 2 commercial buildings. Four of the houses and both commercial establishments are considered to need

major repairs. There is no water or sewer service to the area, and no paved streets.

Though small at the present time, this area is an example of what can happen when development within a city is not controlled. No codes or ordinances governing housing standards, plumbing, electrical installations or zoning have been applied here, and the result is blight. The danger in allowing such areas to begin is that they tend to spread, devaluating surrounding property. It is the responsibility of the City Council to establish and enforce definite policies controlling growth and development within the city limits.

Characteristics of Families

Low Income: Estimates by Sales Management, Survey of Buying Power, indicate that 32.1% of the families in Brewster County had incomes of less than $2,500 during 1965. The average income per family was $5,981, somewhat lower than the State average of $7,008, but comparable to other counties in the immediate area. The last United States Census, 1960, included a survey of income in families having Spanish surnames, and indicated that the 483 families falling into this category in Brewster County had an average income of $2,522. A recent independent survey of incomes of Latin American families seems to agree with this figure, indicating that little change in the economic situation of this group has occurred since 1959.

Elderly or Retired

The total number of persons in Alpine receiving some form of State welfare aid is 94, or 1.74% of the total population. The State-wide figure is 2.4% of the State's population.

The map which was prepared showing the residence place of persons receiving aid indicated that a concentration exists in those areas designated "A" and "D" in the blighted area survey. Approximately 78% of the total number of persons receiving aid live south of the Southern Pacific railroad.

Racial or Ethnic Groups

The present population of Alpine is estimated to be approximately 56% Anglo white, 43.3% Latin American white, and 0.7% Negro. All of the Negroes, and most of the Latin American whites, reside south of the Southern Pacific railroad. Several Anglo white families also live in the area, and families of Latin American whites are scattered throughout the town.

Size of Families

Estimates based on a count of occupied homes, and an extension of figures contained in the 1960 U. S. Census indicate that the average Latin American family in Alpine contains 5.68 persons, and the average Anglo white family has 2.75 persons. This low figure among the Anglo whites is partly attributable to the college student population in the

and much can be done to shape its lines. The ideal purpose of any land use plan is the provision of a better community for present and future citizens to enjoy. We believe the recommendations made in this Report are directed toward achieving this purpose.

SUMMARY AND CONCLUSIONS

Introduction

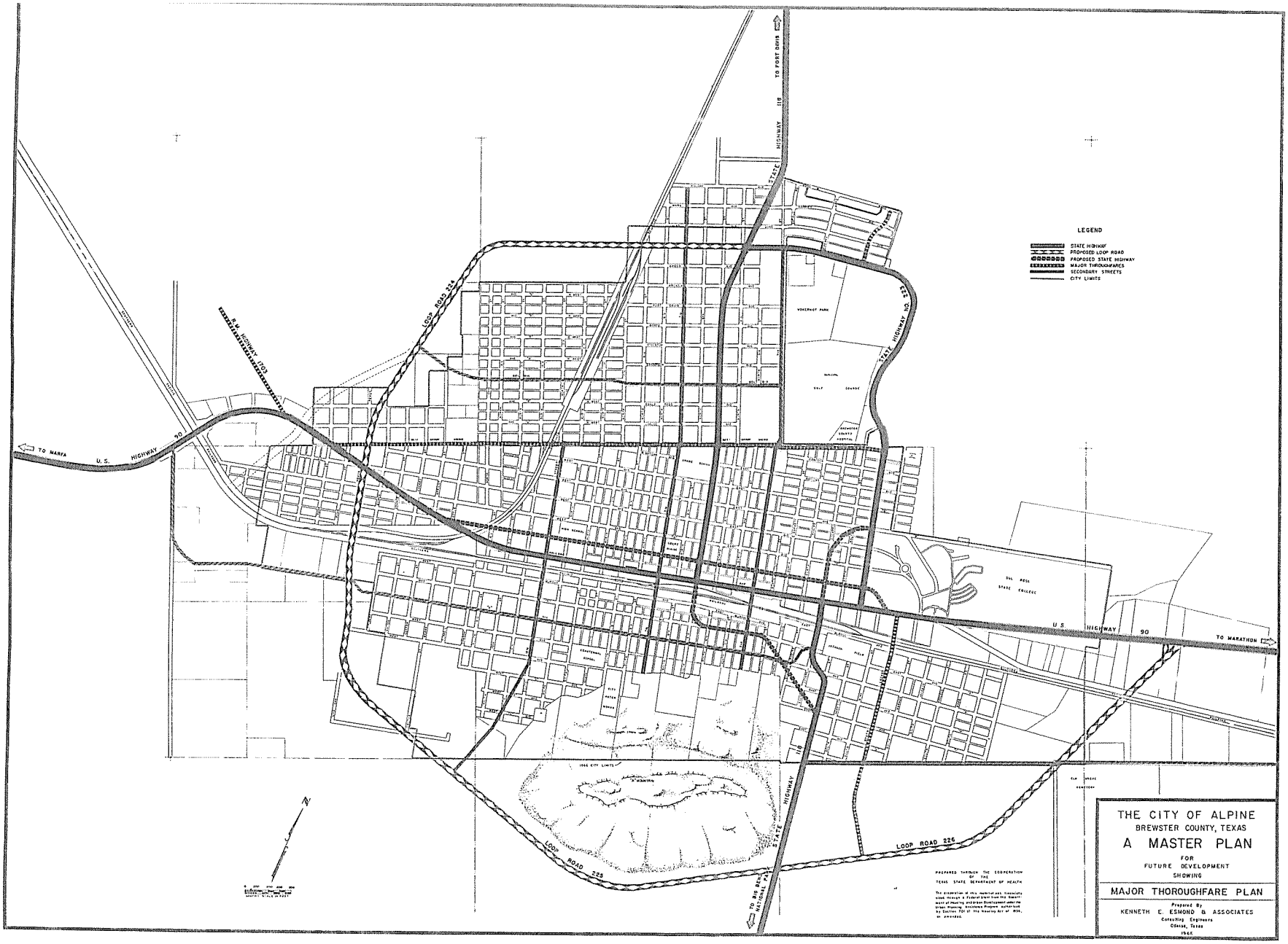
While the auto has been called the "pump that courses the life-blood through the veins of our economy", it can also strangle the prospects of growth through congestion, hazardous traffic conditions, and poor traffic management. These are problems which no community can ignore, for free and easy traffic circulation are vital to the prosperity of a town, and will become more so as the number of people and automobiles steadily increases.

Involved in these factors and considerations we find the need for traffic study and planning on the part of every city, and the basic need for an adequate, workable Thoroughfare Plan.

Registered Vehicles

Current growth trends point toward a multiplication of traffic problems in the coming years. Records of motor vehicle registrations and estimates of the increase in numbers to be expected over the next decade give some indication of the problem.

In 1950 there were 51,914,000 motor vehicles registered in the United States. By 1960 the number had increased by 46.3% to 75,954,000 and in 1964, 86,297,000 vehicles were registered, an increase of 13.6% in four years. Texas registrations have climbed on a similar scale: from 3.1 million in 1950 to 4.9 million in 1960. The 1965 figure is placed at 6 million motor vehicles, and the Texas Highway Department


LEGEND
STATE HIGHWAY
PROPOSED LOOP ROAD
PROPOSED STATE HIGHWAY
MAJOR THROUGHFARES
SECONDARY STREETS
CITY LIMITS
TO FORT DAVIS
STATE HIGHWAY 118
STATE HIGHWAY NO. 223
LOOP ROAD 224
R.M. HIGHWAY 1703
TO MARFA
U.S. HIGHWAY 90
U.S. HIGHWAY 90
TO MARATHON
STATE HIGHWAY 118
LOOP ROAD 225
LOOP ROAD 226
TO BIG BEND NATIONAL PARK
PREPARED THROUGH THE COOPERATION OF THE TEXAS STATE DEPARTMENT OF HEALTH
THE CITY OF ALPINE
BREWSTER COUNTY, TEXAS
A MASTER PLAN
FOR
FUTURE DEVELOPMENT
SHOWING
MAJOR THOROUGHFARE PLAN
Prepared By
KENNETH E. ESMOND & ASSOCIATES
Consulting Engineers
Odessa, Texas
1966

PREPARED THROUGH THE COOPERATION OF THE TEXAS STATE DEPARTMENT OF HEALTH

The preparation of this material was financially aided through a Federal Grant from the Department of Housing and Urban Development, under the Urban Planning Assistance Program authorized by Section 701 of the Housing Act of 1954, as amended.

LEGEND

A-1	GOOD
B-1	GOOD—VACANT
A-2	FAIR
B-2	FAIR—VACANT
A-3	POOR
B-3	POOR—VACANT
A-4	SHACK
B-4	SHACK—VACANT

THE CITY OF ALPINE

BREWSTER COUNTY, TEXAS

A MASTER PLAN

FOR

FUTURE DEVELOPMENT

SHOWING

PROPOSED EXTENSION OF HIGHWAY 118

Prepared By

KENNETH E. ESMOND & ASSOCIATES

Consulting Engineers

Odessa, Texas

1966

estimates that by 1980, as many as 15 million machines will be using the highways and streets of our State.

In 1950, there were 2,966 vehicles in Brewster County. In 1966, with 3,882 vehicles registered and an estimated 7,320 people in the County, the ratio was 1.87 persons per vehicle, or 53 vehicles per 100 people. Assuming that this ratio remains the same for the next 25 years, there would be an estimated 7,750 vehicles in the County in 1991.

Existing Streets and Highways

Alpine is served by east-west U.S. Highway No. 90 and north-south State Highway No. 118. These two main arteries, together with the Ranch Roads in the vicinity, form an adequate network of routes for the area.

Most of the street system in Alpine is laid out on what is commonly called a "gridiron" pattern, consisting of streets which intersect at right angles and produce square blocks. This pattern does not allow the maximum utilization of the natural slope of the ground for drainage, nor does it provide direct routes to and from frequently visited areas, such as downtown and schools. It is a recommendation of this report that future streets and thoroughfares be allowed to follow a curvalinear pattern and deviate from the restrictive gridiron system.

Types of Improvements

The two railroads form a man-made barrier to the traffic circulation pattern of the City, however, the main problem in this connection is caused by the east-west Southern Pacific Railroad. There has been only sparse development to the west of the Santa Fe tracks, up to this time,

and the problem of circulation in this area is not yet serious. In the years to come, however, this barrier will become increasingly important, as future development is expected to take place west of the tracks.

The first step toward obtaining better traffic flow can be accomplished by the installation of relatively inexpensive signs, signals and markings. These items must be placed with care, however, as they can hinder traffic flow if improperly or unwisely located.

There are many functional types of streets and roads, and of these, Alpine will be generally concerned with four: (1) the major arterial street or loop road; (2) the collector street: (3) the central business street; and (4) the local neighborhood street. Typical section for these streets are shown on page T8 of this report.

Proposed Thoroughfare Plan

The proposed Thoroughfare Plan, designed to serve the anticipated 1991 population, is shown on page T6. Generally, the plan can be described as consisting of main arterial loop roads through the outer lines of the expected 1991 urban area, with sufficient collector and local streets to move the traffic from origin to destination by the most direct and safest route.

Highways

U.S. Highways 90 and 67, and State Highway 118 serve as the major cross-town carriers of traffic, aided by State Highway 223, which loops around the northeast quadrant of Alpine, connecting Highway 90 with Highway 118 to the north.

In an attempt to alleviate congestion and improve the safety features of traffic movement in the City, the City and the Texas Highway Department have entered into an agreement whereby the City has furnished new right-of-way at the intersection of Highway 90 and Highway 223 for a division of movement of Highway 90 traffic into two one-way arteries. The present Holland Avenue will be converted into one-way movement to the east and Avenue E will be converted into one-way movement to the west. The costs of these improvements are estimated in the neighborhood of $1,450,000, with the Highway Department bearing the major costs. This project will materially resolve the congestion and safety problems in the major east-west movement of in-city traffic.

Reference is hereby made to the section of the Alpine Plan which deals with proposed water and sewer improvements. Since the highway project pavement is to be concrete, the laying of new water mains in Avenue E, and certain sewer improvements, need to be scheduled ahead of the highway work. A prior study of these items has been conducted by this firm and a report made to the City Council.

From a study of past records of the accidents which have occurred on the highways through Alpine, it was revealed that certain intersections have become hazardous in the movement of vehicles. These are:

1. Intersection of Holland Avenue (U.S. Highway 90) and the main South College entrance. A traffic light should be installed at this location, with a flashing beacon, initially, then changing to a regular signal light if the accidents do not decrease .

2. Intersection of Holland Avenue (U. S. Highway 90) and State Highway 223. A traffic light system should be installed at this location as a part of the currently contemplated Highway Department project. If the project is delayed for any length of time, a signal light should be installed in the immediate future.

3. Intersection of Holland Avenue (U. S. Highway 90) and Cockrell Avenue (south leg being State Highway 118). A traffic light should be installed at this location, on both Holland and Avenue E, when the latter is incorporated in the proposed improvement plan.

4. Intersection of 5th Street and the Southern Pacific railroad. This crossing was the scene of a local fatality in collision with a train in 1967. It is the recommendation of this Report that automatic barrier gates, with sound and signal, be installed at this location immediately.

5. Intersection of Cockrell Street (State Highway 118 South) and the Southern Pacific railroad. It is the recommendation of this Report that automatic barrier gates, with sound and signal, be installed at this location immediately.

6. Intersections of 11th Street, 7th Street, 2nd Street and Lackey Street with the Southern Pacific railroad. It is the recommendation of this Report that signs, containing a warning light and clanging signal, be installed at each of these locations.

7. Intersection of State Highway 118 and State Highway 223. In order to aid the traveling motorist in making a safe selection of high-

way routes at this point, in case he is looking for the bypass, a traffic light should be installed at this location.

In addition to the above signalization projects, the following improvements and new constructions are recommended:

1. Southerly extension of State Highway 118, from the intersection of Holland Avenue to connect with South Walker Street at the southeast corner of the City.

Since the majority of serious accidents within the City are those in which some turning movement of cross-traffic is involved, a very serious hazard would be removed if Highway 118 could be extended on southerly through Alpine, from this point.

A proposed route for the extension of this highway is shown in this Report, on map page T7. This is a general location, and should be studied in detail by the Texas Highway Department, making such revisions as they feel appropriate.

2. Northerly extension of State Highway 118, from intersection of Holland Avenue. This extension would pass north and south bound traffic across the main stream of traffic danger to access with either the Sul Ross College or State Highway 223. The extension is shown as terminating at Avenue B and Highway 223.

Loop Roads

It is recommended that three proposed Loop Roads, designated as Loop 224, Loop 225, and Loop 226, be delineated upon the ground and the process of acquiring rights-of-way be started. This could be done by

the City, or as a joint City-County-State project, but should begin as soon as possible so that construction can proceed when funds become available, and when traffic densities justify their expenditure. The recommended minimum width of all rights-of-way for these proposed Loop Roads is 106 feet. Certain intersections and interchanges will require additional right-of-way, depending upon their function and geometric design. The proposed route of the Loop Roads is shown on the map on page T6.

Collector Streets

The collector streets, shown on the Master Thoroughfare Plan on page T6 as "Secondary Streets," are generally existing streets with extensions proposed to connect them to the loop roads and to the highway system. Their purpose is to receive and discharge traffic from local streets and convey the flow to and from the loop roads by the most direct possible route. This expedites the travel to and from the main business district by increasing both speed and safety, and also adds to the effectiveness of the loop roads and highways.

The collector streets are recommended to have a 70-foot wide paved surface consisting of four driving lanes, each 12 feet wide, two 10-foot wide parking lanes and a 2-foot wide median strip.

Local Streets

It is recommended that the minimum paving width for a local street should be 40 feet, as measured from back to back of curbs. This width allows for two 11-1/2 foot wide driving lanes and two parking lanes,

each eight feet wide.

Central Business District

Downtown Circulation: The central business district of any city requires some special consideration in thoroughfare planning with respect to traffic circulation and parking. A study has been made of the Alpine business area to observe the existing traffic circulation.

This district consists primarily of a 16-block area dominated by Holland Avenue and Avenue E. The study revealed major traffic congestion on Holland Avenue and 5th Streets, with Holland Avenue experiencing around 7,000 vehicles per 24 hours and 5th Street showing over 3,200 vehicles for a like period.

Steps should be taken to eliminate unnecessary vehicular traffic, such as trucks, service vehicles, etc., through this part of town by providing the loop roads recommended in the preceding paragraphs of this Report. Past and present experiences of other cities of larger size indicate that the downtown merchant and the local citizen become casualties to the congested highway system which passes through the downtown area.

The other streets which comprise the downtown business district should be improved and widened as much as possible, within their already narrow rights-of-way, in order to improve the safe movement of the shopping citizen, and the tourist who comes to the downtown complex to see, and to purchase.

Downtown Parking: Each medium of transportation requires three

elements, without which it cannot operate effectively: (1) the vehicle, (2) the right-of-way, and (3) the terminal.

The principal function of a street is the efficient moving of vehicles, and quite often, curb parking interferes with this function. Planning and control of parking must be integrated with traffic studies and other phases of urban planning if proper balance is to be assured.

A survey of the existing parking facilities in the 16-block business area was made. The total number of vehicles which can be accommodated by on-street curb parking at present is 520, with an additional 378 off-street parking places now available. Of the 520 spaces, 155 are metered parking spaces. To ascertain the adequacy of these spaces for Alpine, the following standard parking criteria were used.

1. All design is for average use, as peak periods of need for parking do not occur with sufficient frequency to warrant providing excess space.

2. All banks and public buildings require one parking space for each 500 square feet of floor area provided for their patrons' use.

3. All other business establishments require one parking place for every 1,000 square feet of floor space for their patrons.

4. Parking spaces available for employee use should range from 50% to 100% of that available for patrons and customers.

By these standards, 345 parking spaces are needed to serve the downtown business district in Alpine at the present time, in addition to the approximately 170 spaces required for parking the vehicles of

employees. Since there are presently 900 available spaces in the area, there appears to be no need for additional parking at this time.

On site inspection revealed that many employees do not park on side streets or behind their places of employment, but apparently in the parking spaces at the curb in front of the stores. This is an undesirable practice, and does nothing to further commercial interests in Alpine.

Assuming that the business interests expand 50% by 1991, as is anticipated by the population growth, the required number of parking spaces for customers and employees will be 750. This indicates that there is sufficient parking, at present, to satisfy the 1991 requirements.

Transportation

In addition to the privately owned and operated vehicles, there are other modes of travel and transportation which use the thoroughfares. For the purpose of this Report, only those which directly affect the citizens of Alpine were studied.

At present, Alpine is served by two railroads, two bus lines, and two scheduled truck line enterprises. The basic demand for heavy transportation facilities is to serve the mining industries, agricultural and ranching interests in the vicinity.

Railroads

The Southern Pacific Railroad and the Santa Fe Railroad both serve Alpine. At the present time, an estimated 350 to 400 carloads of

assorted goods, automobiles, lumber, farm and ranch supplies, and mining equipment are shipped into Alpine each year. A sizeable number of carloadings of cattle, sheep and goats are shipped out of the area, but these figures were not made available to the writers.

Southern Pacific freight trains make two stops each week to deliver in-bound freight and pick up out-bound cars and freight. The Santa Fe has one freight train each day, which also serves Presidio.

The Southern Pacific has one east-bound and one west-bound passenger train each day, while the Santa Fe does not maintain passenger service over their line.

Bus Lines

Two bus companies presently serve Alpine, both offering passenger, package and mail service. The Continental Trailways Line has two connections each way, per day, with direct passage, through Alpine, between El Paso and San Antonio. The Odessa-Midland Bus Lines operate one schedule per day, which connects to Alpine on a daily round-trip service through Midland, Odessa, Pecos and Presidio.

Motor Freight Lines

The Alpine area is served by two principal trucking firms, which are based in Alpine. There are numerous private, individual operators who do free-lance trucking for ranchers in moving feed and cattle over the ranching area.

The two trucking firms are: Southern Pacific Transport Company, which is operated out of the Southern Pacific Depot, and Slovers Truck-

ing Company. From the information which could be evaluated, it appears that the two firms, with the addition of the numerous singular individuals who own and operate their trucks for hire, either on a regular or seasonal basis, keep the demand for this type of service satisfied.

Summary of Recommendations

The following are proposals which this Report recommends be adopted by the City of Alpine:

1. Adopt a Major Thoroughfare Plan as a guide to future street and road development.

2. Acquire rights-of-way for Loop Roads and Collector Streets to insure their proper location.

3. Require future subdivision plats to conform to the Plan and furnish required rights-of-way at the time of platting.

4. Begin construction of the Loop Roads and Collector Streets, by phases.

5. Construct curb and gutter and widen U. S. Highway 90 and Avenue E completely through town, with the aid and assistance of the Texas Highway Department.

6. Conduct a city-wide paving program to improve local streets in all areas of town. Particular attention and assistance should be directed to those areas where paving would upgrade and enhance both traffic movement and property values.

7. Extend State Highway 118 southward from Holland Avenue to join again with Highway 118 (South Walker) near the south city limits.

8. Extend State Highway 118 (South Walker) northward from Holland Avenue to intersect with State Highway 223 (Loop Highway).

9. Work with the Southern Pacific Railroad Company to secure the installation of automatic barrier gates at the railroad on South Walker Avenue and on 5th Street.

10. Work with the Southern Pacific Railroad Company to secure the installation of warning lights, with clanging signals, at the railroad and the following streets: Lackey, 2nd, 7th and 11th.

11. Work with the Texas Highway Department to secure the installation of traffic lights and/or signals at the following intersections:

a. Holland Avenue (U. S. 90) and the main south entrance to Sul Ross College.

b. Holland Avenue (U. S. 90) and State Highway (Loop Highway) 223.

c. Holland Avenue (U. S. 90) and Cockrell (South Walker).

