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LINCOLN COUNTY

WATER & SEWER FACILITY PLANS



Colorado State Planning Office

LINCOLN COUNTY
WATER AND SEWER
FACILITY PLAN

Prepared for:

Lincoln County Commissioners

By:

Colorado State Planning Office
700 State Capitol Annex
1375 Sherman Street
Denver, Colorado 80203



In Cooperation with:

The Farmers Home Administration
U.S. Department of Agriculture

LINCOLN COUNTY

Water and Sewer Facility Plan

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I INTRODUCTION

The preparation of this report was financially aided through a grant from the Farmers Home Administration, United States Department of Agriculture, under the Consolidated Farmers Home Administration Act of 1961, as amended.

Federal money is available to aid communities under 5,500 population in obtaining adequate water and sewer facilities. After October 1, 1971, a community can be eligible for some of this money only if the county in which it is located has an overall comprehensive water and sewer qualification plan. Since many counties do not have funds available for such plans, the aforementioned grant is being used to provide the county with a comprehensive water and sewer qualification plan.

One of the reasons for a comprehensive plan is to provide the county with controlled, orderly growth. This report should be utilized not only as a guide for controlling growth, but also to avoid any duplication of efforts or overdesign or underdesign in the area of water and sewer facilities.

II THE SETTING

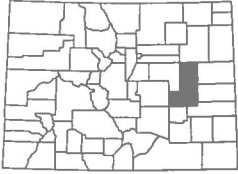
General Description

Lincoln County was created in 1889 from parts of Elbert and Bent counties. The county is located in east central Colorado, bounded on the north by Washington County, on the east by Kit Carson and Cheyenne counties, on the south by Kiowa and Crowley counties, and on the west by El Paso and Elbert counties. Geographically, the county forms a backwards block "L", which is 72 miles long, and 48 miles wide in the south, but only 30 miles wide in the north. This configuration gives the county an area of 2,593 square miles. The topography is predominantly rolling prairie, with several river valleys and numerous sand hills. The principal topographical feature is the Arkansas Divide which separates the Arkansas watershed from the South Platte watershed. The basic economic activity in the county is cattle grazing and dry land farming. Primary crops include wheat, corn, barley, beans, hay, sorghum, and forage crops. Generally, the county's agricultural production is good. However, occasional droughts do occur. These periodic droughts tend to depress the county's economic base.

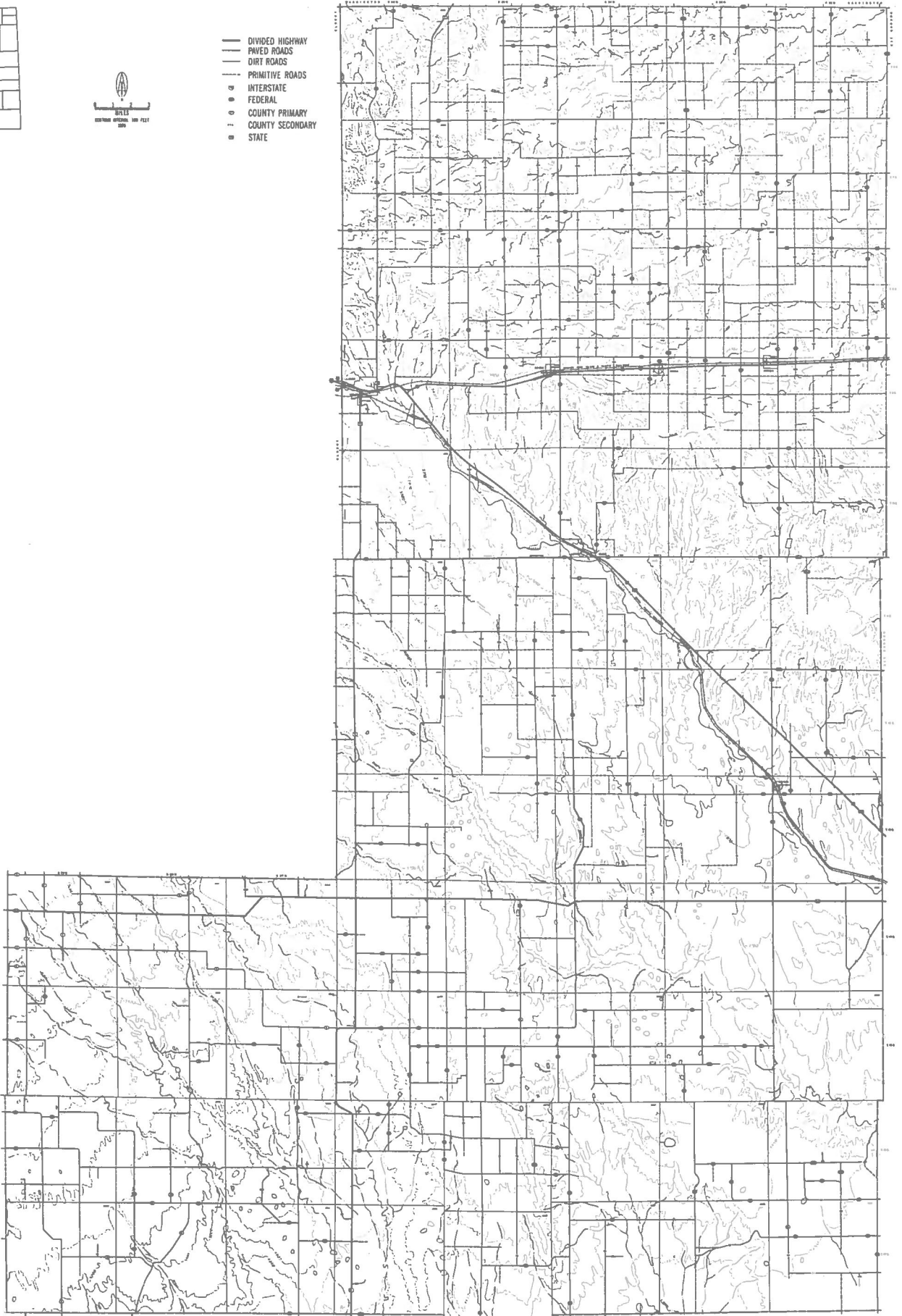
The two largest towns in Lincoln County are Limon, with a population of 1,915; and Hugo, the county seat, with a population of 820.