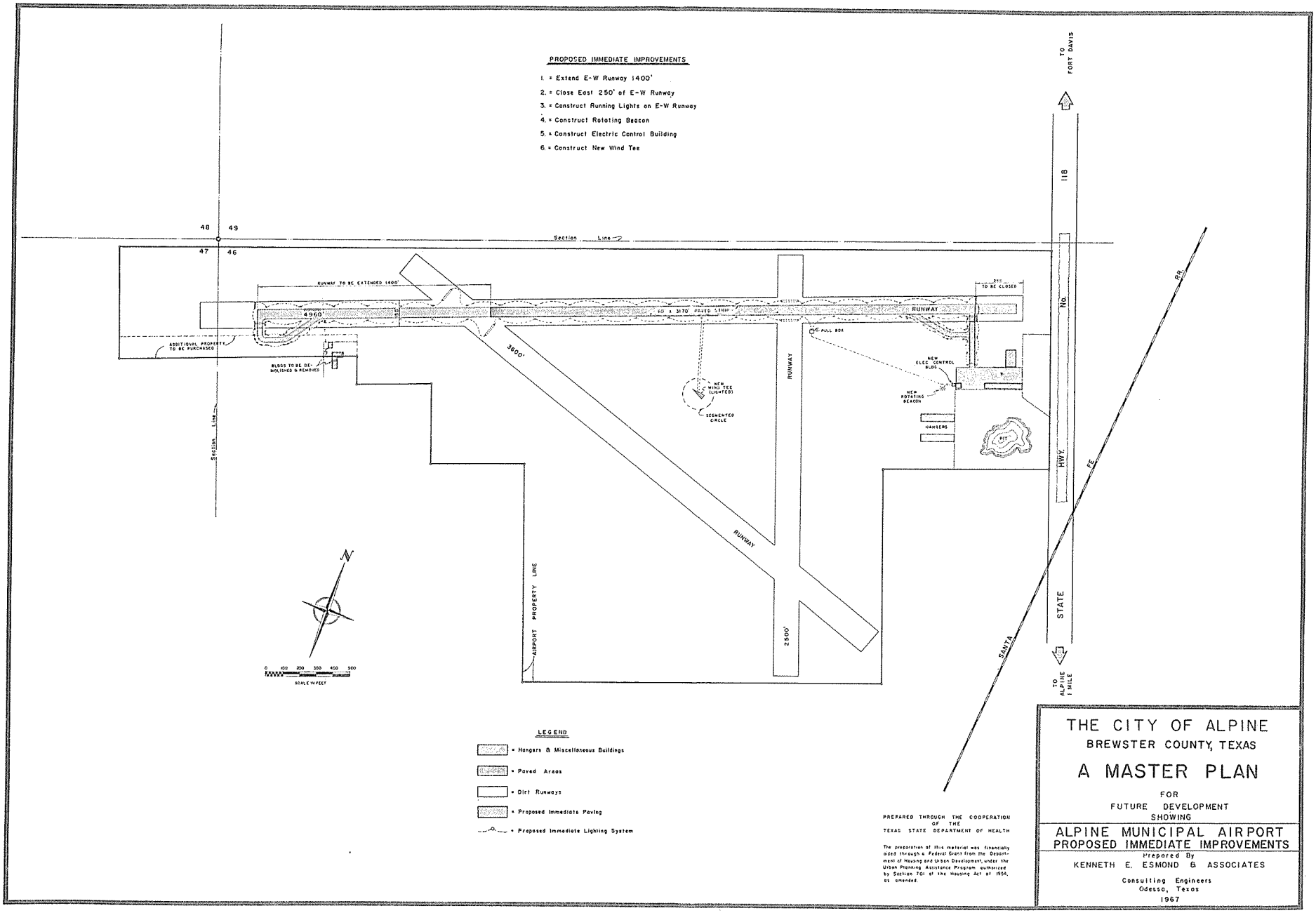
d. State Highway 118 (North) and State Highway 223 (Loop Road).

12. Encourage the construction of off-street parking spaces in the downtown area. Employees who work in this area should be educated to park on side streets or in designated off-street sites, in order to reserve the prime parking spaces for customers.

13. All new business interests should be informed of the new recommendations to provide off-street parking for their establishments.

14. Emphasize to the downtown merchants and their employees the

fact that ease and safety of traffic movement and the availability of convenient parking space are two key factors in creating and maintaining a healthy business climate in the downtown district.


PROPOSED IMMEDIATE IMPROVEMENTS
1. = Extend E-W Runway 1400'
2. = Close East 250' of E-W Runway
3. = Construct Running Lights on E-W Runway
4. = Construct Rotating Beacon
5. = Construct Electric Control Building
6. = Construct New Wind Tee
TO FORT DAVIS
118
No.
HWY.
STATE
TO ALPINE 1 MILE
48
49
47
46
Section Line
RUNWAY TO BE EXTENDED 1400'
4960'
60 x 3170' PAVED STRIP
RUNWAY
250' TO BE CLOSED
PULL BOX
ADDITIONAL PROPERTY TO BE PURCHASED
BLDGS TO BE DEMOLISHED & REMOVED
3600'
NEW WIND TEE (LIGHTED)
SEGMENTED CIRCLE
RUNWAY
NEW ELEC. CONTROL BLDG.
NEW ROTATING BEACON
HANGERS
PIT
RUNWAY
2500'
AIRPORT PROPERTY LINE
Section Line
N
0 100 200 300 400 500
SCALE IN FEET
SANTA FE
RR.
LEGEND
= Hangars & Miscellaneous Buildings
= Paved Areas
= Dirt Runways
= Proposed Immediate Paving
= Proposed Immediate Lighting System
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A MASTER PLAN
FOR
FUTURE DEVELOPMENT
SHOWING
ALPINE MUNICIPAL AIRPORT
PROPOSED IMMEDIATE IMPROVEMENTS
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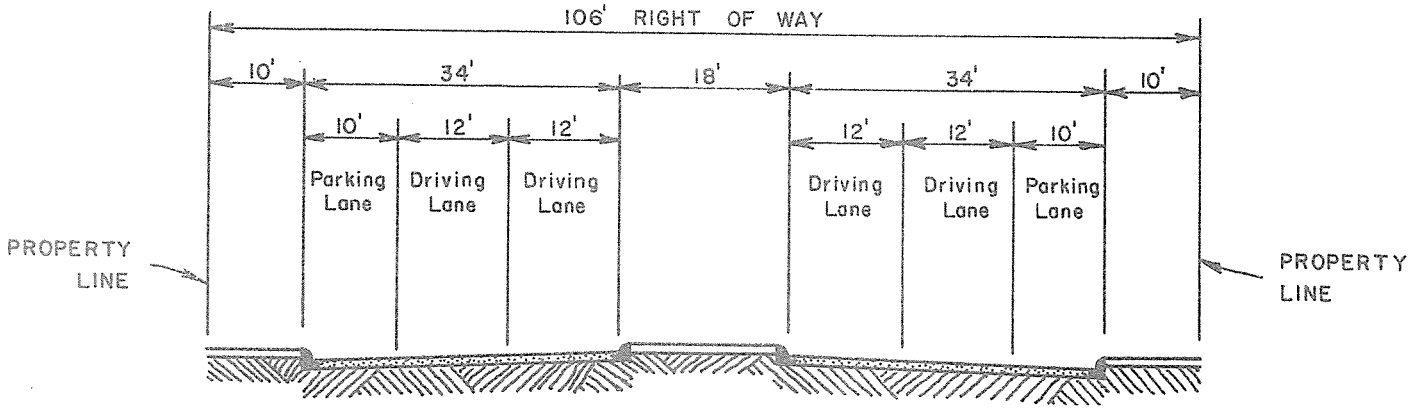
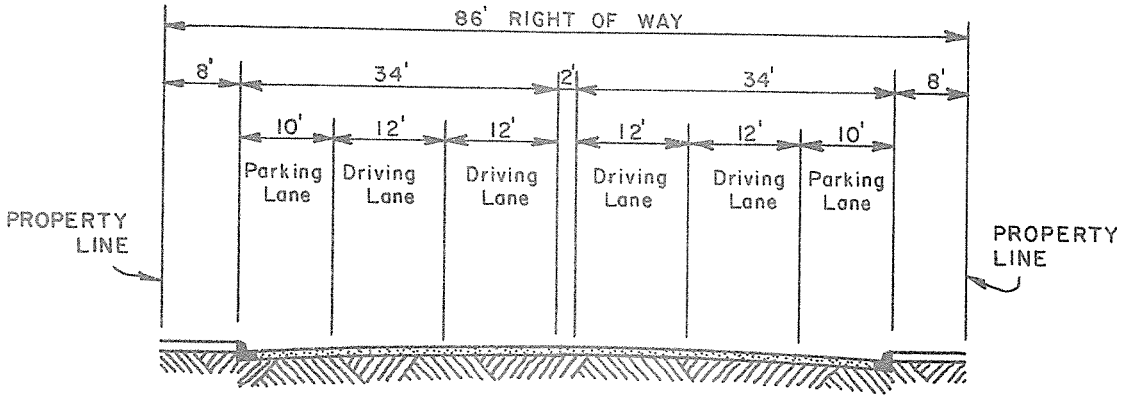
Odessa, Texas
1967

A-2

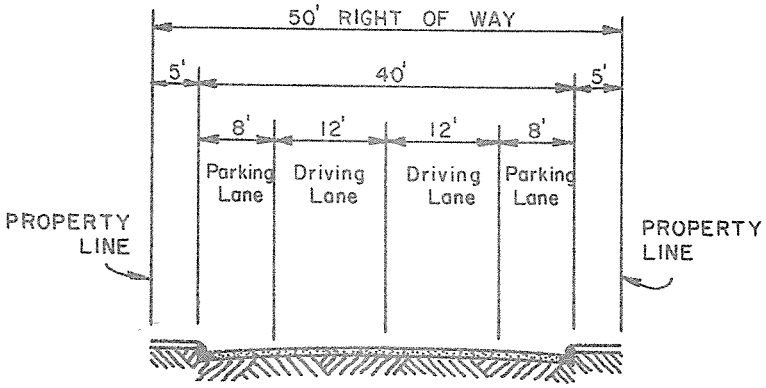
PROPOSED STREET & ROAD SECTIONS CITY OF ALPINE, TEXAS



LOOP ROAD



MAJOR THOROUGHFARE



LOCAL & SECONDARY STREETS

AIRPORT

The City of Alpine presently operates a municipal airport, known as "Starns Airport", on a site which is located approximately three-fourths of a mile north of the city limits, on the west side of State Highway 118.

Because of the comparatively remote location of Alpine, being a considerable distance removed from the larger metropolitan centers of the State, travel by air is a popular and growing trend. Local citizens, businessmen, and ranchers own private planes and use them extensively for both business and pleasure trips. Tourists, cattle buyers, contractors, salesmen, government employees, and others use the airport frequently.

At present, there are sixteen planes based at the airport, with two base operators furnishing charter service and student training. At least one of the operators is usually on duty during daylight hours. The operators offer gasoline and oil servicing, with one of them furnishing some repair and mechanic work. Tie-downs are available for transient planes, with space for two single engine (or one small twin engine) craft to be hangared.

Improvements at the airport consist of the following:

1. One large wooden hangar (owned by the City).
2. One small wooden shed-hangar (privately owned).
3. Two metal Tee-hangars (both privately owned).
4. One wooden office and storeroom (privately owned).

5. One concrete block office (privately owned).

6. An east-west (230° - 50°) paved runway, approximately 60 feet wide and 3,150 feet in length. This runway has a graded earth extension to approximately 5,000 feet total combined length, which functions as emergency space.

7. A wind-tee and windsock, both of local improvised construction.

8. Portable low-intensity lighting for the paved runway, but the quality is sub-standard.

9. Unicom is operated by one of the attendents, when he is not on charter flight or instructing students.

The title to the land occupied by the airport is reportedly in need of certain curative work, in order to place matters in the usual concept of firm ownership. The details of this matter were not thoroughly investigated, but should be accomplished by the City at the earliest possible time.

With the rapid growth of private aviation, and the rising popularity of the Alpine area as a tourist attraction, the need for an improved air transportation facility should not be lightly considered.

The Alpine airport has been inspected by the Federal Aviation Administration in past years and has been repeatedly recommended for improvement, with Federal participation in matching funds. It is included in the 1966-1970 National Airport Plan, with the following list

of recommendations:

a. Purchase additional land for runway extensions and side clearances.

b. Extend runway and taxiway.

c. Extend aprons.

d. Install lighting, including main runway and rotating beacon.

In the spring of this year (1967), the City of Alpine initiated a formal request to the Federal Aviation Administration for matching funds in the amount of $39,000. Under joint conference with the F.A.A. representative, the application was for the purpose of providing funds for the following improvements:

a. Construct and pave a 1,400-foot extension, 60-feet wide, to the present paved runway.

b. Close the east 250 feet of the paved runway, as it is too close to the boundary fence to meet minimal clearances.

c. Construct permanent-type, medium intensity lighting on the paved runway (230° - 50°).

d. Construct new wind tee or lighted windsock, in segmented circle.

e. Construct rotating beacon.

f. Construct vault or small building to house electrical controls.

Airport Plan

The items, immediately above listed, have been recommended to

the City as a part of this Report. The plan, showing these improvements, is included in this Report on page A2. Page A3 of this Report shows the plan of development of the airport to the year 1990. In general, the plan envisions the following needs, in the interim period, as the increase in aviation activity and the availability of funds will permit.

a. Widen main east-west runway to 80 feet and extend the paved length to 5,000 feet. Construct paved taxiway.

b. Extend runway (270° - 90°) to 4,600 feet and pave 60 feet wide.

c. Extend runway (320° - 140°) to 3,000 feet and improve surface to gravel or caliche.

d. Purchase additional land to accomplish items a, b, and c, above.

e. Demolish all old wooden hangars and construct new hangar and maintenance shops.

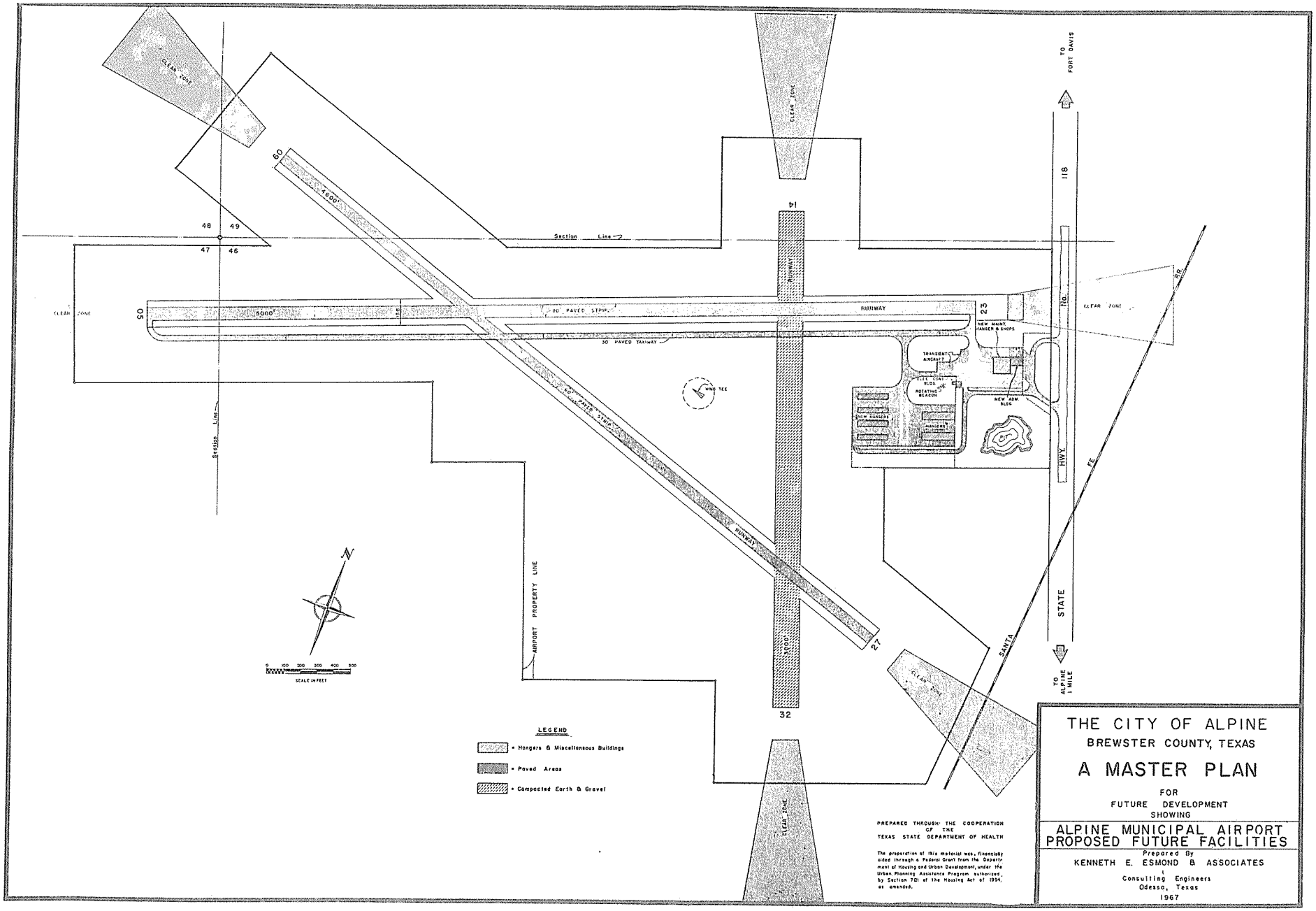
f. Construct new administration building, offices, and terminal.

g. Construct new Tee-hangars.

h. Pave additional ramps and taxiways for access to terminal area and hangars.

i. Construct paved parking and access roads.

Because of the vital importance of an airport of first quality to Alpine, the City administration and citizens at large should take a dedicated interest to keep abreast of modern trends in aviation.



CLEAR ZONE
60
4600'
48
49
47
46
Section Line
14
RUNWAY
05
5000'
80' PAVED STRIP
RUNWAY
23
30' PAVED TAXIWAY
NEW MAINT. HANGER & SHOPS
TRANSIENT AIRCRAFT
ROTATING BEACON
NEW HANGERS
NEW ADM. BLDG.
WIND TEE
60' PAVED STRIP
RUNWAY
27
32
AIRPORT PROPERTY LINE
SCALE IN FEET
TO FORT DAVIS
118
No.
HWY.
STATE
SANTA FE RR.
TO ALPINE 1 MILE
LEGEND
= Hangers & Miscellaneous Buildings
= Paved Areas
= Compacted Earth & Gravel
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PROPOSED FUTURE FACILITIES
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Odessa, Texas
1967

A3

COMMUNITY FACILITIES

SUMMARY AND CONCLUSIONS

PARKS AND RECREATIONAL FACILITIES

Existing Recreational Facilities

An inventory of recreational facilities in Alpine indicated that those existing are mostly privately owned: there are no public parks or municipally owned facilities in the town. The grounds of the public schools offer the only playground equipment available, and these have only a bare minimum of the types of equipment normally used by young children. There are concrete slabs with basketball standards and baseball practice backstops at both elementary schools. At one time, there were tennis courts at both Central and Alpine High School, but these have fallen into ruin and are no longer usable. Other recreational areas and facilities are listed below:

1. College swimming pool - This facility, like the tennis courts on the campus, is primarily for use by students and faculty of Sul Ross. Some outside use is allowed, but college activities have first consideration.

2. High School stadium - This is used as a practice field for the high school football team, and for the playing of "B" team games. The stadium area includes a track and bleacher type seating. It is not open to general public use, and is locked when not in use.

3. Jackson Field - Owned by the college, the facility includes a football field, track, seating, and a baseball practice area.

4. Kokernot Lodge - This college-owned property includes an outdoor theatre, barbecue pits and a lodge with a meeting room capable of seating up to one hundred fifty persons. The college allows general community use of the lodge, charging no rent. The outdoor theatre is used primarily for the presentation of little theatre plays during the summer. The program is headed by the director of speech from Sul Ross, and the college pays most of the cost of the productions. No admission is charged for attending the plays.

5. Kokernot Field - This is a privately-owned and very complete baseball stadium which the owner has allowed the college to use for their games, without charge.

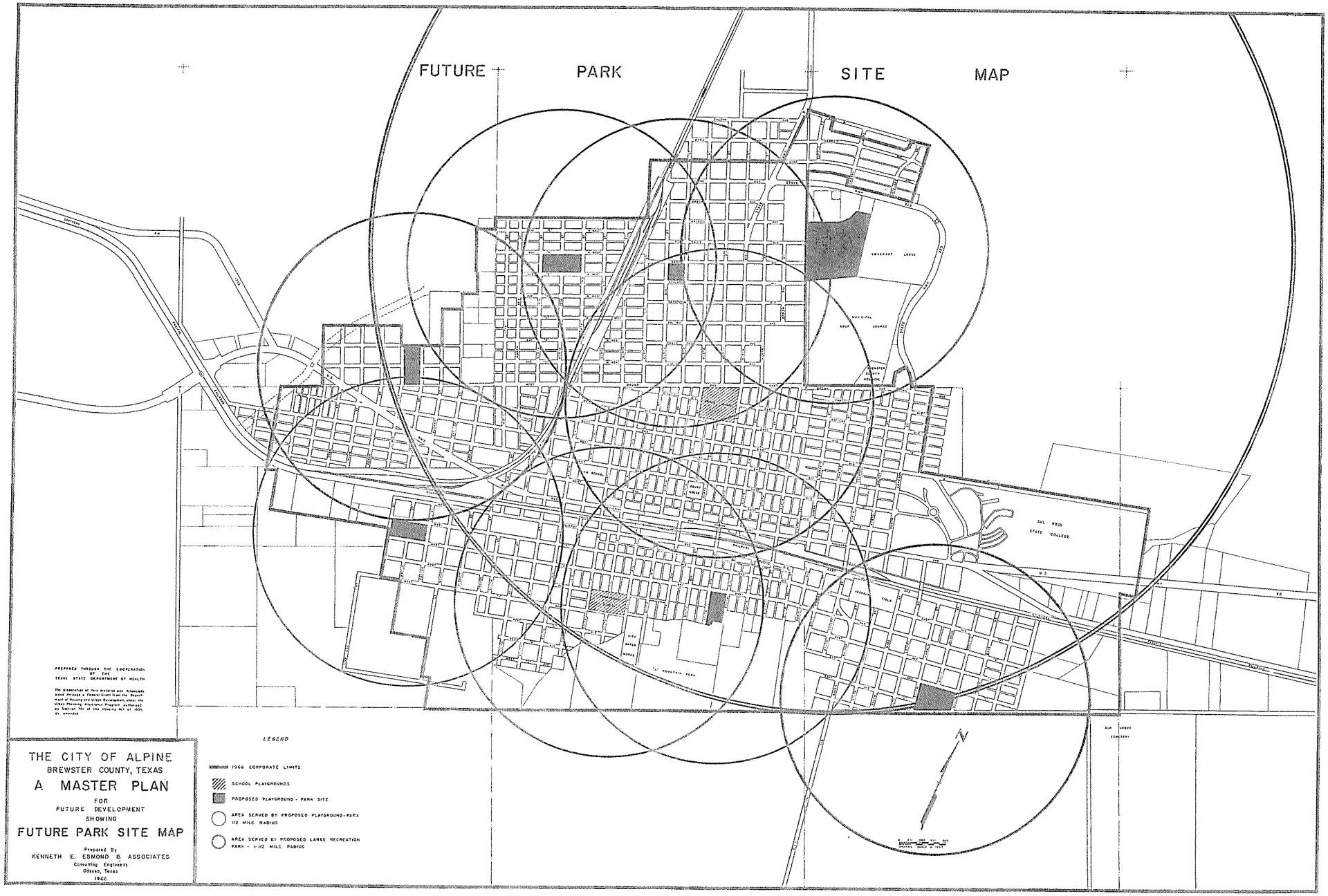
6. Rodeo grounds - Another college-owned facility, the grounds are very well equipped with a large arena, chutes, and grandstand. Student rodeos are a popular local entertainment.

7. Golf course - The nine-hole course is owned by the City, but leased to the Country Club which operates and maintains it. Anyone who wishes to play may do so by paying the required greens fee.

8. Little League baseball field - Located adjacent to Kokernot Field, this well equipped facility has a diamond with backstop, a press box, and bleachers for spectator seating. The Alpine Lion's Club organizes and sponsors a Little League baseball program during summer months.

EXISTING PARK AND RECREATION AREAS

NO.	NAME	LOCATION	SIZE IN ACRES	TYPE
1	Centennial School	South 9th & W. Ave. H	1.5	Playground
2	Central School	North 7th & W. Ave. A	3	Playground
3	High School	North 11th & W. Ave. D	.2	Special Recreation Area
4	College Swimming Pool	Sul Ross Campus		Special Recreation Facility
5	High School Stadium	W. Ave. D		Special Recreation Area
6	Jackson Field	East Murphy		Special Recreation Area
7	Kokernot Lodge	Loop Road	30	Special Recreation Area & Facility
8	Kokernot Field	Loop Road		Special Recreation Area
9	Rodeo Grounds	Old Hwy. 90	10	Special Recreation Area
10	Golf Course	Loop Road	56	Special Recreation Area
11	Little League Baseball Field	Loop Road		Special Recreation Area
12	County Library	North 7th & W. Ave. D		Special Recreation Facility
13	Alpine Community Center	402 E. Ave. G		Special Recreation Area


FUTURE PARK SITE MAP
PREPARED THROUGH THE COOPERATION OF THE TEXAS STATE DEPARTMENT OF HEALTH
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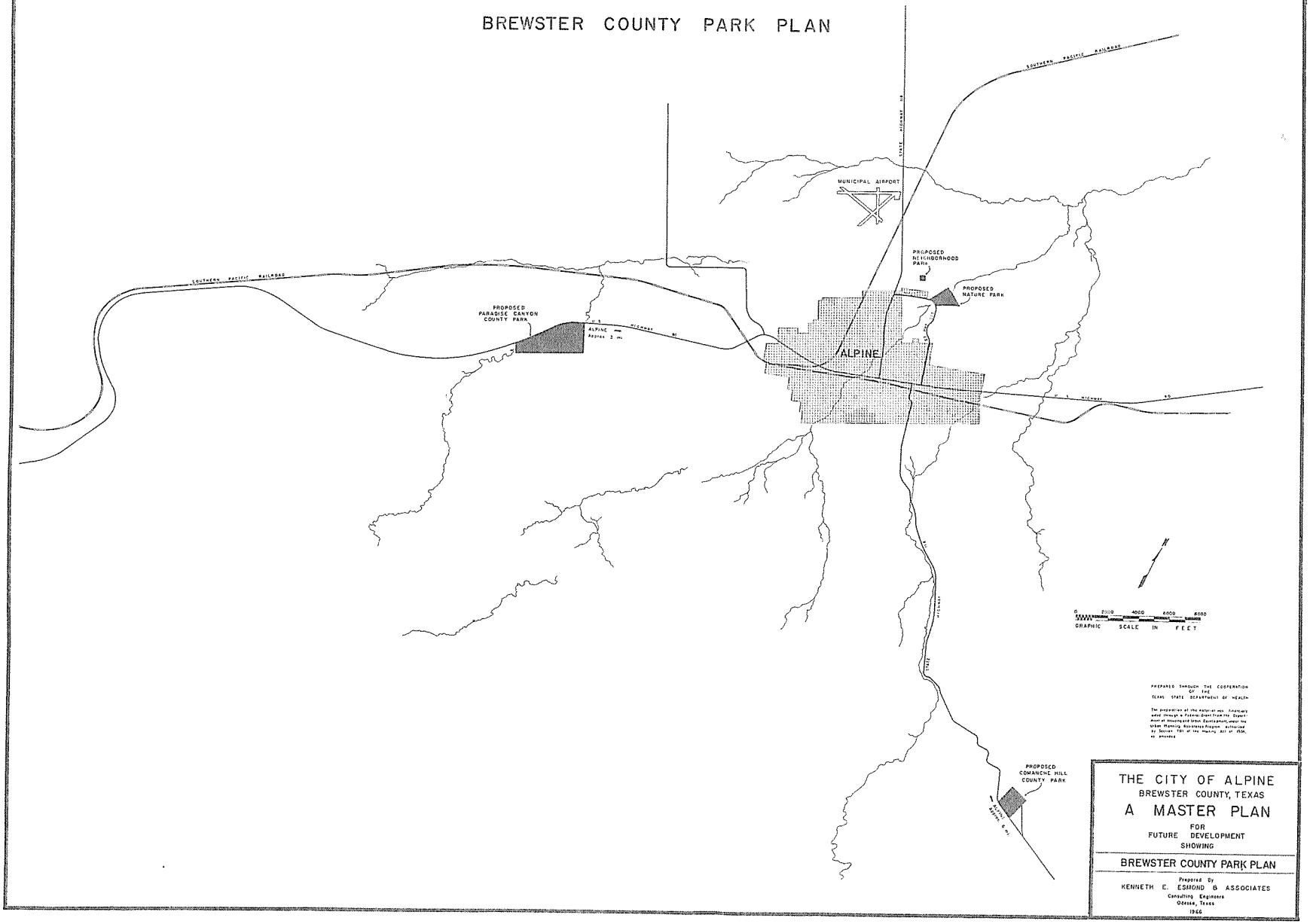
FUTURE DEVELOPMENT
SHOWING
FUTURE PARK SITE MAP
Prepared By
KENNETH E. ESMOND & ASSOCIATES
Consulting Engineers
Odessa, Texas
1966
LEGEND
1966 CORPORATE LIMITS
SCHOOL PLAYGROUNDS
PROPOSED PLAYGROUND - PARK SITE
AREA SERVED BY PROPOSED PLAYGROUND-PARK 1/2 MILE RADIUS
AREA SERVED BY PROPOSED LARGE RECREATION PARK - 1-1/2 MILE RADIUS
SUL ROSS STATE COLLEGE
N

BREWSTER COUNTY PARK PLAN



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THE CITY OF ALPINE
BREWSTER COUNTY, TEXAS
A MASTER PLAN
FOR
FUTURE DEVELOPMENT
SHOWING

BREWSTER COUNTY PARK PLAN

Prepared By
KENNETH E. ESMOND & ASSOCIATES
Consulting Engineers
Odessa, Texas
1966

9. Alpine Community Center - Owned and operated by the Board of Missions of the Methodist Church, this center renders a great service to Alpine. The building contains a large auditorium, two class or meeting rooms, a fully equipped kitchen and other work areas. Kindergarten classes are taught in half-day sessions during the nine months of the regular school year, for four, five and pre-school six year olds. Adult classes in English language, cooking, sewing and other such subjects are held regularly and a scouting program is sponsored. About 400 persons are enrolled in the various programs of the Center. When the building is not in use by the Methodist Mission activities, it is available for rent to selected groups with some restrictions placed upon activities which may be held.

An inventory of these and other recreation areas is on page P1.

Present and Future Needs

The most obvious and immediate need in Alpine is for playground space and equipment for children. Since there is adequate space on both elementary schoolyards for such equipment, it is recommended that it be added to the yards at the earliest possible date.

George W. Baines Memorial Park - Block 74, located at South 4th and East G Streets, has been donated to the City for this park site, and the improvement of the area has begun. It is recommended that this park be developed as a neighborhood park, with some facilities planned for both adults and children. Future plans should include

the acquisition of Block 1, Ferguson Addition, immediately south of this park, to be developed as part of George W. Baines Memorial Park.

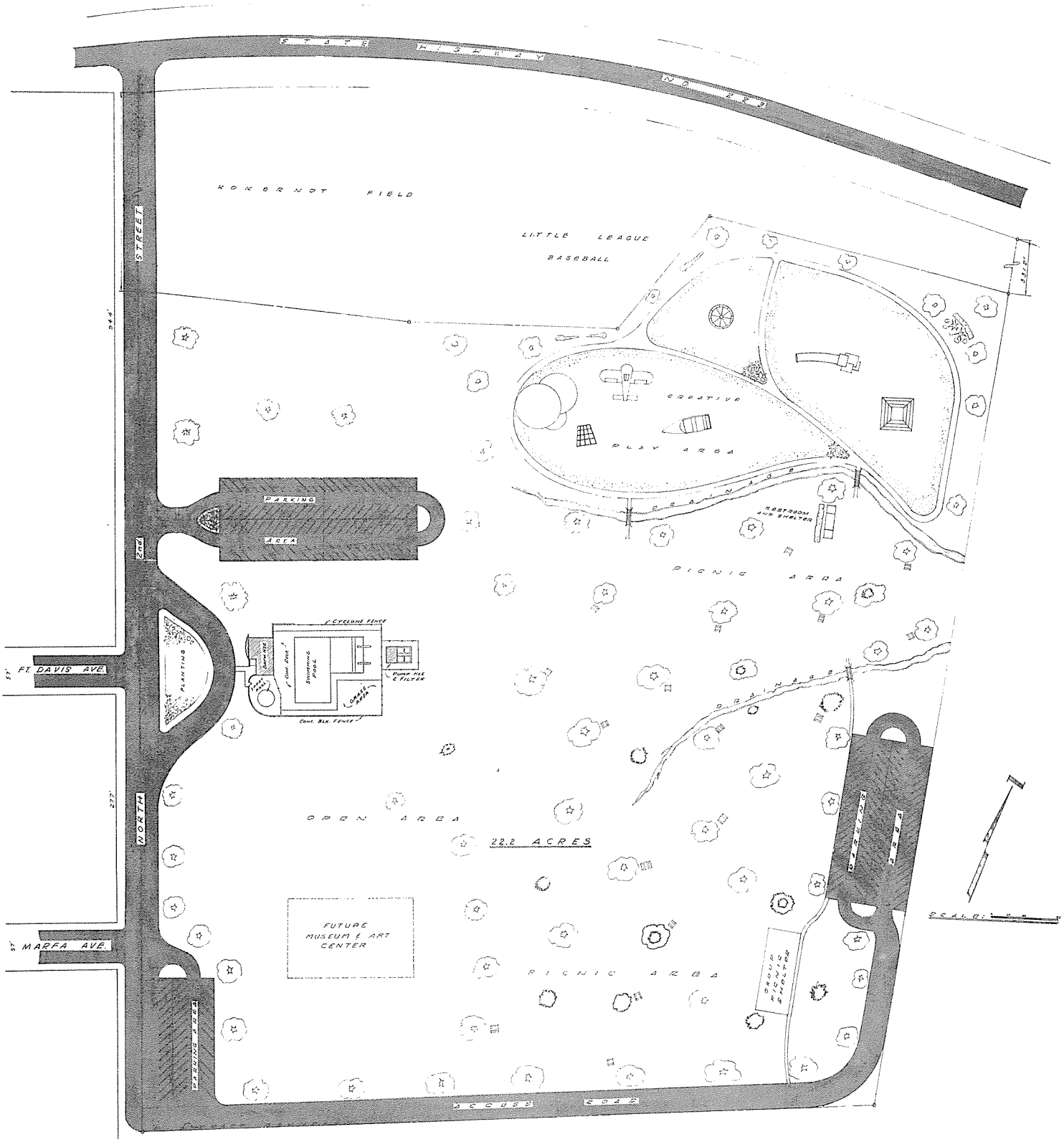
Kokernot Municipal Park - A total of 22.2 acres of land located southeast of Kokernot Field and northwest of the golf course has been donated to the City for use as a park. Plans are presently being drawn for construction of a swimming pool and bathhouse to be located on 2.5 acres of this site. This project will be financially aided by a grant from the Texas Parks and Wildlife Department. In addition to the pool area, a childrens' playground is recommended for immediate development, along with some landscaping and picnic facilities. Future plans call for paving of parking areas and a road in the park, construction of a "shelter", public rest rooms and additional playground and picnic facilities, and landscaping of the remaining park site. A map of the proposed park is on page P5.

"A" Mountain Park - This proposed park is located on approximately 32 acres of land situated on "A" Mountain in the south part of town. The tract was once donated to the City for park use, but was returned to the original owner when no development was possible. The land is still vacant, and it is recommended that the City make an attempt to re-acquire the property. Immediate plans for development include construction of an access road to the top of the mountain and a parking lot on the top. Laying out of hiking or "nature" trails and installation of some picnic facilities and shelters would complete the park for use. At a future date, further improvements could be

PROPOSED

KOKERNOT MUNICIPAL PARK

CITY OF ALPINE, TEXAS



Prepared By:
KENNETH E. ESMOND & ASSOCIATES
Consulting Engineers
Odessa, Texas
Revised August 3, 1967

made to parking and picnicking facilities, additional shelters added, and a well drilled to provide drinking water. It is also recommended that future plans consider the construction of a "Big Bend Zoo" to contain species of native wildlife.

Alpine Creek Nature Park - The land to the east of Alpine Creek and Loop Road, in the central part of Section 98, is a choice location for an undeveloped, open area type of park. The area adjoins Kokernot Lodge and extends up Sul Ross Hill. The only development recommended here is minimal clearing of brush to develop some hiking trails.

Paradise Canyon Park - This park is proposed for development on approximately 149 acres of land, located adjacent to U. S. Highway 90 about three miles west of Alpine in Paradise Canyon. Planned with a view toward attracting tourists as well as providing recreation for Alpine residents, the park should be fenced and cleared of some brush during the first phase of development. Construction of park roads, parking areas, picnic facilities and campsites in a portion of the park would complete the development recommended immediately. Future plans include additional roads and parking areas, more picnic facilities and added overnight camping sites, plus the drilling of a well for drinking water. A map of the proposed park is on page P7.

Comanche Hill Park - The location of this proposed park is a 41 acre tract of land on the top of "Big Hill" or "Comanche Hill", south of Alpine and adjacent to State Highway 118, which extends to the Big Bend National Park. The view from this hill is exceptionally beautiful

and a park site is planned primarily to serve the motorist. Immediate improvements proposed include an access road, parking area, picnic tables and shelters, and the drilling of a water well. Future improvements will consist of enlarging and improving these facilities.

Recreational Program

Many communities have found that an organized program helps the people to realize the fullest benefits from their recreational facilities. Such a program usually offers instruction in various sports, craft groups, playground games, summer concerts, and other activities. Close cooperation is needed between city, county and school officials to prevent duplication of effort and achieve the greatest measure of economy in any organized program, and it is recommended that a committee be formed for this purpose, composed of these officials. The function of this committee would be the formation of an organized program of recreation for Alpine.

Summary

Though the proposed park and recreational facilities may appear to be extensive, we believe they are well justified. The City has been remiss in the provision of such facilities and now must attempt to remedy the deficiency. Much action has already been taken by the City to begin construction of park facilities, and it is strongly recommended that these plans not be permitted to lag, but be carried out to their fullest stages of development.

PUBLIC SCHOOLS

Curriculum

Alpine Independent School District encompasses about 2,017 square miles of the northwestern portion of Brewster County, and has a scholastic population of approximately 1,300.

The curriculum offered in the different grades is varied and covers those subject which students planning to attend college are required to have, as well as vocational and general subjects for those who do not plan further education. Salaries paid to teachers average $200 per year above the State Minimum Foundation scale. The testing programs conducted in the schools indicate that Alpine students rank on a level with the national average in educational achievement.

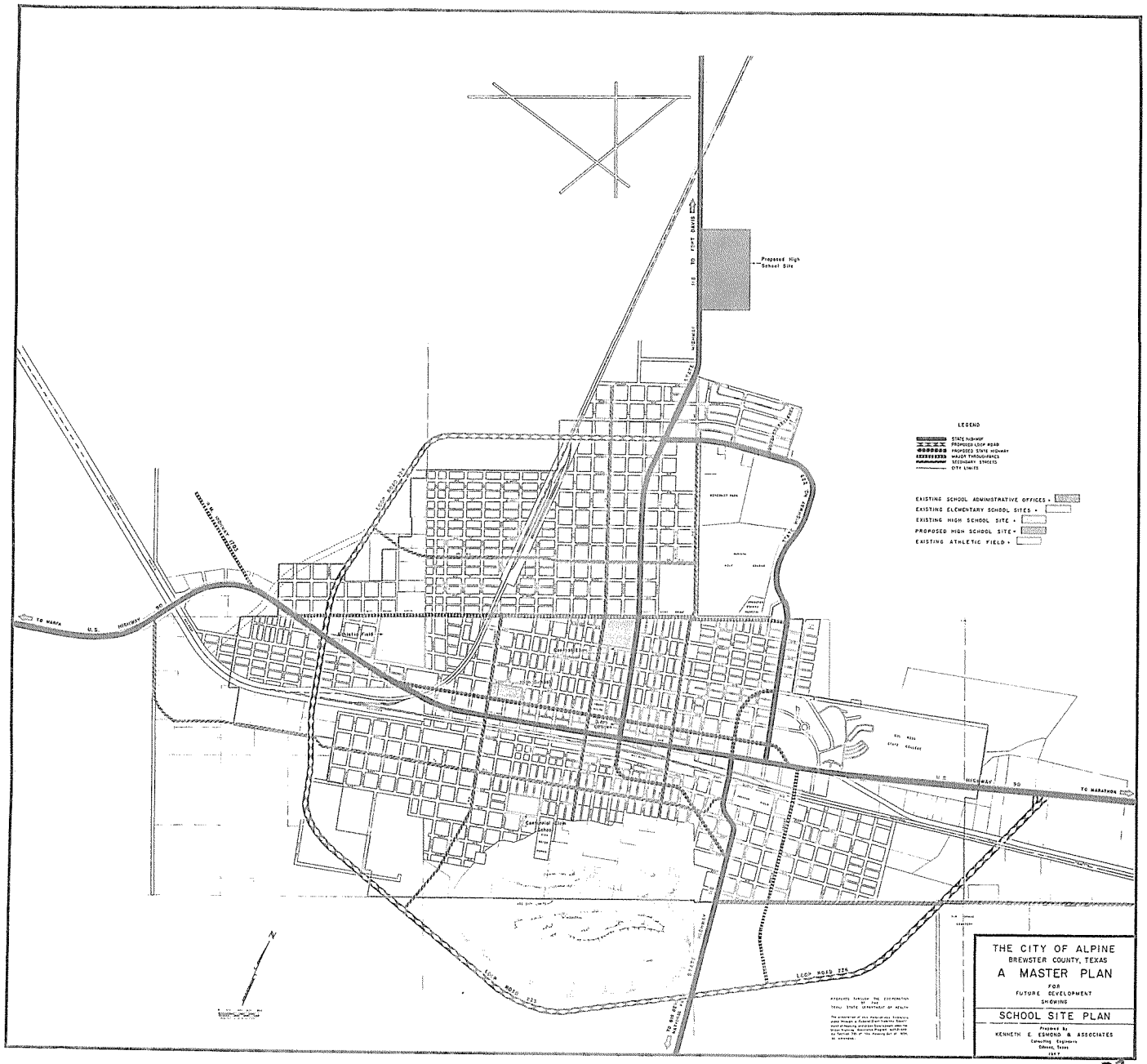
Alpine has an unusual record in the literary division of the University Interscholastic League contests, having won 20 consecutive First Division ratings, from 1946 to 1966. Athletic teams have also scored well in these contests.

Enrollment

The school enrollment was studied over the past eleven years, based on yearly reports made by the superintendent. During this period, the total enrollment has grown by 220 students, from 1,048 in 1956 to 1,268 in 1967. By determining the percentage of population which is of school age, and applying this percentage to the different grades and adjusting for expected future population, drop-out numbers,

ALPINE SCHOOL ENROLLMENT
ACTUAL AND ESTIMATED FUTURE

	YEAR ENDING	GRADES: 1	2	3	4	5	6	7	8	TOTAL	9	10	11	12	TOTAL	TOTAL ALL GRADES
Actual	1956	136	128	129	110	81	93	99	61	837	69	47	57	38	211	1,048
	1957	137	97	120	113	90	104	80	78	819	48	63	48	55	214	1,033
	1958	133	100	120	93	115	87	74	52	774	95	45	59	42	241	1,015
	1959	133	92	98	112	88	105	86	77	791	52	76	46	54	228	1,019
	1960	140	97	102	99	117	97	108	68	828	68	46	63	43	221	1,049
	1961	115	128	107	107	107	126	87	93	870	63	58	48	57	226	1,096
	1962	126	86	125	105	102	117	109	79	849	93	68	53	49	263	1,112
	1963	108	100	95	115	110	95	115	102	840	73	87	61	49	270	1,110
	1964	125	82	93	91	130	113	92	107	833	109	75	80	62	325	1,158
	1965	102	98	96	97	106	120	111	88	818	112	99	60	70	341	1,159
	1966	120	98	104	102	95	106	130	124	879	96	103	88	67	354	1,233
	1967	125	104	102	103	117	102	99	121	873	134	94	87	80	395	1,268
Estimated	1968	128	106	115	99	107	119	97	90	861	122	127	86	82	417	1,278
	1969	132	100	105	106	103	109	113	88	856	119	116	116	81	432	1,288
	1970	136	109	111	108	115	105	104	94	882	88	113	106	109	416	1,298
	1971	139	112	114	108	112	118	106	101	910	92	90	109	107	398	1,308
	1972	140	117	120	114	115	117	115	100	938	100	90	84	106	380	1,318
	1973	142	120	124	119	120	119	114	107	965	103	96	84	81	364	1,329
	1974	144	123	126	122	124	123	115	106	983	100	97	88	81	366	1,349
	1975	145	124	129	123	126	126	117	106	996	105	95	89	84	373	1,369
	1976	146	126	131	126	128	129	121	109	1,016	103	99	86	85	373	1,389
	1977	147	128	133	128	132	131	124	112	1,035	104	98	90	82	374	1,409
	1978	149	129	134	129	133	134	125	114	1,047	108	99	89	87	383	1,430
	1979	150	130	135	130	134	135	128	115	1,057	110	103	93	88	394	1,451
	1980	151	132	137	132	136	137	129	118	1,072	112	105	95	88	400	1,472
	1981	152	133	138	133	137	138	131	120	1,082	114	108	98	91	411	1,493
	1982	153	135	140	135	139	140	132	121	1,095	117	109	100	93	419	1,514
	1983	155	136	142	136	140	141	134	122	1,106	119	113	102	96	430	1,536
	1984	157	138	142	138	142	143	136	124	1,120	121	115	105	97	438	1,558
	1985	158	140	145	139	144	146	138	126	1,136	122	116	106	100	444	1,580
	1986	159	142	147	142	145	147	140	127	1,149	123	117	108	102	450	1,599
	1987	160	143	148	143	147	148	142	130	1,161	125	119	109	104	457	1,618
	1988	162	145	150	145	149	151	143	132	1,177	126	120	110	104	460	1,637
	1989	163	147	152	147	150	152	144	132	1,187	129	122	112	106	469	1,656
	1990	164	148	153	148	152	154	146	134	1,199	131	125	114	106	476	1,675
	1991	165	150	155	150	154	156	148	136	1,214	131	126	116	108	481	1,695



LEGEND
STATE HIGHWAY
PROPOSED LOOP ROAD
PROPOSED STATE HIGHWAY
MAJOR THROUGHFARES
SECONDARY STREETS
CITY LIMITS
EXISTING SCHOOL ADMINISTRATIVE OFFICES
EXISTING ELEMENTARY SCHOOL SITES
EXISTING HIGH SCHOOL SITE
PROPOSED HIGH SCHOOL SITE
EXISTING ATHLETIC FIELD
Proposed High School Site
TO FORT DAVIS
TO MARFA
U.S. HIGHWAY 90
TO MARATHON
LOOP ROAD 226
THE CITY OF ALPINE
BREWSTER COUNTY, TEXAS
A MASTER PLAN
FOR
FUTURE DEVELOPMENT
SHOWING
SCHOOL SITE PLAN
Prepared by
KENNETH E. ESMOND & ASSOCIATES
Consulting Engineers
Odessa, Texas

E3

and other considerations, an estimate of future enrollment to the year 1991 was made, and is shown on page E2. This estimate indicates that a total of about 1,695 students may be expected to be enrolled in Alpine schools by 1991.

Financial Status

For the past several years, the tax levied by the Alpine Independent School District has been $1.75 per $100 of assessed valuation. The percent of actual valuation used for taxation has varied from 25% to 31%. In 1967, the tax rate was lowered to $1.65 per $100 and the percent of actual value taxed was increased to 48%. Present bonded indebtedness of the district is $240,000, and an additional $47,000 is owed to the local bank.

Under the old rate of $1.75 per $100 at 31% of total value, the tax charged a home owner whose property is valued at $10,000 was $54.25. Under the new rate of $1.65 at 48%, the tax on this same home will be $79.20.

Physical Plant Analysis

An inventory and analysis of each school was made. A summary of the findings follows.

Centennial School - The main building at Centennial, including additions, contains 16 classrooms. The building appears to be in very good condition, and rooms are spacious and fairly well equipped. Four additional classrooms and the library are provided in an old army

building which was moved onto the campus in 1947 and remodeled. This old wooden building has far over-reached its original life expectancy. The gymnasium is also an old army building, presently in poor condition. Playground equipment is very limited, and the playground is fenced. Gates are locked by late afternoon, and the facilities are no longer available for use by neighborhood children.

Immediate improvements recommended for Centennial are:

1. Remove the old army building known as "Centennial Annex" from the campus. Renovate one classroom of the main building for use as a library.

2. Remove the old army building used as a gymnasium.

3. Construct a "cafetorium" for athletic activity, assembly purposes, and the serving of food.

4. Discontinue transporting the students across town by bus to Central School for lunch; food will be prepared in the Central School kitchen and brought to Centennial School for serving.

5. Purchase additional playground equipment.

6. Remove fence from all playground except those areas used for ball practice, leaving playground open for the use of neighborhood children.

These recommendations leave 15 instruction classrooms at Centennial, which will accommodate 375 to 400 students without over-crowding. It is proposed to move the 7th and 8th grades to a new junior-senior high school. During 1966-67, total enrollment at Centennial was 456.

Of these, 110 were 7th and 8th grade students, and their removal leaves 346 students. This allows for some increase in future enrollment at this school, and no additional facilities are planned for construction here. Careful and regular maintenance of the building should keep it in good condition through the planning period.

Some arrangement of districts, based on the place of the student's residence, may need to be established in order to determine which school a child will attend.

Central School - Eight classrooms at this school are in a modern one-floor building, constructed in 1963, which also houses the library, workroom and book room, and the principal's office. With continued good maintenance, the building should serve through the planning period, and beyond.

The remaining eight classrooms at Central School are on the lower floor of a two-story building, which is 57 years old. The top floor is now used only for storage. The general condition of the building is poor, the inside is of wooden frame construction, and there is some evidence of structural failure.

The gymnasium is an old army building which was moved onto the campus and remodeled in 1947. The playing floor is uneven and has undergone some poorly constructed repairs. The entire wooden interior of the building needs paint.

Very little playground equipment is provided.

Improvements proposed for immediate construction at Central:

1. Construct a wing, extending south from the east end of the new Central building, containing eight classrooms. Enlarge the present library, book room and workroom space where the new wing connects with the existing building.

2. Tear down and remove the old Central building from the campus.

3. Purchase and install additional playground equipment.

The seventh and eighth grades should be moved to the proposed new junior-senior high school, leaving Central an elementary school. Total enrollment (grades 1 through 8) at Central during 1966-67 was 432. Of these, 110 were 7th and 8th graders, and their removal leaves 322 students in the elementary grades. The school, as improved, can accommodate 400 to 425 students before classrooms become crowded.

Improvements proposed for future construction at Central:

1. Construct an additional 8 classrooms, connecting to the south end of the wing built under the immediate improvements program, making a total of 24 classrooms in the building.

2. Enlarge cafeteria and kitchen facilities to accommodate added numbers of students expected by 1991.

3. Remove existing gymnasium from the campus and construct a new facility.

Alpine High School - The main building was erected in 1929 and is of brick with wooden interior construction. A 672-seat auditorium is

included in the building.

In 1947, a total of four old army buildings were moved onto the campus. The largest was converted to use as a gymnasium and band hall, and the three smaller ones were used for classrooms and to house the vocational agriculture and home economics departments. In 1961, the administrative offices were moved into an old residence located on the northwest corner of the campus. These have since been moved to a downtown office, and the residence is now used to store maintenance equipment and as a meeting place for one class. There is no maintenance building, and busses are parked behind the residence.

The converted army buildings and the old residence are in very poor condition, and the main school building also needs much repair. In view of the total number of classrooms needed to accommodate the student load, it is deemed impractical to undertake construction at the present site. The school system has recently obtained an option to purchase a 35-acre tract of land north of the city limits and adjacent to Highway 118. It is recommended that this site be used for construction of a new facility, and that the following improvements be made.

Immediate improvements recommended for Alpine High School:

1. Construct a new junior-senior high school with sufficient space to accommodate the approximately 647 students expected in grades 7 through 12 by the year 1980, including a cafeteria for the serving of food and use as an assembly room.

2. Construct new gymnasium and practice fields for athletics.

3. Dispose of existing practice field and stadium.

4. Remove the old residence and all converted army buildings, except the gymnasium, from the present high school site.

5. Renovate the main building to house the administrative offices and refurbish the auditorium for continued use.

6. Convert the gymnasium to maintenance barn use.

Future improvements recommended for Alpine Junior-Senior High School:

1. Construct six additional classrooms.

2. Construct a new auditorium with approximately 1,000 seats.

3. Improve and add to existing athletic facilities where needed.

A map showing the site of the proposed new school, and of existing schools, is on page E3 of this Report.

PUBLIC BUILDINGS

A survey of the major public buildings in Alpine was made, and the findings and recommendations concerning each are summarized below:

Fire Department

Alpine has a volunteer fire department with twenty three members and a fire chief on the roll at the present time. Housed in a concrete block building, constructed in 1955 and containing about 300 square feet, the department appears to be very well equipped. The five fire trucks, hose and other necessary equipment are in good condition, and meet or exceed the minimum requirements of the Texas State Board of Fire Insurance. Weekly training meetings are held for the volunteers, and a siren warning system is used to alert the town to an emergency.

While the building is of adequate size to house the trucks and hose, there is limited space for storage of other items and no office space for the fire chief. At present, the trucks must be moved out of the building to allow room for the training sessions. A properly heated and ventilated room should be provided for this purpose. A building adjoining the existing fire station would provide the needed equipment and record storage, office space and training room. It is recommended that such an addition be made to the present fire station.

Police Department

The offices of the police department are housed in a privately-

owned building which the City rents jointly with the Civil Defense Department. Telephone service is shared by the City, the Civil Defense, and the Brewster County Sheriff's office. The City owns the police radio equipment, which serves all three offices, and the salary of the dispatcher is paid in equal amounts by the City, the Defense and Disaster Relief department, and the County Sheriff's office.

There are no jail facilities of any kind, and persons arrested by the City are confined in the Brewster County jail. This is a workable situation at present; however, it would be highly desirable for the police department to have some space available for the temporary detention of prisoners, at least during the time of investigation and questioning.

City Hall

The administrative offices and meeting place of the Alpine City Government are housed in a building 61 years old, located in the downtown area. The building contains about 1,700 square feet of floor space and includes one large room, one small room, the Council meeting chamber, and two fireproof vaults for records. The building is in generally good condition, but lacks much needed space. The large room serves as the work space for all departments, and is the place where the townspeople come to pay water bills and taxes, and to attend to other business with the City. The small room is little more than a wide place in the hall, and holds the City Secretary's desk. The

Council meeting room is about 20 feet square, with a large table and chairs for the Councilmen almost completely filling the floor space. The two fireproof vaults are both full, and many old records are stored at the City's warehouse on South Hill.

The City of Alpine owns one-fourth of a block of land on the southeast corner of the intersection of Avenue E and 3rd Street. This is an ideal location for a city hall, close to the downtown area and between the two main arteries of traffic. The land immediately east of the City property is vacant, except for a commercial building on the corner of Avenue E and 2nd Street. It is recommended that the City acquire this vacant land, close the north-south alley which separates it from the property which they now own, making one continuous tract of land, and build a new city hall on the site with room for parking and future expansion when needed.

In the planning for a new building, consideration should be given to the necessary functions which it must house. The following suggests some of the more important factors.

The new facility should include the following:

1. Office and work area for the Utilities Superintendent.
2. Office for the City Secretary.
3. A large workroom for water department accounting.
4. A workroom for the tax department.
5. A small work area for office copying, mimeographing, etc.
6. Ample storage space for paper supplies, stationery, etc.

7. Fireproof vaults adequate for present needs and future record storage.

8. A council room of adequate size to permit a seating area for citizens attending meetings.

9. The police department offices.

10. Jail facilities, adequate for the temporary detention of prisoners.

11. A drive-in window for payment of water bills.

The building which now houses the City's offices should be placed on the market for sale.

MAINTENANCE BARN AND STORAGE YARD

The maintenance barn and warehouse is a corrugated galvanized iron building, about 40 feet by 100 feet in size, located on South Hill in the southern portion of the City. It is surrounded by a fenced yard, in which the City's heavy equipment is parked or stored.

The area appears to be of adequate size for the necessary storage, and maintenance and repair operations which are done there.

The yard is somewhat untidy in appearance, due largely to uncut weeds and scattering of supplies, such as pipe and tires, at random over the area. Periodic cutting of weeds and a practice of stacking supplies, storing obsolete equipment, and parking working equipment in specific places should be established.

Library

The Alpine Public Library is owned and operated by the Alpine Public Library Association, Inc., and is housed in a county-owned building which was once a residence. About 34,000 volumes make up the bulk of the library's contents, and about 100 reference books are available. Withdrawals average 250 per day, but no record of the total number of persons borrowing books is kept. Two full-time and two part-time employees make up the paid staff, and a volunteer librarian oversees the operation.

By American Library Association Standards, this library has less than the needed seating space and fewer volumes than recommended. However, the facility does not appear to be overloaded, probably due to the college library which is open to the public.

The building is well-arranged and lends a quiet charm and pleasant atmosphere. So long as the demands placed upon this library do not exceed its capabilities, the present building and operation should continue to function adequately.

Brewster County Courthouse and Jail

Courthouse: This two-story red brick building was constructed in 1887, and is a landmark in the area. The ground floor houses seven offices and the upper floor contains a large courtroom, a meeting room for jurors, and the office of the 83rd District Court Judge. No provision is made for any of the county commissioners or the district attorney.

The office of the district and county clerks is in a separate building, located immediately west of the main courthouse. This is a one-story structure, with a basement, which is built of steel and fire-proof masonry, and the entire building serves as a fireproof vault for record storage. It was constructed in 1930 and though the building is apparently in good structural condition, it is beginning to show some signs of deterioration. Storage and work space within the offices are presently used to full capacity.

Most offices within the main courthouse are used to their full capacity and very little room exists for growth. The offices of both the county judge and county attorney are small and somewhat crowded, and there is no work space for any secretarial help. These offices, together with a meeting room for the use of the county commissioners, should be grouped together with a central reception room and work space for a secretary-receptionist.

The County Jail is located in a two-story brick building on the same block with the Courthouse. It was built in 1897, and is in only fair condition, requiring frequent repair. The building houses the jail on the second floor and a small apartment on the first floor which serves as living quarters for a deputy who functions as the jailer. The sheriff's office is in a small separate building located on this same block, and is very crowded. During 1964, 220 persons were jailed in this building for varying lengths of time. During 1965, the total was 281 and in 1966, there were 306. These totals do not include

aliens, who are generally confined for only about 24 hours before being moved elsewhere. The average daily load varies from a minimum of 6 to a maximum of 16 prisoners. On exceptional days, more than 40 prisoners have been jailed. The jail is designed to hold a maximum of 20 persons and facilities are inadequate to provide the separation of juvenile and adult, male and female prisoners, as prescribed by law. There are no separate cells for confinement of drunks, or dangerous prisoners.

Recommendations for Brewster County Courthouse and Jail:

It is the conclusion of this Report that additional space is needed in the courthouse, and that the existing jail facilities and sheriff's office are inadequate and antiquated, and should be replaced at the earliest possible time. The site of the present courthouse has ample space for additional building, and it is recommended that a two-story annex, or wing, be constructed adjoining the north side of the existing building. The lower floor should be large enough to provide the needed office space for the sheriff, county judge, county attorney, county commissioners, and district attorney, as well as housing the district and county clerks' offices and record storage. The upper story would contain the jail and living quarters for the jailer. Space for the mechanical equipment necessary in the building's operation, and additional storage space, should be provided by a basement. The building which houses the present jail, sheriff's office and county clerk's office should be removed.

Brewster County Hospital

Established in 1957, the Brewster County Hospital is housed in a very nice, modern building on a pleasant hillside location in the north part of Alpine. The hospital has 52 beds and a nursing staff of 6 registered nurses and approximately 20 licensed vocational nurses. Six local doctors and two from Marfa make up the "regular" medical staff. Other out-of-town doctors serve as consultants in special fields. Two operating rooms, one delivery room, one recovery room, and full laboratory facilities are available; the nursery has five bassinets.

The average patient load is 25 persons.

Valle Hi Nursing Home

Located in the near-vicinity of the hospital in an attractive building, this privately-owned facility has space for 40 patients. Nursing care is provided for elderly or chronically ill persons and for those convalescing who need extended nursing care.

Post Office

The Alpine Post Office is housed in a brick building containing about 7,815 square feet of floor space. The structure was built in 1938 and is owned by the United States General Services Administration. There are presently 856 postal boxes available to patrons, and sufficient space to add another 250 boxes. Two carriers deliver mail to houses within the city limits, and one Star route delivery is made

between Alpine and Terlingua. No other rural delivery is made. The building is in very good condition, and office and box spaces appear to be adequate for many years to come. The parcel post department and mail work areas, however, are presently filled to capacity, and it is likely that more space will be needed for these services in the future. The site of the post office is sufficiently large to permit an addition to the building, or an annex building could be constructed, or leased, at another location for the specific use of the parcel post department and carrier mail.

Summary of Recommendations

1. Build an addition to the existing fire station for a training room, equipment storage, and Fire Chief's office and record storage.

2. Continue regular review of equipment and other standards which the Department must meet to comply with Texas State Board of Fire Insurance requirements.

3. Acquire the vacant land to the east of the City-owned property on the southeast corner of the intersection of Avenue E and 3rd Street.

4. Construct a new City Hall on this site.

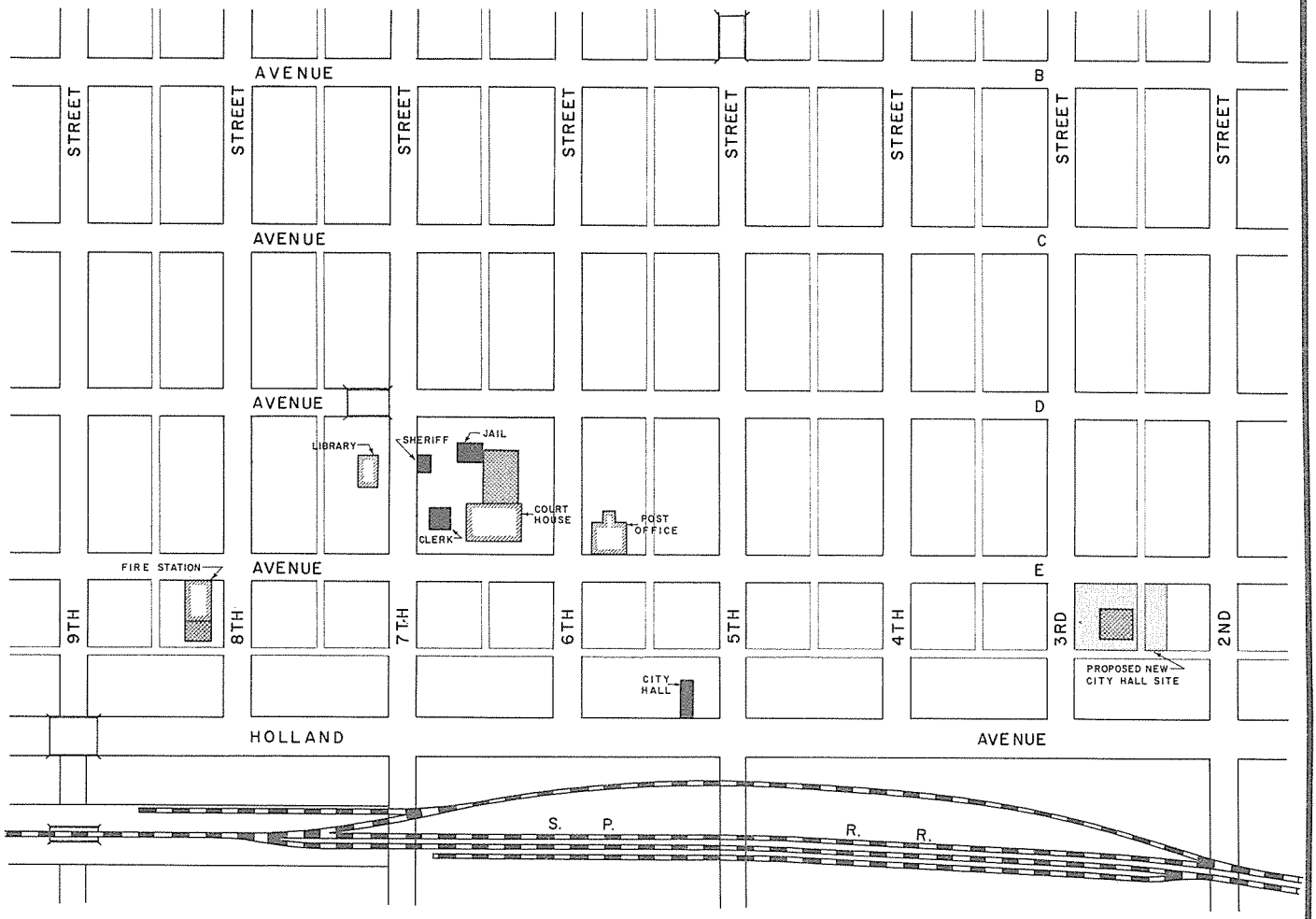
5. Sell the present City Hall building and site.

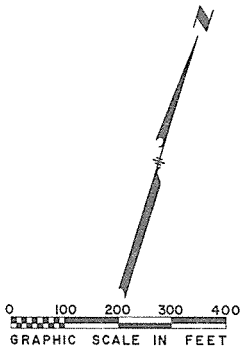
6. Construct an annex, or wing, adjoining the north side of the existing Courthouse, to contain the County Clerk's office, the Jail and

Sheriff's Department, and provide additional space for offices in the present Courthouse.

The timing of these improvements, the types of construction and their approximate cost should be coordinated carefully by the various authorities and governmental agencies involved.

PUBLIC BUILDING SITE PLAN





PREPARED THROUGH THE COOPERATION OF THE TEXAS STATE DEPARTMENT OF HEALTH

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LEGEND

EXISTING PUBLIC BUILDINGS =

PROPOSED PUBLIC BUILDING IMPROVEMENTS =

EXISTING PUBLIC BUILDINGS TO BE DISPOSED OF =

THE CITY OF ALPINE

BREWSTER COUNTY, TEXAS

A MASTER PLAN

FOR FUTURE DEVELOPMENT SHOWING

PUBLIC BUILDING SITE PLAN

Prepared By
KENNETH E. ESMOND & ASSOCIATES
Consulting Engineers
Odessa, Texas
1967

UTILITIES AND DRAINAGE

SUMMARY AND CONCLUSIONS

WATER SYSTEM

Generally, the study of any water system is divided into three separate major categories. In like manner, this study of the Alpine water system is comprised of these divisions: (1) water supply system, (2) storage, and (3) distribution system.

Alpine's water system is subjected to a wide range of demands. The demand placed upon the system varies through a wide cycle daily and even a wider cycle monthly and seasonally. If the water system is to provide adequately for the consumer, it must be capable of meeting the maximum demands placed upon it at any given instant of time.

A period of six years (1961-1966) was used to determine the demand placed upon the system, since these were the most reliable records available at the time of this study. The average daily water consumption over the entire six years studied was 924,500 gallons. A multiplier of 235% is used to determine the peak demand day, based on the annual average day. Therefore, the peak demand or useage calculated by this formula would be approximately 2,200,000 gallons per day.

Generally, the peak rate of demand is 180% of the average daily useage. Using this factor and on the maximum day of more than two million gallons total use, the rate of flow during the hours of peak demand reaches 3,600,000 gallons per day, or 2,500 gallons per minute.

Supply System

Underground water is presently the only source of water for the City of Alpine and is produced from two well fields: (1) Nine wells located in and adjacent to the City, and (2) Sunny Glen field, consisting of nine wells located three miles northwest of the City, east of Sunny Glen Canyon. Several studies have been made of the water resources of the area, one of which was made by hydrologist, Mr. Ed L. Reed, P.E., and concerned specific ground water resources for the City of Alpine.

There are nine operative wells in and adjacent to the City which supply water to the system at the present time. The wells vary in pumping capacity from 25 gallons per minute to 310 gallons per minute, with a total capacity of 845 gallons per minute, or 1,216,800 gallons per day. Mr. Reed indicated in his report that the existing wells are producing water at their maximum capacity, being limited by the characteristics of the ground water formation and that the City should not drill any more wells in the immediate area to bolster water production.

The wells now producing in the Sunny Glen Well Field range in pumping capacities from 50 gallons per minute to 175 gallons per minute with the total production of the field being 745 gallons per minute, or 1,072,800 gallons per day. A 42,000 gallon detention tank is located in the field into which all of the wells pump. An eight-inch line extends from the tank into the City, through which water partially flows by gravity. Pumps are used to increase the flow when the demand indicates the need for additional water. In his report, Mr. Reed has recom-

mended that no further increase in water production from the Sunny Glen field should be made by the City.

The combined maximum production from the two well fields is 1,590 gallons per minute, or 2,290,000 gallons per day. It is reasonable to assume that during the past few summers, water consumption during some extreme peak days has exceeded the production of the two well fields. The deficit was withdrawn from storage and was not replaced until the water consumption lessened.

It has been reported in authoritative studies that the annual safe yield from the City's present wells is 400,000,000 gallons. This capacity only allows for a water consumption increase of 5 percent above the amount used during the peak year, 1964. Such increases are to be expected, due to either population growth or increased per capita use, or both.

Future Requirements

The Bureau of Business Research of the University of Texas has projected the growth of Alpine to include 11,000 persons by 1991. The present water useage, per person, is 180 gallons per day. Assuming that this per capita use remains constant, the average daily water demand in 1970 will be 1,134,000 gallons per day and by 1991, will be 1,980,000 gallons per day. These growth rates will call for a "peak day" demand of 2,665,000 gallons in 1970, and 4,653,000 gallons in 1991, with the expected annual water requirements of 413,000,000 gallons in 1970 and 722,700,000 gallons in 1991.

Alpine has outgrown the yield from both of the existing well fields; therefore, additional sources of water need to be found. Two sources of new water supply are available to the City: (1) ground water from wells located in new fields and (2) surface water from lakes or reservoirs filled by storm runoff. The Musquiz Creek area seems to be the most promising new ground water supply available in the area, while a reservoir in Sunny Glen Canyon is the best proven location for a surface reservoir.

Water Supply Recommendations

1. Replace the pump in South Hill Well No. 4 with a submersible pump of proper size.

2. Replace pump in Funk Well with pump of proper size to eliminate need for throttling to prevent well from pumping off.

3. Replace pump in Parker Well with one of proper size for well capacity.

4. Procure easement for pipeline from Kokernot Well to Parker Well to Funk tank.

5. Drill additional large diameter test well in the Musquiz area and run pumping tests designed to guide the trained hydrologist in determination of possible reservoir yields, capabilities, and dependability.

6. Develop two wells in Musquiz, if proven advisable, and construct pipeline into town.

7. Install automatic chlorinators at all detention tanks serving

more than one well.

8. Prepare plans for automation of all producing wells and instigate a program for installing well automation, as possible.

9. Develop and complete new Daugherty Well to replace existing well in order to eliminate interference.

10. Enter into cooperative program with the U. S. Geological Survey to gauge flow of various creeks, beginning with Sunny Glen.

11. Evaluate stream flow data obtained through program with the U. S. Geological Survey relative to surface water reservoirs for water supply to the City of Alpine.

12. Instigate a program to train other men in addition to the Water Superintendent as water works operators. The City should have more than one qualified and certified water works operator.

13. After the yield from the Musquiz area has been estimated, the City should continue in long range planning of additional sources of water supply, both ground and surface. This planning and exploration should be carried out to such an extent that the City can determine their needs and source of supply well in advance of the actual demand.

Water Distribution System

The Alpine water distribution system is made up of a network of pipelines, eight inches in diameter and smaller in size. Many consumers are served by lines as small as 3/4 inch in diameter. Approximately 25 percent of the fire hydrants in the City are fed from four-

inch or smaller lines and the State of Texas Insurance Commission does not recognize fire hydrants served by lines less than six inches in diameter as being of any value. There are also a large number of dead-end lines in the existing system.

The future water distribution system design has been divided into two parts: (1) immediate improvements, those required to provide an adequate distribution system to meet the demands of the present population, and (2) the future inprovements, those required at a future date to provide for anticipated increased population and demands.

The proposed immediate improvements, the proposed future improvements, as well as the existing water distribution system are shown on the map on page U9. The relation of the Musquiz Creek area to the Sunny Glen Well Field and the City of Alpine is shown on the map on page U10.

The Texas Board of Insurance sets water storage requirements which must be met to keep a city's key rate charges, as applied to insurance premiums, to a minimum. Based on Alpine's present estimated population of 5,500, the elevated storage tank requirement is 298,000 gallons and the ground storage tank requirement is 715,000 gallons. The existing tank capacities seem adequate at the present time; however, some repair is needed.

Summary of Immediate Proposed Distribution Improvements

1. Construct 8-inch distribution feeder in 13th Street and Avenue F to provide additional connection of Sunny Glen supply line and

South Hill reservoir to the mercantile district and to the Sul Ross Hill reservoir.

2. Repair and replace old and obsolete lines and services in Holland Avenue and Avenue E that are to be covered by proposed Texas Highway Department street improvements.

3. Provide additional fire hydrants in the expanded mercantile district along Holland Avenue.

4. Construct 8-inch, 6-inch, and 4-inch lines to provide improved service to several sections of the City.

5. Construct new ground storage reservoir in connection with development of the Musquiz supply source, if such development proves feasible.

6. Provide additional fire hydrants in several areas of the City.

7. Repair reservoir on South Hill.

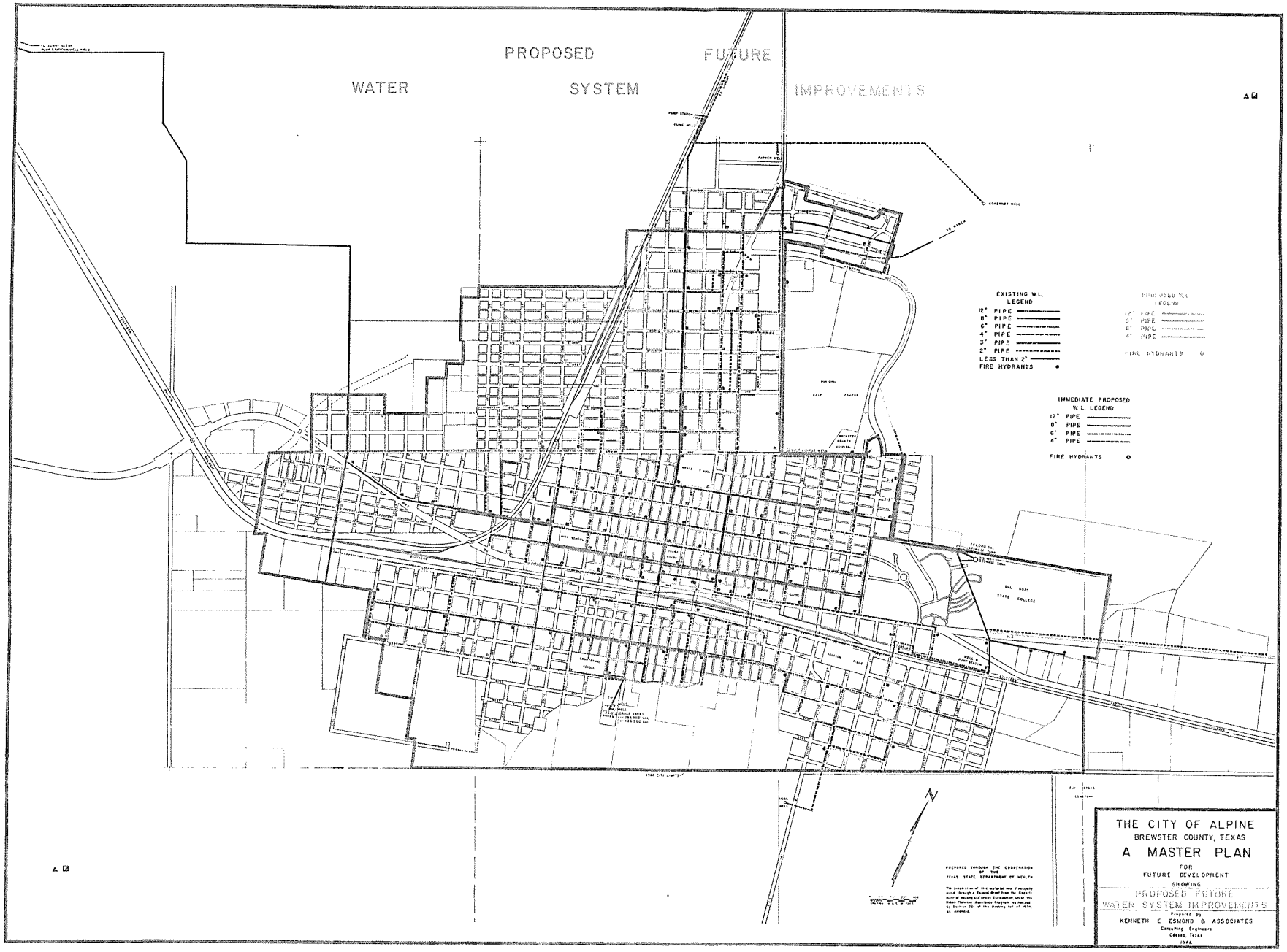
Summary of Requirements for Future Distribution Improvements

1. Construct additional distribution lines to serve the requirements of the population, in general.

2. Install additional fire hydrants to meet the State Fire Insurance Board requirements.

3. Replace all old, small lines with at least 4-inch pipe. In the future, no line smaller in diameter than 4-inches should be constructed in the City distribution system.

4. Construct a new ground reservoir in Sunny Glen well field area.


PROPOSED FUTURE
WATER SYSTEM IMPROVEMENTS
EXISTING W.L. LEGEND
12" PIPE
8" PIPE
6" PIPE
4" PIPE
3" PIPE
2" PIPE
LESS THAN 2"
FIRE HYDRANTS
PROPOSED W.L. LEGEND
12" PIPE
8" PIPE
6" PIPE
4" PIPE
FIRE HYDRANTS
IMMEDIATE PROPOSED W.L. LEGEND
12" PIPE
8" PIPE
6" PIPE
4" PIPE
FIRE HYDRANTS
THE CITY OF ALPINE
BREWSTER COUNTY, TEXAS
A MASTER PLAN
FOR
FUTURE DEVELOPMENT
SHOWING
PROPOSED FUTURE
WATER SYSTEM IMPROVEMENTS
Prepared By
KENNETH E. ESMOND & ASSOCIATES
Consulting Engineers
Odessa, Texas
1966
PREPARED THROUGH THE COOPERATION OF THE TEXAS STATE DEPARTMENT OF HEALTH
The preparation of this material was financially aided through a Federal Grant from the Department of Housing and Urban Development, under the Urban Planning Assistance Program, authorized by Section 701 of the Housing Act of 1954, as amended.

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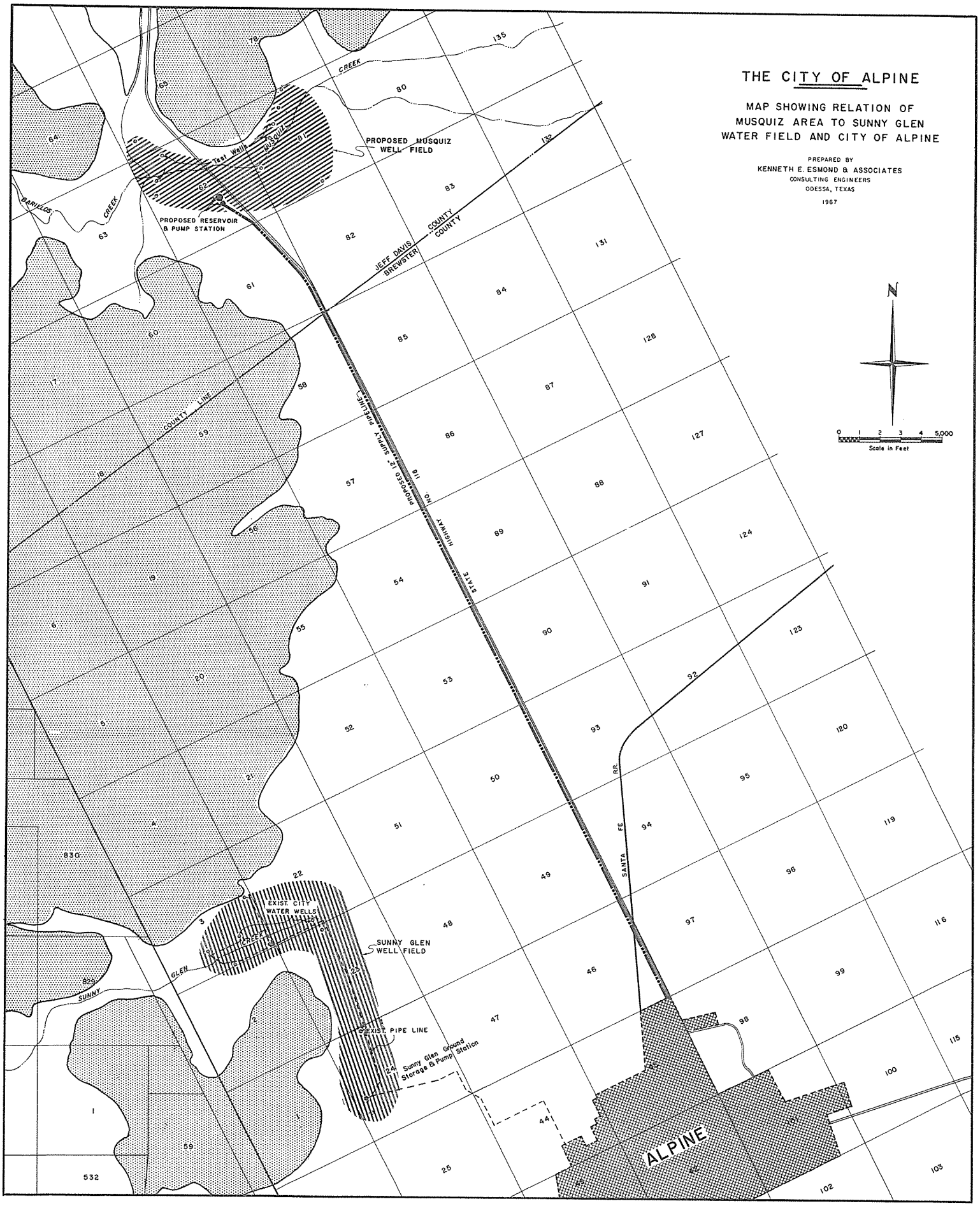

THE CITY OF ALPINE
MAP SHOWING RELATION OF MUSQUIZ AREA TO SUNNY GLEN WATER FIELD AND CITY OF ALPINE
PREPARED BY
KENNETH E. ESMOND & ASSOCIATES
CONSULTING ENGINEERS
ODESSA, TEXAS
1967
N
0 1 2 3 4 5,000
Scale in Feet
PROPOSED MUSQUIZ WELL FIELD
Test Wells
MUSQUIZ
CREEK
PROPOSED RESERVOIR & PUMP STATION
BARILLOS CREEK
JEFF DAVIS COUNTY
BREWSTER COUNTY
COUNTY LINE
STATE HIGHWAY NO. 118
PROPOSED 12" SUPPLY PIPELINE
SANTA FE R.R.
EXIST. CITY WATER WELLS
SUNNY GLEN CREEK
SUNNY GLEN WELL FIELD
EXIST. PIPE LINE
Sunny Glen Ground Storage & Pump Station
ALPINE

SANITARY SEWERAGE SYSTEM

The Alpine sewerage system can be divided into three parts:

1. The collection lines;
2. The outfall line; and
3. The disposal plant.

Collection Lines

In order to analyze the adequacy of the present and future collection lines, it was necessary to map the existing system. The map on page U15 portrays both the present collection and outfall lines, as well as the recommended immediate and future improvements. Analysis of both the present and proposed systems made use of the following data:

1. The "Economic Potential and Population" Report, of this plan;

2. An average sewage flow of 80 gallons per capita per day (a figure widely used for West Texas and recently re-confirmed in studies by this firm.

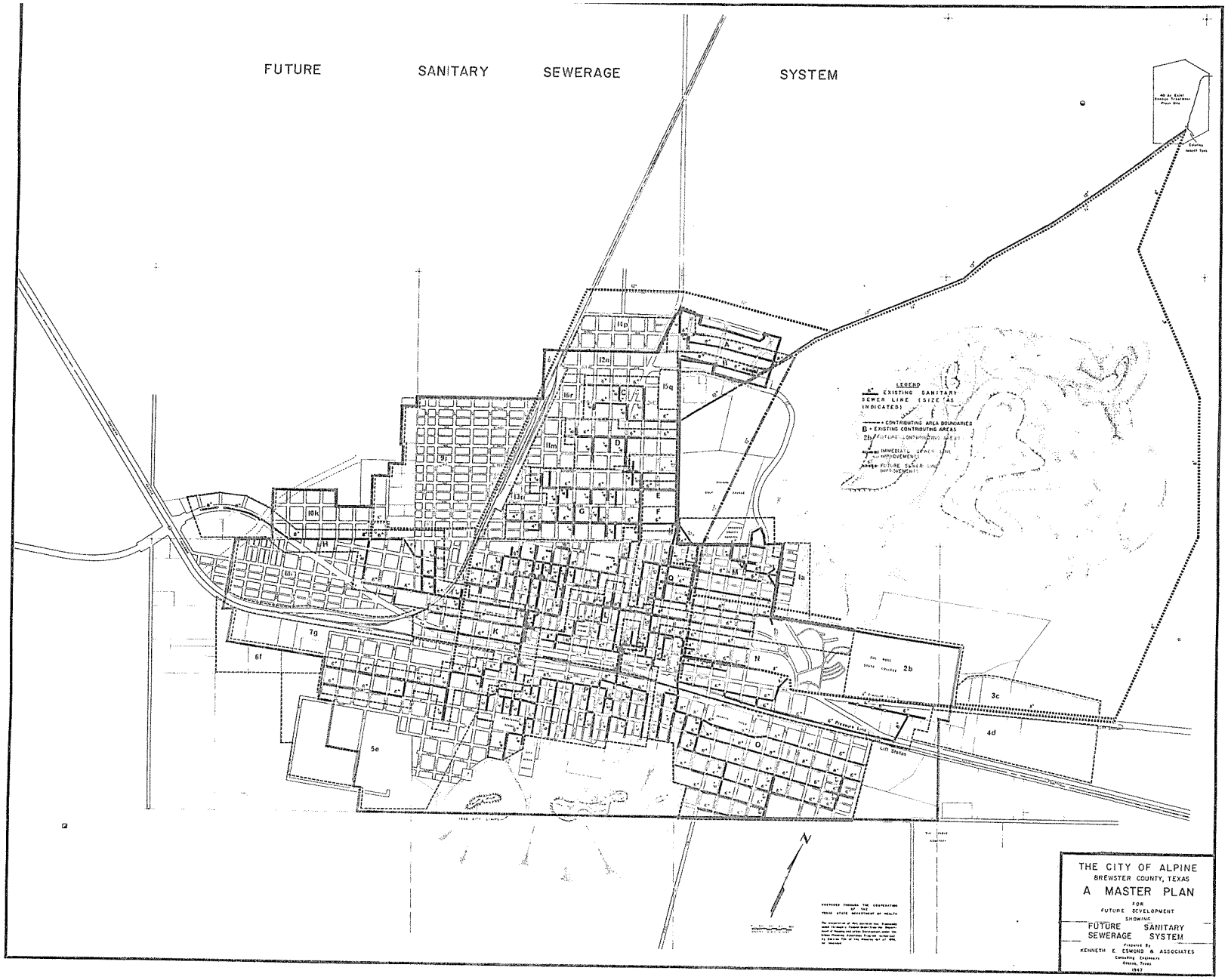
3. A sewage flow factor of .00024 cubic feet per second per person.

Pipe capacities were calculated by use of Manning's Formula.

The present collection lines consist of 4", 6", 8" and 10" diameter lines, although the Texas State Department of Health considers all lines smaller than 6 inches to be inadequate for collection lines.

Analysis of the present system revealed other shortcomings, with the result that the following improvements are recommended (see page U15).

1. Immediately replace the 6-inch and 8-inch line in Garnett Street with larger (10-inch and 12-inch) lines and extend it to the


FUTURE SANITARY SEWERAGE SYSTEM
LEGEND
EXISTING SANITARY SEWER LINE (SIZE AS INDICATED)
CONTRIBUTING AREA BOUNDARIES
B - EXISTING CONTRIBUTING AREAS
2b - FUTURE CONTRIBUTING AREAS
IMMEDIATE SEWER LINE IMPROVEMENTS
FUTURE SEWER LINE IMPROVEMENTS
Lift Station
N
THE CITY OF ALPINE
BREWSTER COUNTY, TEXAS
A MASTER PLAN
FOR
FUTURE DEVELOPMENT
SHOWING
FUTURE SANITARY SEWERAGE SYSTEM
Prepared By
KENNETH E. ESMOND & ASSOCIATES
Consulting Engineers
Odessa, Texas
1967

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existing outfall as indicated.

2. Replace the 4-inch line in the alley west of Walker Street and between Hancock and Nations Avenues with an 8-inch line.

3. Replace the existing line in Avenue E between Garnett Street and Cockrell Street, with an 8-inch line and replace the 4-inch portion of the parallel line in the alley between Avenue E and Holland Avenue with a 6-inch line.

4. Replace the 6-inch line in the alley between June and Hendrix Avenues and west of Antelope Drive with an 8-inch line.

5. Replace the 6-inch line in 10th Street between the Southern Pacific Railroad and Holland Avenue with an 8-inch line.

6. At some time in the future, intercept the 8-inch line in West Brown Avenue at Cherry Street with another 8-inch line and connect this to the proposed future main collector line to be laid along the west right-of-way of the Santa Fe Railroad.

7. Replace all existing 4-inch lines with 6-inch lines.

The present interceptor and main collector lines are adequate to permit considerable growth within areas already served. Annexation of the area east of the city limits along U. S. Highway 90 will require construction of a lift station and a 4-inch pressure line discharging into the improved collector system recommended by Item 1, above, on the Sul Ross Campus.

Development west of the Santa Fe railroad, or extensive building in the southwest part of the City, will require that a new main collector

line be laid from the outfall, around north of the present city limits, then south along the west right-of-way of the Santa Fe tracks and southerly in 14th Street. This line should intercept all flow from the areas west of it.

Outfall Line

It is recommended that the present outfall line be slightly rerouted in the Carpenter Addition away from existing improvements (houses, walks, sheds, etc.) and into public easements in order to insure access to it for maintenance purposes.

It is expected that a new 12-inch outfall, parallel to the present line, will be required to serve future anticipated growth of the City.

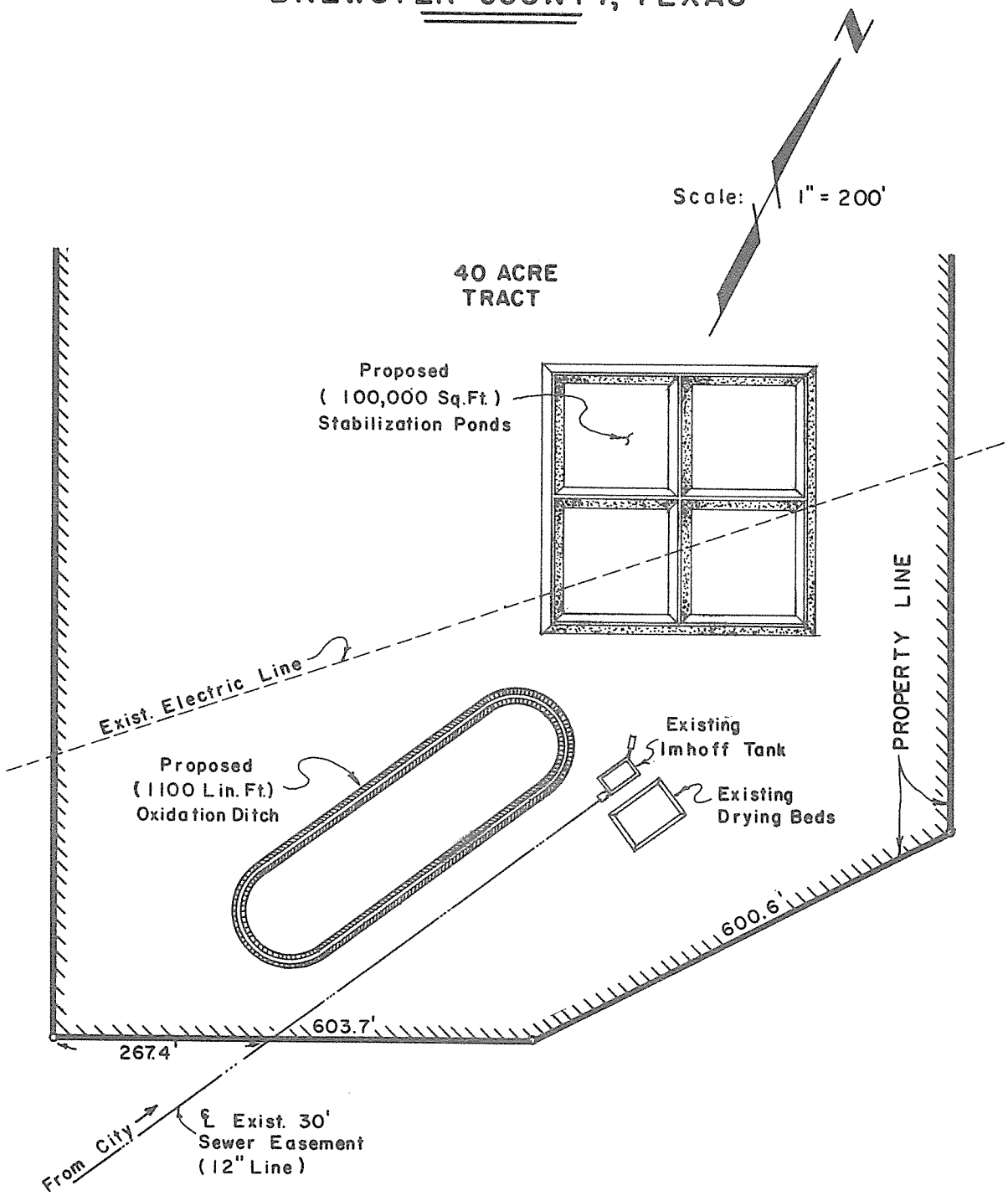
Substantial development of the City to the east along Highway 90 may require construction of an 8-inch gravity line east of Sul Ross Hill, which would replace the lift station and the 4-inch pressure line discussed above.

Sewage Treatment Plant

Although the present treatment plant site provides ample space for both immediate and future expansion, the existing plant is inadequate when measured by State Health Department Standards. Proposals for immediate improvements are:

1. Install bar screens.
2. Install measuring device for measuring influent flow.
3. Construct 1,100 feet of concrete-lined oxidation ditch with

PROPOSED
SEWER PLANT IMPROVEMENTS
CITY OF ALPINE,
BREWSTER COUNTY, TEXAS



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Odessa, Texas
1967

necessary rotors and appurtenances.

4. Convert existing Imhoff tank to settling basin.

5. Construct new sludge drying beds.

6. Construct stabilization ponds for secondary treatment.

Proposed for future improvements are:

1. Lengthen the oxidation ditch.

2. Construct new settling tank.

3. Construct additional sludge drying beds.

4. Provide additional stabilization ponds.

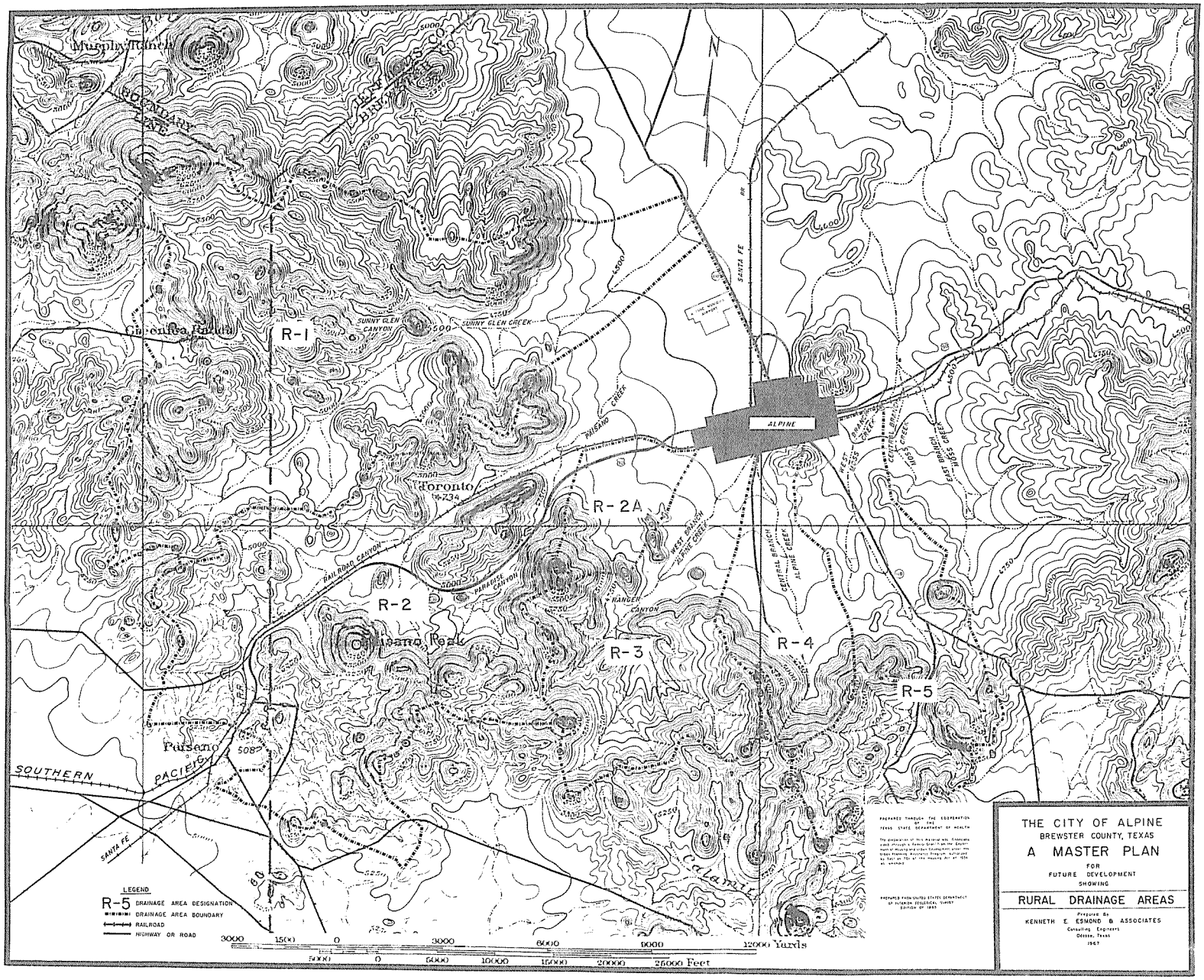
DRAINAGE

The City of Alpine is located in a valley surrounded by mountains. The confluence of several major drainage courses occurs at, or near, the site of the City proper, causing periodic flood problems.

Rainfall records for Alpine are available from the year 1931 to the present time, and were carefully studied in the work of this Report. Alpine has an average annual rainfall of 15.16 inches. The largest daily rainfall to date has been 2.90 inches.

After considering the available local data and having received the conclusions of several national authorities on rainfall-runoff intensities and relationships, it was decided that a design rain for Alpine should be based on a "50-year frequency". This is calculated to be a rainstorm of such intensity that it would deposit 3-inches of rain on the Alpine watershed in one hour of time. The computations, tables, and recommendations of this Report are based on this "design frequency."

In discussions held between members of this firm and the U. S. Corps of Engineers, it is believed that the Corps favors the use of a design criteria of greater intensity, which they refer to as "The Sanderson (Texas) Storm." Insofar as can be determined, Alpine has never experienced a rainstorm approaching the Sanderson intensity. While this basis would probably result in the design of channels, culverts and bridges which would remove all possible doubt of damage from flooding, it is our opinion that the very high cost of construction,


THE CITY OF ALPINE
BREWSTER COUNTY, TEXAS
A MASTER PLAN
FOR
FUTURE DEVELOPMENT
SHOWING
RURAL DRAINAGE AREAS
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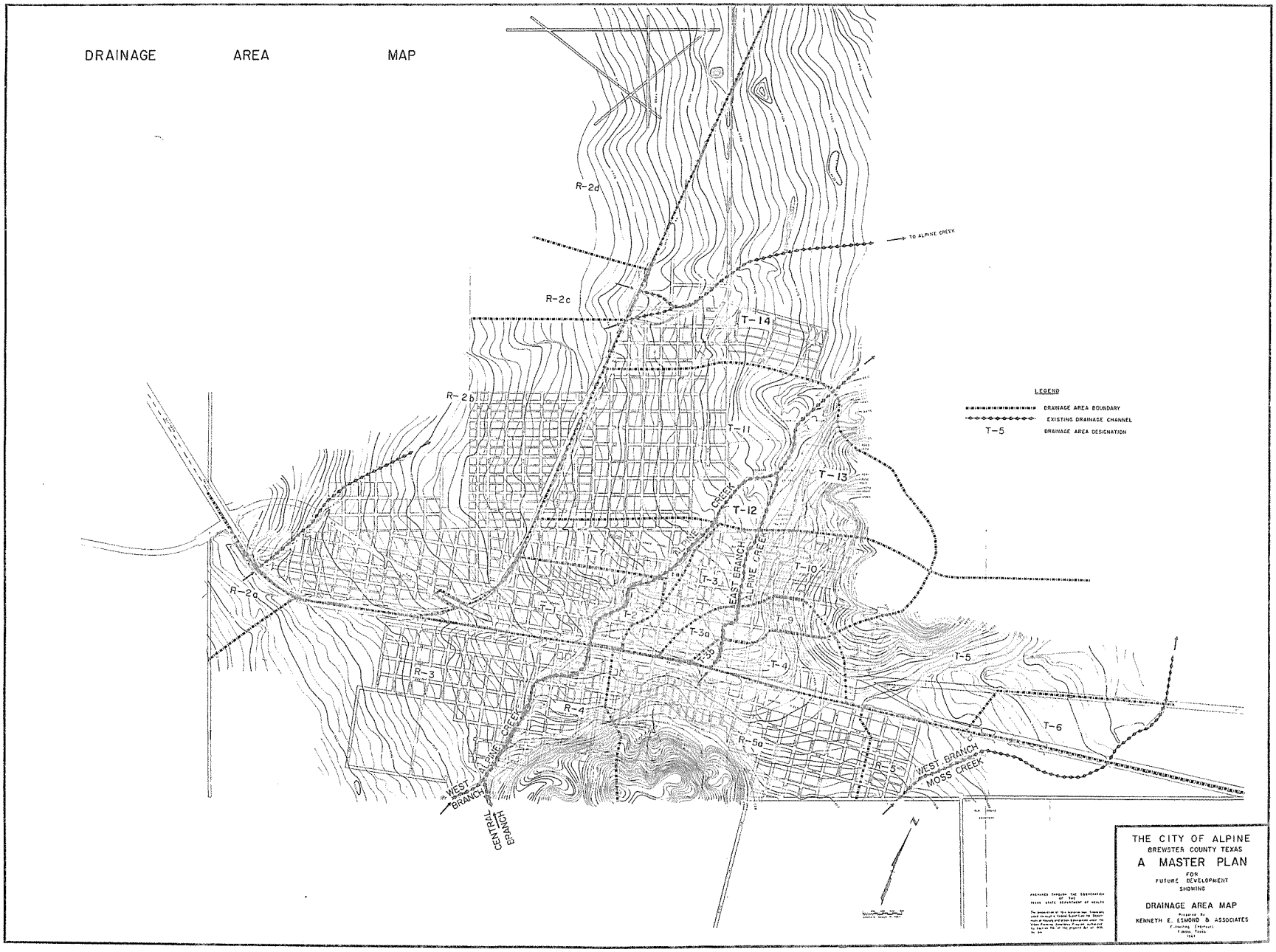
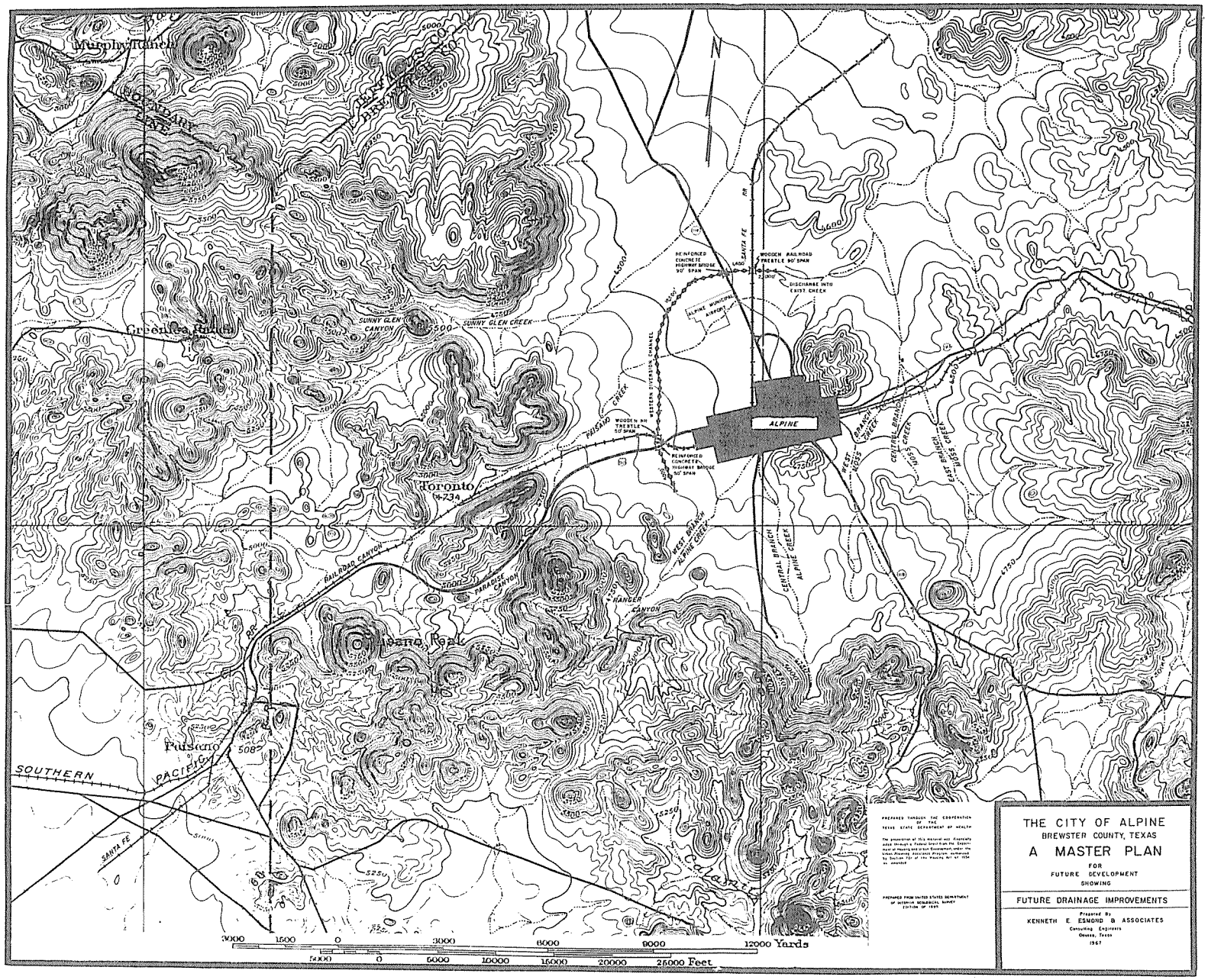
Odessa, Texas
1967
LEGEND
R-5 DRAINAGE AREA DESIGNATION
DRAINAGE AREA BOUNDARY
RAILROAD
HIGHWAY OR ROAD
3000 1500 0 3000 6000 9000 12000 Yards
5000 0 5000 10000 15000 20000 25000 Feet
ALPINE
R-1
R-2
R-2A
R-3
R-4
R-5
Toronto
Paisano
SOUTHERN PACIFIC
SANTA FE
SUNNY GLEN CANYON
SUNNY GLEN CREEK
PAISANO CREEK
RAILROAD CANYON
PARADISE CANYON
RANGER CANYON
WEST BRANCH ALPINE CREEK
CENTRAL BRANCH ALPINE CREEK
WEST BRANCH MOSS CREEK
CENTRAL BRANCH MOSS CREEK
EAST BRANCH MOSS CREEK
Calamit

DRAINAGE AREA MAP





Murphy Ranch
Greenlee Ranch
Toronto
Paisano Peak
Paisano
SOUTHERN PACIFIC
SANTA FE
SUNNY GLEN CANYON
SUNNY GLEN CREEK
RAILROAD CANYON
PARADISE CANYON
RANGER CANYON
WEST BRANCH ALPINE CREEK
CENTRAL BRANCH ALPINE CREEK
WEST BRANCH MOSS CREEK
CENTRAL BRANCH MOSS CREEK
EAST BRANCH MOSS CREEK
PAISANO CREEK
WESTERN DIVERSION CHANNEL
ALPINE MUNICIPAL AIRPORT
ALPINE
REINFORCED CONCRETE HIGHWAY BRIDGE 90' SPAN
WOODEN RAILROAD TRESTLE 90' SPAN
DISCHARGE INTO EXIST. CREEK
WOODEN RR TRESTLE 50' SPAN
REINFORCED CONCRETE HIGHWAY BRIDGE 50' SPAN
N
3000 1500 0 3000 6000 9000 12000 Yards
5000 0 5000 10000 15000 20000 25000 Feet
PREPARED THROUGH THE COOPERATION OF THE TEXAS STATE DEPARTMENT OF HEALTH
PREPARED FROM UNITED STATES DEPARTMENT OF INTERIOR GEOLOGICAL SURVEY EDITION OF 1959
THE CITY OF ALPINE
BREWSTER COUNTY, TEXAS
A MASTER PLAN
FOR
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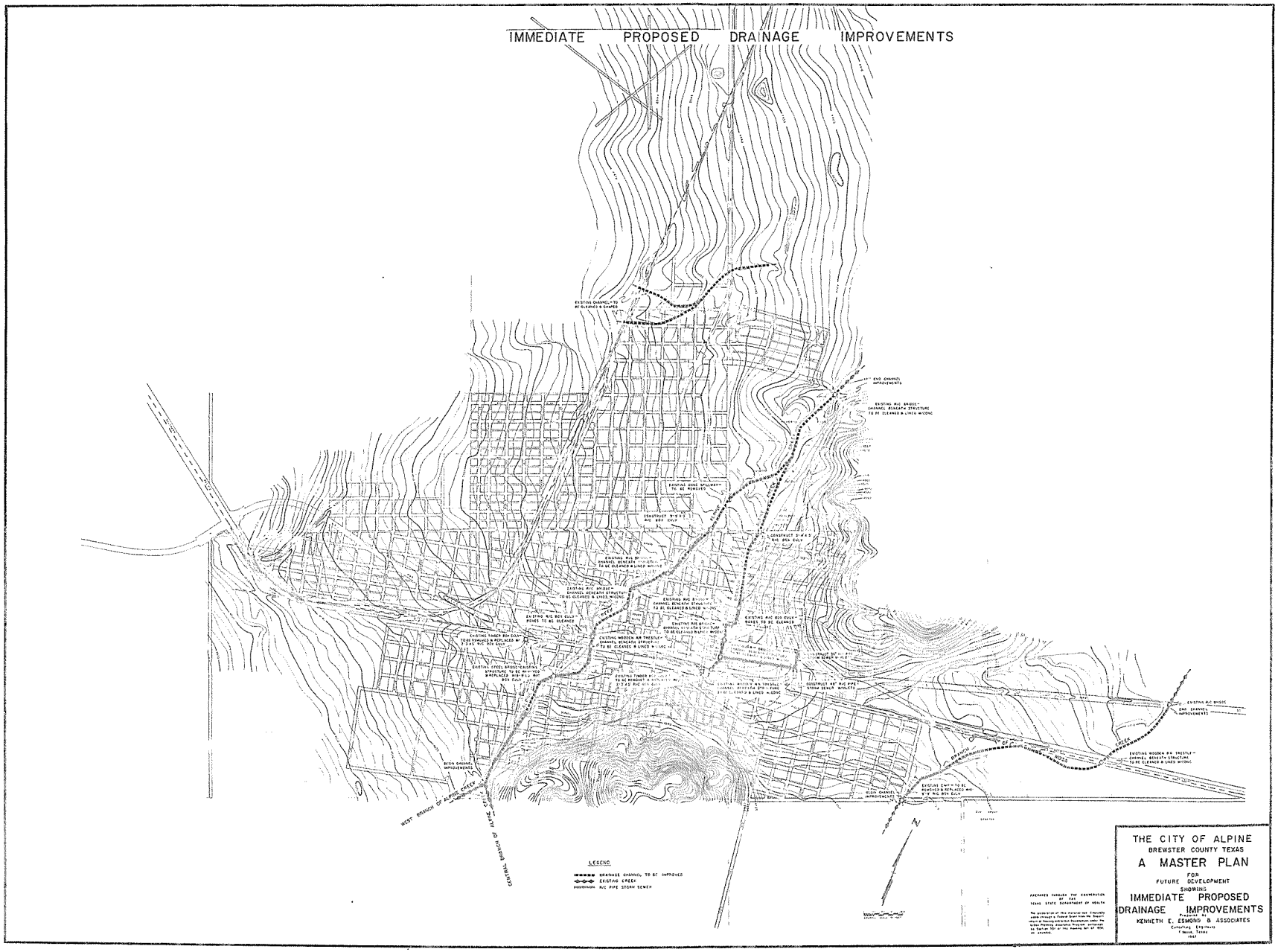

IMMEDIATE PROPOSED DRAINAGE IMPROVEMENTS
LEGEND
DRAINAGE CHANNEL TO BE IMPROVED
EXISTING CREEK
R/C PIPE STORM SEWER
THE CITY OF ALPINE
BREWSTER COUNTY TEXAS
A MASTER PLAN
FOR
FUTURE DEVELOPMENT
SHOWING
IMMEDIATE PROPOSED
DRAINAGE IMPROVEMENTS
KENNETH E. ESMOND & ASSOCIATES

based on this design criteria, cannot be economically justified in Alpine.

As stated above, Alpine is located on a broad plain bordered by mountains on the south, west, and east (see map on page D3). The precipitous grades and steep-walled canyons encountered in the mountainous areas cause a high percentage of rain water to run off. As these give way to the flat, alluvial plain, the resulting decrease in velocity of flow, combined with the high permeability of the soils of the plain, allows an appreciable amount of water to soak into the ground. Were it not for this, Alpine's problem would indeed be acute, for Alpine is located in an area subject to natural flooding from time to time and virtually all of its low-lying areas have been subjected to annoying or damaging flooding within the memory of present residents. As is typical, the works of man have aggravated rather than alleviated this situation.

Before proceeding with a description of specific drainage areas, it is appropriate to discuss the method employed in evaluating them. Runoff quantities were calculated by use of the so-called "rational method" which requires solution of the equation: $Q = CiA$, where "Q" is the quantity of runoff in cubic feet per second, "A" is the drainage area in acres, "i" is the rainfall intensity in inches per hour, and "C" is the proportional amount of the rainfall that appears as runoff. At this point, it should be mentioned that while the analytic investigation of the channels and drainage structures was as complete as reasonably possible, no attempt was made to investigate the structural

soundness of the existing bridges, culverts and inlets. In other words, the drainage capacity of culverts and bridges was investigated; their ability to withstand the structural loads imposed by traffic or water pressures was not.

The prevention of severe flooding in Alpine may be accomplished in one of two basic ways:

1. Provide a drainage system of sufficient capacity to carry the water away as quickly as it arrives in the damage area.

2. Prevent the water from ever reaching the area where damage will occur.

The recommendations of this Report incorporate both of these techniques.

Located astride the confluence of two important dry creeks, Alpine and Paisano, and encroaching on the banks of a third, Moss Creek, which flows immediately to the east of town, Alpine is located on a site where flooding "comes naturally." When combined with a fourth, Sunny Glen Creek, these channels provide the major source of flood problems which affect the City. Each of these four creeks carries the runoff from one of the major watersheds affecting Alpine or its immediate environs.

Sunny Glen Canyon (Area R-1 on the map on page D3) is drained by Sunny Glen Creek, which flows due east in a definite "bed and bank" until it reaches the Alpine Plain, where it fans out to become sheet flow. Normally, this water continues to flow eastward past the north side of

the airport, under State Highway 118 and the Santa Fe Railroad, and eventually finds its way into Alpine Creek. Though Sunny Glen Creek probably does not pose any pressing drainage problem to Alpine at present, it should be given serious consideration in the planning of any new subdivisions to the north.

Immediately to the south of Sunny Glen Canyon lies drainage area R-2, which includes Railroad and Paradise Canyons. When combined with the "Twin Peaks" watershed (Area R-2a) this area forms the Paisano Creek watershed which is one of the major sources of surface flow. Together, these areas are responsible for most of the flooding which occurs west of the Santa Fe Railroad and north of Mars Avenue (see the map on page D4). Paisano Creek also loses its "bed and bank" character and converts to sheet flow as it discharges onto the Alpine Plain, flowing to the eastward until reaching the embankment of the Santa Fe Railroad, where it is joined by the discharge from Area R-2a. The Paisano Creek waters are diverted to the north until reaching a trestle under the railroad. Passing under the railroad, they then continue eastward across the north side of town until percolating into the ground or reaching Alpine Creek. As a result of all this, frequent and extensive flooding can occur west of the Santa Fe railroad.

As the watershed can be expected to carry a substantial amount of runoff (in excess of 19,000 cubic feet per second), it poses a flooding problem of major proportions. Flooding from this source can best be eliminated by construction of the Western Diversion Channel (see pages

D11 and D12) which will divert water from Areas R-2a and R2 away from Alpine, around the airport and, eventually, into Alpine Creek. At the same time, improve the existing channels between the Santa Fe Railroad and State Highway 118, lying immediately to the north of Mars Avenue.

Undoubtedly, the Alpine Creek watershed is the most important in the City's present drainage picture. This watershed includes all of Alpine proper lying between the Santa Fe Railroad and Sul Ross Hill, plus all of that portion which is south of the Southern Pacific Railroad and west of the Moss Creek watershed.

Rural Areas R-3 and R-4 are the drainage areas for the West and Central Branches (see map on page D3) and Rural Area R-5a (see map on page D4) is drained by the East Branch. These three eventually converge to form Alpine Creek which emerges from the northeast corner of the City and continues in a northeasterly direction.

Two of the most persistent problem areas of Alpine lie within this watershed: (1) All of the lower-lying areas of town located south of the Southern Pacific Railroad; and (2) the lower reaches of Urban Area T-4. Improvements recommended for this watershed should be the first of the Capital Improvements for drainage undertaken. Beginning with Alpine Creek (see the map on page D13), by:

(a) Shaping the entire channel from State Highway 223 to the southern edge of the City in accord with the cross-sections shown on page D14;

(b) Removing the spillway at the Country Club Golf Course,

bridging the existing sewer line over the channel, and installing a box culvert.

(c) Installing a box culvert where the creek crosses Brown Avenue.

(d) Lining the channel with concrete at each drainage structure.

(e) Replacing the steel bridge on South 11th Street with a concrete box culvert.

Improvement of the East Branch of Alpine Creek should be the next project undertaken:

(a) The channel should be shaped to a cross-section similar to that shown on page D14.

(b) The channel should be lined with concrete at all structures and a box culvert should be installed at Brown Avenue.

(c) A storm sewer should be constructed in Holland Avenue to intercept the drainage at the intersections of Loop 223 at Holland Avenue and Avenue E, in conjunction with the proposed Texas Highway Department project.

The West Branch of Moss Creek which carries runoff from Stocking Canyon (Rural Area R-5) and from Urban Areas T-5 and T-6, flows to the east of Alpine and Sul Ross Hill. Although this affects only a small portion of Alpine now, it will become increasingly important as the City grows eastward. The Moss Creek channel should be shaped as shown on page D14 from the point where it enters the City Limits to where it crosses under U. S. Highway 90. It should be lined with concrete at the railroad trestle. The metal box culvert at the southern limits of

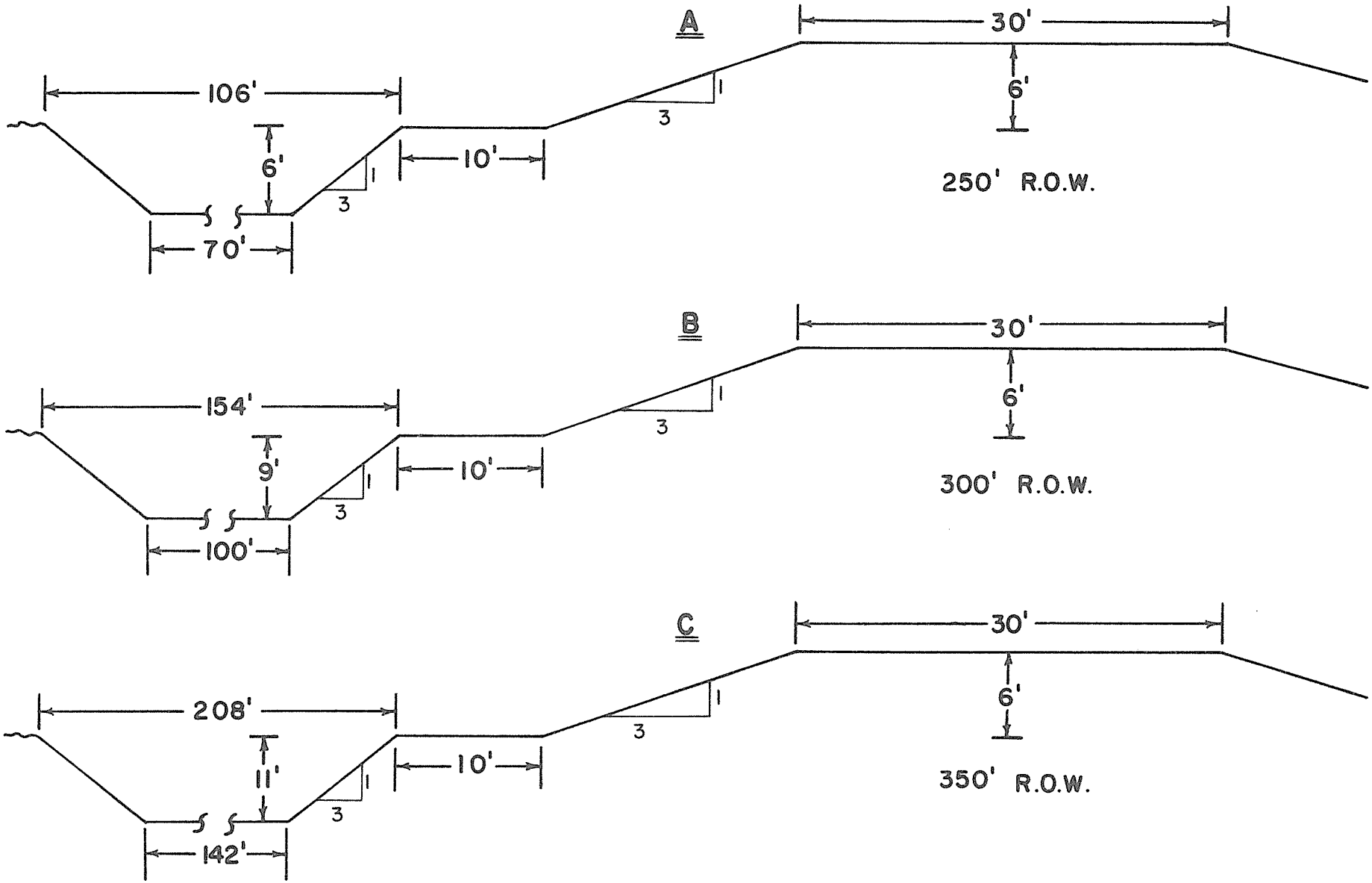
the City should be replaced with a larger concrete box culvert.

The ditch along the south side of the Southern Pacific Railroad is an important subsidiary drainage channel; therefore, it is recommended that the wooden culverts at 2nd Street and at 13th Street be replaced with larger concrete culverts.

It is recognized that smaller individual problem areas exist which have not been discussed here; however, these are rather limited in extent and are primarily local in origin.

Before commencing any extensive capital improvements for drainage purposes, it should be kept in mind that the Corps of Engineers, U. S. Army, is making a flood control survey of Alpine Creek with the aim of proposing flood control improvements for that watershed. The findings of the Corps should be reviewed as they become available by the City and its engineer.

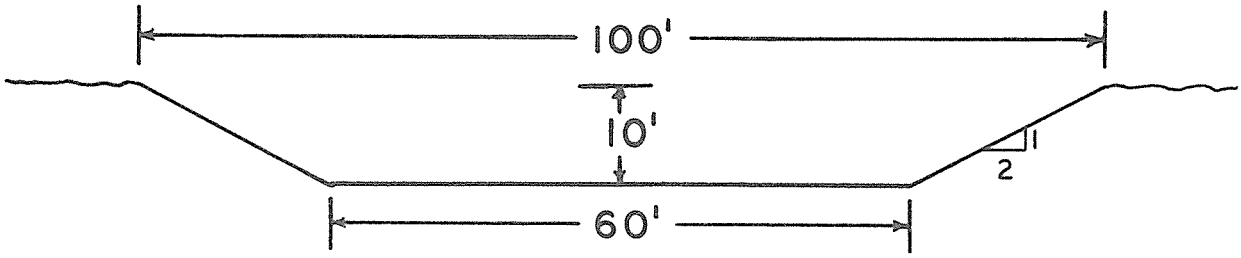
CITY OF ALPINE



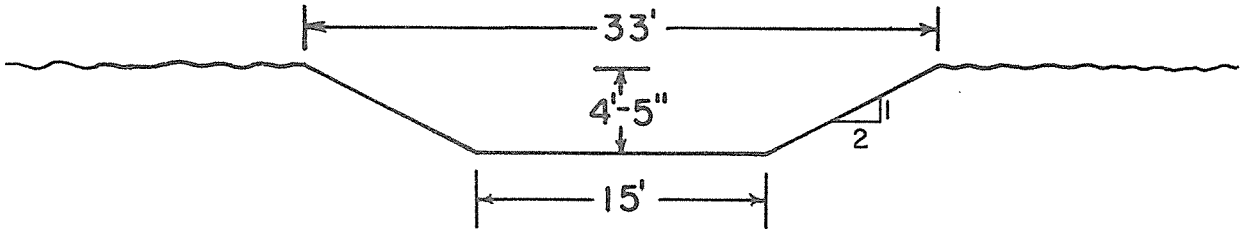
TYPICAL SECTIONS OF
THE WESTERN DIVERSION CHANNEL

CITY OF ALPINE

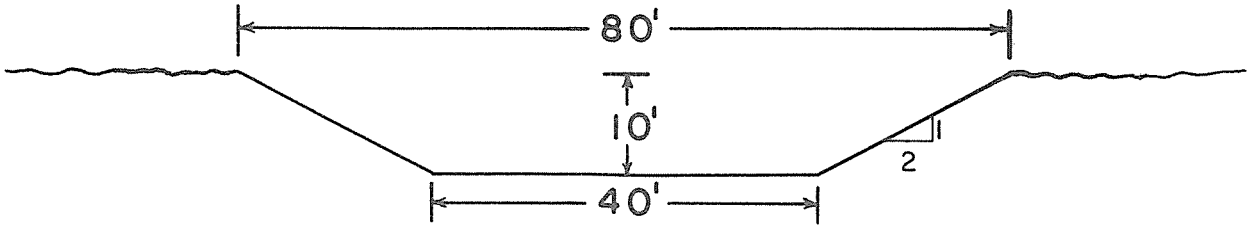
TYPICAL SECTION OF ALPINE CREEK DRAINAGE CHANNEL



TYPICAL SECTION OF EAST ALPINE CREEK DRAINAGE CHANNEL



TYPICAL SECTION OF MOSS CREEK DRAINAGE CHANNEL



ADMINISTRATIVE CONTROLS

SUMMARY AND CONCLUSIONS

Introduction

In the complex society of the modern world, it has become desirable for local government to exercise certain minimal controls over the uses of individual properties, in order that the general welfare of all citizens may be protected. In the case of the city government, these controls generally take the form of ordinances requiring minimum standards and practices in such things as plumbing installation, electrical wiring, and building construction. Other measures of protection are provided by land subdivision regulations and zoning ordinances which govern the use made of land.

Ideally, a minimum of fair regulations and controls should be established to govern these activities and property use. These must have a substantial relationship to the general public welfare, and should be done in accordance with a comprehensive plan which has the understanding and support of the community.

Existing Ordinances

The City of Alpine presently has adequate ordinances governing building, plumbing, electrical and gas installations. They have adopted the Southern Standard Building Code, the Southern Standard Housing Code, the National Plumbing and Electrical Codes, and the American Standard Gas Code.

Proposed Ordinances

The American Insurance Association has prepared a Fire Prevention Code, modeled after the needs arising in various cities, and it is recommended that Alpine consider adopting this code for their use.

The present zoning and subdivision ordinances of the City are considered to be inadequate for present needs. In cooperation with City officials, the text of a zoning ordinance and a subdivision ordinance was prepared and submitted to the City Council. The Council has held several meetings on this subject and apparently is planning to adopt them. The contents of these ordinances is summarized briefly below.

Zoning Ordinance

The zoning ordinance is a three-part instrument consisting of the main body of the ordinance, the schedule of district regulations, and the official zoning map upon which the districts are delineated. The body of the ordinance is based upon material prepared by the American Society of Planning Officials as a "model" ordinance for small to medium size towns. Its components have been tested through use and in courts and have proved to be sound.

The schedule of districts contains lists of representative uses which are to be permitted in each area. Not every use is listed specifically, but similar types of use may be inferred to be included. The schedule also specifies minimum requirements as to area of property;

limits height and bulk of structures; and regulates density of dwelling use. The zoning shows the boundary lines of the various districts.

The ordinance requires the appointment of an administrative official and a Board of Adjustment, and outlines the duties of each.

Land Subdivision Ordinance

This ordinance would regulate new subdivisions of land within the city limits and within a one-mile radius outside the city limits. It sets standards which must be met in street widths, utilities and improvements of other kinds, and requires preliminary and final plats to be presented to the proper authority for approval, prior to the acceptance and approval of new subdivisions. A provision is made for establishing a Planning Commission, which serves to review preliminary plats and offer their approval or disapproval before the plat is presented to the City Council for final action.

Administration and Enforcement

These various ordinances should provide adequate guidelines for the future growth of Alpine, if they are properly administered and enforced. The best designed regulations are worth little unless put into effect and used in the manner for which they were created. Much of the responsibility for such enforcement rests upon the Planning Commission and the City Council. The City probably cannot afford to hire a professional planner to administer and enforce these ordinances and assist the Planning Commission and Council in this respect. However,

some local assistance in investigations, reports and assembling of pertinent information should be supplied; possibly this could be managed by assigning a present member of the City's staff to attend these duties. A review of the working staff and their duties should be made to determine if this is possible or practical. Assistance from time to time, depending upon need and emerging problems, should be obtained from a firm of planning consultants.

Public Relations

If the greatest benefits are to be realized from this Comprehensive Plan, then it must receive the support of the citizens of Alpine. To gain this support, it is necessary that the public, and especially the leaders of the community, fully understand the program. The following are only a few of the ways in which this understanding may be achieved:

1. The distribution of publications concerning the Plan among civic leaders.

2. The use of local newspaper and radio facilities to aid in publicizing important aspects of the Plan.

3. Discussion and appearances at local civic clubs by members of the Planning Commission and others concerned with the program.

4. Wide distribution of applicable portions of the Plan in schools, the library, and other public places.

5. The inclusion of studies concerning the Plan in government classes in the local schools.

6. The appointment of a subcommittee within the Planning Commission, whose duties would consist of guiding a total public relations program.

CAPITAL IMPROVEMENTS PROGRAM

The final consideration of the improvements recommended in this Plan is that of the economic feasibility. A study of the revenues of the City indicated an assessed valuation for 1967 of $5,103,943, and a tax rate of $2.00 per hundred of assessed valuation with a $2.50 limit established by law. In addition to taxes, the City's major source of revenue is the sale of water, sewer services and garbage collection. The present City water rate is $3.00 minimum for 3,000 gallons, $0.50 per 1,000 for the next 17,000 gallons, and $0.30 per 1,000 for all over 20,000 gallons. The sewer rates were changed during 1967, and provide for varying rates, depending upon fixtures. Garbage collection charges are $1.50 per month for residential users and $4.00 minimum for commercial users.

The City has operated at a deficit during four of the last seven years, with the total deficit amounting to $152,864.26 during the period. The City's indebtedness as of March 31, 1967, was $694,000.00 general obligation bonds and warrants, and $35,000.00 water and sewer revenue bonds, plus $98,500.00 for water rights and sewer plant land. The service of the general obligation bonds will required $1.50 of the $2.00 tax rate during the present year.

The summary of all projects recommended in this Plan Report, accompanied by an estimate of cost of construction, was made. The estimated costs were based on today's market, with no attempt made to forecast changing prices due to inflation or other factors. The proposed

improvements were grouped into 1967-1973 improvements as those of immediate need, and into 1974-1991 for future needs.

The summary sheets from each category of the proposed improvements follow:

CITY OF ALPINE
CAPITAL IMPROVEMENT PROGRAM

Summary of Estimated Cost

	1967 - 1973	1974 - 1991	TOTAL
Parks and Recreation	$ 218,250.00	$ 233,650.00	$ 451,900.00
Thoroughfares	391,800.00	632,000.00	1,023,800.00
Airport	59,700.00	426,800.00	486,500.00
Public Buildings	23,200.00	559,500.00	582,700.00
Public Schools	1,822,000.00	827,000.00	2,649,000.00
Water Improvements	618,000.00	1,626,100.00	2,244,100.00
Sewer Improvements	159,100.00	320,000.00	479,100.00
Drainage Improvements	1,082,000.00	1,678,000.00	2,760,000.00
	$4,374,050.00	$6,303,050.00	$10,677,100.00

DISTRIBUTION OF TOTAL COST

City's Total	$1,463,250.00	$2,710,700.00	$ 4,173,950.00
Alpine Independent School's Total	1,822,000.00	827,000.00	2,649,000.00
Brewster County Total	74,500.00	473,700.00	548,200.00
Abutting Property Owners or Developers	126,000.00	713,650.00	839,650.00
State Highway Dept.	23,000.00	92,000.00	115,000.00
Corps of Engineers	842,500.00	1,447,000.00	2,289,500.00
Southern Pacific R. R.	22,800.00	15,000.00	37,800.00
Sante Fe R. R.	- 0 -	24,000.00	24,000.00

DIVISION OF CITY'S 1967-1974 COST

Authorized bonds and warrants	$ 525,000.00
State & Federal Grant assistance applied for	$ 277,600.00
Future State or Federal Grants	$ 164,500.00
FUTURE CAPITAL FINANCING	$ 496,150.00

CITY OF ALPINE, TEXAS

PARK AND RECREATIONAL IMPROVEMENTS

Summary

PROJECT TITLE	1967-1973	1974-1991	TOTAL
Baines Memorial Park	$ 10,400.00	$ 13,500.00	$ 23,900.00
Kokernot Municipal Park	145,550.00	78,450.00	224,000.00
"A" Mountain City Park	16,800.00	52,500.00	69,300.00
Alpine Creek Nature Park		40,000.00	40,000.00
Paradise Canyon Park	24,500.00	16,000.00	40,500.00
Comanche Hill Park	21,000.00	8,200.00	29,200.00
Additional Park Land		25,000.00	25,000.00
TOTAL	$218,250.00	$233,650.00	$451,900.00

DISTRIBUTION TOTAL COST	1967-1973	1974-1991	TOTAL
City of Alpine	$161,750.00	$209,450.00	$371,200.00
Brewster County	56,500.00	24,200.00	80,700.00
	$218,250.00	$233,650.00	$451,900.00

DIVISION OF CITY'S 1967-1973 COST

Available bond funds	$ 95,000.00
Texas Park and Wildlife grant (BOR)	$ 60,000.00
REQUIRED FUTURE GENERAL FUND FINANCING	$ 6,750.00

CITY OF ALPINE, TEXAS

STREET IMPROVEMENTS

Summary

PROJECT TITLE	1967-1973	1974-1991	TOTAL COST
City participation in the reconstruction of Holland Ave. and Ave. E into one-way streets to serve as U. S. Highway 90	$ 95,200.00	- 0 -	$ 95,200.00
Acquisition of R.O.W. for Loop Road 224	22,000.00	- 0 -	22,000.00
Acquisition of R.O.W. for Loop Road 225	- 0 -	31,000.00	31,000.00
Acquisition of R.O.W. for Loop Road 226	- 0 -	21,000.00	21,000.00
Acquisition of R.O.W. for Extension of State Highway 118 North	30,000.00	- 0 -	30,000.00
Acquisition of R.O.W. for Collector Street	- 0 -	10,000.00	10,000.00
Assessment Paving Projects including secondary and local streets.	180,000.00	570,000.00	750,000.00
Installation of signals and barriers at S.P. Railroad Crossings.	32,000.00	- 0 -	32,000.00
Installation of Signals at S.P. Railroad Crossings	20,000.00	- 0 -	20,000.00
Installation of traffic signals at highway intersections.	12,600.00	- 0 -	12,600.00
TOTAL	$391,800.00	$632,000.00	$1,023,800.00

DISTRIBUTION OF COST

	1967-1973	1974-1991	TOTAL
City of Alpine Cost	$225,000.00	$183,500.00	$ 408,000.00
Abutting Property Owner's Cost	126,000.00	399,000.00	525,000.00
Southern Pacific Railway's Cost	22,800.00	- 0 -	22,800.00
Brewster County Cost	18,000.00	49,500.00	68,000.00
TOTAL	$391,800.00	$632,000.00	$1,023,800.00

DIVISION OF CITY'S 1967 - 1973 COST

Authorized available warrant	$ 125,000.00
REQUIRED FUTURE CAPITAL FINANCING	$ 100,000.00

CITY OF ALPINE

AIRPORT IMPROVEMENTS

Summary

PROJECT	1967-1973	1974-1991	TOTAL
Purchase of additional property	$10,000.00	$ 80,000.00	$ 90,000.00
Improvements to runway 05-23	21,650.00	73,000.00	94,650.00
Runway lighting system	27,060.00	3,500.00	30,560.00
Soil test, legal work, striping and miscellaneous.	990.00		990.00
Improvements to runway 09-27		68,000.00	68,000.00
Improvements to runway 14-32		22,000.00	22,000.00
Taxiways and paved areas		41,000.00	41,000.00
Access Roads and parking		8,300.00	8,300.00
Building improvements		131,000.00	131,000.00
TOTAL	$59,700.00	$426,800.00	$486,500.00

DISTRIBUTION OF TOTAL COST

City of Alpine	$59,700.00	$426,800.00

DIVISION OF CITY'S 1967 - 1973 COST

Pending FAA Grant	$39,000.00
REQUIRED FUTURE CAPITAL FINANCING	$20,700.00

CITY OF ALPINE, TEXAS

IMPROVEMENTS TO PUBLIC BUILDINGS

Summary

PROJECT TITLE	1967-1973	1974-1991	TOTAL
Addition to existing Fire Station	$17,200.00		$ 17,200.00
Fire truck		$ 30,000.00	30,000.00
Acquire additional land for City Hall	6,000.00		6,000.00
City Hall		129,500.00	129,500.00
County Courthouse and Jail Annex		400,000.00	400,000.00
TOTAL ESTIMATED COST	$23,200.00	$559,500.00	$582,700.00

DISTRIBUTION OF COST

City of Alpine	$23,200.00	$159,500.00	$182,700.00
Brewster County	- 0 -	$400,000.00	$400,000.00

DIVISION OF CITY'S 1967 - 1973 COST

Authorized Financing - 0 -

REQUIRED FUTURE CAPITAL FINANCING $ 23,200.00

CITY OF ALPINE, TEXAS

SCHOOL IMPROVEMENTS

Summary

PROJECT TITLE	1967-1973	1974-1991	TOTAL
Central Elementary School improvement	$ 175,000.00	$301,000.00	$ 476,000.00
Centennial Elementary School improvement	100,000.00		100,000.00
Acquire land for new high school	10,000.00		10,000.00
Construction of new Alpine High School	1,537,000.00	526,000.00	2,063,000.00
TOTAL	$1,822,000.00	$827,000.00	$2,649,000.00

DISTRIBUTION OF TOTAL COST

Alpine Independent School District	$1,822,000.00	$827,000.00	$2,649,000.00

CITY OF ALPINE, TEXAS

WATER IMPROVEMENTS

Summary

PROJECT TITLE	1967-1973	1974-1991	TOTAL
Water exploration in Musquiz area	$ 10,500.00		$ 10,500.00
Replacement of pumping equipment	1,200.00		1,200.00
Repair old South Hill Reservoir	4,800.00		4,800.00
Construction of distribution main improvements	139,600.00	417,800.00	557,400.00
Replacement of obsolete facilities	13,500.00		13,500.00
Replacement of fire hydrants	2,000.00		2,000.00
Develop additional water supply	378,600.00		378,600.00
Install automatic chlorinators	7,500.00	7,500.00	15,000.00
Automation of existing system		22,500.00	22,500.00
Drill replacement well on Daugherty property	7,500.00		7,500.00
Install stream flow gauge stations in co-operation with U.S. Geological Survey	2,800.00	5,600.00	8,400.00
Long range water exploration		10,000.00	10,000.00
Construct dam, reservoir and appurtentances		1,003,400.00	1,003,400.00
Replacement of distribution line smaller than 4"	50,000.00	159,300.00	209,300.00
TOTALS	$618,000.00	$1,626,100.00	$2,244,100.00

Kenneth E. Esmond and Associates consulting engineers 419 WEST FIFTH ODESSA, TEXAS

Water Improvement Summary Cont'd

DISTRIBUTION OF TOTAL COST

	1967-1973	1974-1991	TOTAL
City of Alpine total cost	$618,000.00	$1,323,100.00	$1,941,100.00
Property owner's and developer's cost	- 0 -	303,000.00	303,000.00

DIVISION OF CITY'S 1967 - 1973 COST

Approved bonds	$200,000.00
Pending HUD Grant application	$178,600.00
Future HUD Grant	$110,400.00
REQUIRED FUTURE CAPITAL FINANCING	$129,000.00

CITY OF ALPINE, TEXAS

SANITARY SEWER IMPROVEMENTS

Summary

PROJECT TITLE	1967-1973	1974-1991	TOTAL
Garnett Street Interceptor	$ 29,000.00		$ 29,000.00
8" sewer collector in Avenue E	8,800.00		8,800.00
Replacement of 4" sewer lines	5,600.00	26,000.00	31,600.00
Western Interceptor		62,000.00	62,000.00
12" outfall		45,900.00	45,900.00
Eastern collector and lift station		45,600.00	45,600.00
Eastern outfall		56,200.00	56,200.00
Sewage Treatment Plant	115,700.00	74,500.00	190,200.00
8" College Hill collector		9,800.00	9,800.00
TOTAL	$159,100.00	$320,000.00	$479,100.00
DISTRIBUTION OF TOTAL COST			
City of Alpine	$159,100.00	$308,350.00	$467,450.00
Abutting property owners of developers	- 0 -	$ 11,650.00	$ 11,650.00

DIVISION OF CITY'S 1967 - 1973 COST

Authorized bonds	$105,000.00
Future grant under PL 660	$ 54,100.00
REQUIRED FUTURE CAPITAL FINANCING	- 0 -

CITY OF ALPINE

STORM DRAINAGE IMPROVEMENTS

Summary

PROJECT	1967-1973	1974-1991	TOTAL
Alpine Creek: Channel improvements and structures	$ 715,000	$ -0-	$ 715,000
East Branch Alpine Creek: Channel improvements and structures	70,000	-0-	70,000
West Branch Moss Creek, Channel improvements and structures	229,000	-0-	229,000
36" and 48" Storm Sewer Main	46,000	-0-	46,000
Misc. Channel Improvements: north part of the City	4,000	-0-	4,000
Drainage Structures: South 2nd St. and South 13th St.	18,000	-0-	18,000
Western Diversion Channel	-0-	1,416,000	1,416,000
Highway Bridges	-0-	184,000	184,000
Railroad Bridges	-0-	78,000	78,000
TOTAL	$1,082,000	$1,678,000	$2,760,000
DISTRIBUTION OF TOTAL COST			
City of Alpine	$ 216,500	$ 100,000	$ 316,500
Texas Highway Dept.	$ 23,000	$ 92,000	$ 115,000
Santa Fe Railway	$ -0-	$ 24,000	$ 24,000
Southern Pacific Railway	$ -0-	$ 15,000	$ 15,000
U.S. Corps of Engineers	$ 842,500	$1,447,000	$2,289,500

DIVISION OF CITY'S 1967-1973 COST:

Authorized Financing	$ -0-
REQUIRED FUTURE CAPITAL FINANCING	$216,500

PRIORITY OF PROJECTS

The following schedule is recommended as the order of priority to be assigned to each proposed project during the period from 1967 to 1973.

PRIORITY NO. 1

Water exploration in the Musquiz area	$ 10,500.00
Garnett Street sewer interceptor	29,000.00
Replacement of 4-inch sewer lines	5,600.00
TOTAL	$ 45,100.00

PRIORITY NO. 2

Develop additional water supply	$ 378,600.00
Repair old South Hill Reservoir	4,800.00
Sewage treatment plant	115,700.00
Acquire land for new school site	10,000.00
Construct new Alpine Junior-Senior High School	1,537,000.00
TOTAL	$2,046,100.00

PRIORITY NO. 3

Installation of signals and barriers at Southern Pacific RR crossings	$ 32,000.00
Installation of signals at Southern Pacific RR crossings	20,000.00
Installation of traffic signals at highway intersections	12,600.00
Central School improvements	175,000.00
Construction of water distribution mains	139,600.00
Replacement of fire hydrants	2,000.00
Kokernot Municipal Park development	145,550.00
George W. Baines Memorial Park development	10,400.00

PRIORITY NO. 3, cont'd.

8-inch sewer collector line in Avenue E	$	8,800.00
36" and 48" storm sewer main		46,000.00
City's participation in reconstruction of Holland Avenue and Avenue E		95,200.00
TOTAL	$	687,150.00

PRIORITY NO. 4

Replacement of obsolete water facilities in Holland Ave.	$	13,500.00
Alpine Creek channel improvements and structures		715,000.00
East Branch of Alpine Creek, channel improvements and structures		70,000.00
Miscellaneous channel improvements in north part of City		4,000.00
Improvements to airport runway 05-23		21,650.00
Airport soil test, legal work and miscellaneous costs		990.00
Addition to existing fire station		17,200.00
Centennial School improvements		100,000.00
TOTAL	$	942,340.00

PRIORITY NO. 5

Replacement of water well pumping equipment	$	1,200.00
Assessment paving projects, secondary and local streets		180,000.00
TOTAL	$	181,200.00

PRIORITY NO. 6

Drill replacement well on Daugherty property	$	7,500.00
Drainage structures on South 2nd and South 13th Streets		18,000.00
Airport runway lighting system		27,060.00
TOTAL	$	52,560.00

PRIORITY NO. 7

Replacement of water distribution lines smaller than 4"	$ 50,000.00
Paradise Canyon Park	24,500.00
West Branch Moss Creek, channel improvements and structures	229,000.00
Acquisition of additional land for City Hall	6,000.00
TOTAL	$309,500.00

PRIORITY NO. 8

Install stream gauge station in cooperation with U.S. Geological Survey	$ 2,800.00
Comanche Hill Park	21,000.00
"A" Mountain Park	16,800.00
Acquisition of right-of-way for extension of State Highway 118 north	30,000.00
Purchase additional airport property	10,000.00
TOTAL	$ 80,600.00

PRIORITY NO. 9

Install automatic chlorinators on water system detention tanks	$ 7,500.00
Acquire right-of-way for Loop Road 224	22,000.00
TOTAL	$ 29,500.00

The realization of all the immediate improvements recommended will require $360,000.00 in new general obligation bonds and $129,000.00 in new water and sewer bonds, along with the sale of the $405,000.00 water and sewer bonds already authorized. The approval and acceptance of this amount of new bonds will require the raising of assessed valuation to approximately $10,000,000.00, with an appropriate tax rate. Water rates should also be raised to cover cost of operating the water system.

The schedule of the present and new bonds, along with the revised annual requirements, are shown on pages CIP6 and CIP8.

Prudent financial management and sound, well-scheduled planning can provide the funds necessary to meet the needs of the community.

CITY OF ALPINE, TEXAS
PROPOSED NEW AND REFUNDING GENERAL OBLIGATION BONDS

Fiscal Year Ending 3-31	Present Annual Requirements *	$265,000 Refunding Bonds Principal 1-1	$265,000 Refunding Bonds Interest 4-5% **	$360,000 New G. O. Bonds *** Principal --	$360,000 New G. O. Bonds *** Interest 5%	Proposed Annual Requirements
1968	$43,945.00					$43,945.00
1969	50,001.25	$ 5,000	$11,850	$ 5,000	$18,000	89,851.25
1970	49,538.75	5,000	11,650	5,000	17,750	88,938.75
1971	43,076.25	5,000	11,450	5,000	17,500	82,026.25
1972	41,751.25	5,000	11,250	5,000	17,250	80,251.25
1973	46,647.50	5,000	11,050	5,000	17,000	84,697.50
1974	44,406.30	5,000	10,850	5,000	16,750	82,006.30
1975	43,044.00	5,000	10,650	5,000	16,500	80,194.00
1976	26,500.10	15,000	10,450	10,000	16,250	78,200.10
1977	30,643.75	15,000	9,850	10,000	15,750	81,243.75
1978	29,656.25	15,000	9,250	10,000	15,250	79,156.25
1979	9,043.75	15,000	8,650	20,000	14,750	67,443.75
1980	13,687.50	15,000	8,050	20,000	13,750	70,487.50
1981	13,212.50	15,000	7,450	20,000	12,750	68,412.50
1982	12,737.50	15,000	6,850	20,000	11,750	66,337.50
1983	12,250.00	15,000	6,250	20,000	10,750	64,250.00
1984	11,750.00	15,000	5,500	20,000	9,750	62,000.00
1985	11,250.00	15,000	4,750	20,000	8,750	59,750.00
1986	10,750.00	15,000	4,000	20,000	7,750	57,500.00
1987	10,250.00	15,000	3,250	20,000	6,750	55,250.00
1988		15,000	2,500	20,000	5,750	43,250.00
1989		15,000	1,750	20,000	4,750	41,500.00
1990		20,000	1,000	20,000	3,750	44,750.00
1991				25,000	2,750	27,750.00
1992				30,000	1,500	31,500.00

*Does not include $125,000 and $150,000 in outstanding warrants validated for conversion to refunding bonds.

**1969 thru 1982 - 4%
1983 thru 1990 - 5%
(To refund Time warrants dated 7/1/66 and 1/5/67)

***Includes: $ 23,000 for public buildings
21,000 for airport
316,000 for streets and drainage

CITY OF ALPINE, TEXAS
PROPOSED WATERWORKS AND SEWER SYSTEM INDEBTEDNESS

Fiscal Year Ending 3-31	$450,000 Revenue Bonds* Principal 4-1	$450,000 Revenue Bonds* Interest 5%	Sewer-Land Contract Principal 1-1	Sewer-Land Contract Interest 5%	Total Annual Requirements
1968			$ 3,600	$1,800	$ 5,400
1969	$ 10,000	$ 22,250	3,600	1,620	37,470
1970	10,000	21,750	3,600	1,440	36,790
1971	10,000	21,250	3,600	1,260	36,110
1972	10,000	20,750	3,600	1,080	35,430
1973	10,000	20,250	3,600	900	34,750
1974	10,000	19,750	3,600	720	34,070
1975	10,000	19,250	3,600	540	33,390
1976	15,000	18,625	3,600	360	37,585
1977	15,000	17,875	3,600	180	36,655
1978	15,000	17,125			32,125
1979	15,000	16,375			31,375
1980	15,000	15,625			30,625
1981	20,000	14,750			34,750
1982	20,000	13,750			33,750
1983	20,000	12,750			32,750
1984	20,000	11,750			31,750
1985	25,000	10,625			35,625
1986	25,000	9,375			34,375
1987	25,000	8,125			33,125
1988	25,000	6,875			31,875
1989	30,000	5,500			35,500
1990	30,000	4,000			34,000
1991	30,000	2,500			32,500
1992	35,000	875			35,875
	$450,000	$331,750	$36,000	$9,900	$827,650

*Includes $15,000 Water and Sewer Bonds outstanding as of April 1, 1968; $305,000 Water and Sewer Bonds voted October 18, 1966; and $130,000 additional Water and Sewer Revenue Bonds to be authorized.

Average Annual Requirement $33,106