LINCOLN COUNTY COLORADO

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- DIVIDED HIGHWAY
- PAVED ROADS
- DIRT ROADS
- PRIMITIVE ROADS
- INTERSTATE
- FEDERAL
- COUNTY PRIMARY
- COUNTY SECONDARY
- STATE



Physiography/Soils

As mentioned above, Lincoln County is basically flat, with some occasional rolling hills. The Arkansas Divide separates the South Platte and Arkansas watersheds. To the north of this divide, the North and South Forks of the Arikaree River and Hell Creek run north-eastward toward the South Platte River. To the south of the divide, Long Branch Creek, Middle Rush Creek, and South Rush Creek combine to form Rush Creek which flows south-eastward toward the Arkansas River. In the western portion of the county, Little Horse Creek, the Steel Fork of Horse Creek, and Pond Creek combine with Horse Creek and flow southward toward the Arkansas River. Geographically, Lincoln County is part of the central high plains portion of the Colorado Piedmont. As such, the terrain is quite flat, and ranges in elevation from 4,500 feet in the southeast to approximately 5,400 feet in the northwest.

There are seven major soil associations in Lincoln County. Generally speaking, these soil types run in a northwest-southeasterly direction, following the general drainage patterns. The first major association is located in the northern half of the county. These soils are brown in color, mostly deep to moderately deep, and of medium to heavy texture. The soils are formed from loess and old outwash materials. The native vegetation is blue grama grasses with moderate amounts of buffalo grass. Just south of this predominating association, there is a thin strip of clay soils which border Big Sandy Creek. These soils are brown, shallow to moderately deep, and heavy textured. The light surface clay soils are

underlain by heavy clay shales. Due to the slow permeability of these soils, water is held near the surface where it is lost by evaporation. The native vegetation is predominantly blue grama, western wheatgrass and galletta grasses.

The third major soil association in the county is located in a thin strip on the southern side of Big Sandy Creek. These soils are light brown, deep, loose, incoherent sands. The predominant vegetation is sand reedgrass, sand bluestem, sand sage, and yucca.

Still another soil association is located in a wide strip just to the south of the previously discussed sand hills. This association has a small intrusion of the previously discussed deep brown soils located in the northern portion of the county, and a second intrusion of the clay soils found just to the north of Big Sandy Creek. Other than these intrusions, the predominant soil type is light brown to brown in color, deep to moderately deep, and medium to heavy textured. These soils were formed from loess and old outwash materials. Blue grama grasses are the predominant natural vegetation.

Another soil association is found in the county just below the previously mentioned group, and extends to the county's southern border. These soils are light greyish brown, shallow to moderately deep, and of heavy texture. The parent material is clay shale. The native vegetation is blue grama, galletta grass, and rabbitbush.

The far western portion of the county has two major soil associations. The southern half of this area has light brown, deep and moderately deep sandy soils. These soils were formed from wind reworked old outwash materials. The native vegetation is blue grama, side oats grama, and sand bluestem grasses. Just

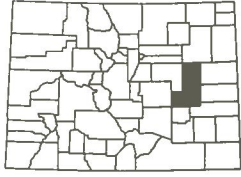
to the north of this area is located a small area of deep brown sandy soils located on upland hills and valleys. These soils have a brown sandy surface overlying sandy to moderately sandy subsoils. The soils are deep to moderately deep, and derived from wind reworked old outwash materials. The native vegetation consists of blue grama, sand dropseed, and sand bluestem grasses.

Climate

Lincoln County's climate is generally mild, having a growing season of 141 days. Limon, which is a representative recording station, has an annual mean temperature of 46.5°. The annual mean precipitation is 16.60 inches. This region is the center of Colorado's dryland winter wheat belt. As such, the farmers rely on substantial amounts of fall and spring moisture, with a relatively dry winter. As always, drought is a major problem with this type of farming. However, the long-term records show that the good moisture years tend to outnumber the dry years.

LINCOLN COUNTY COLORADO

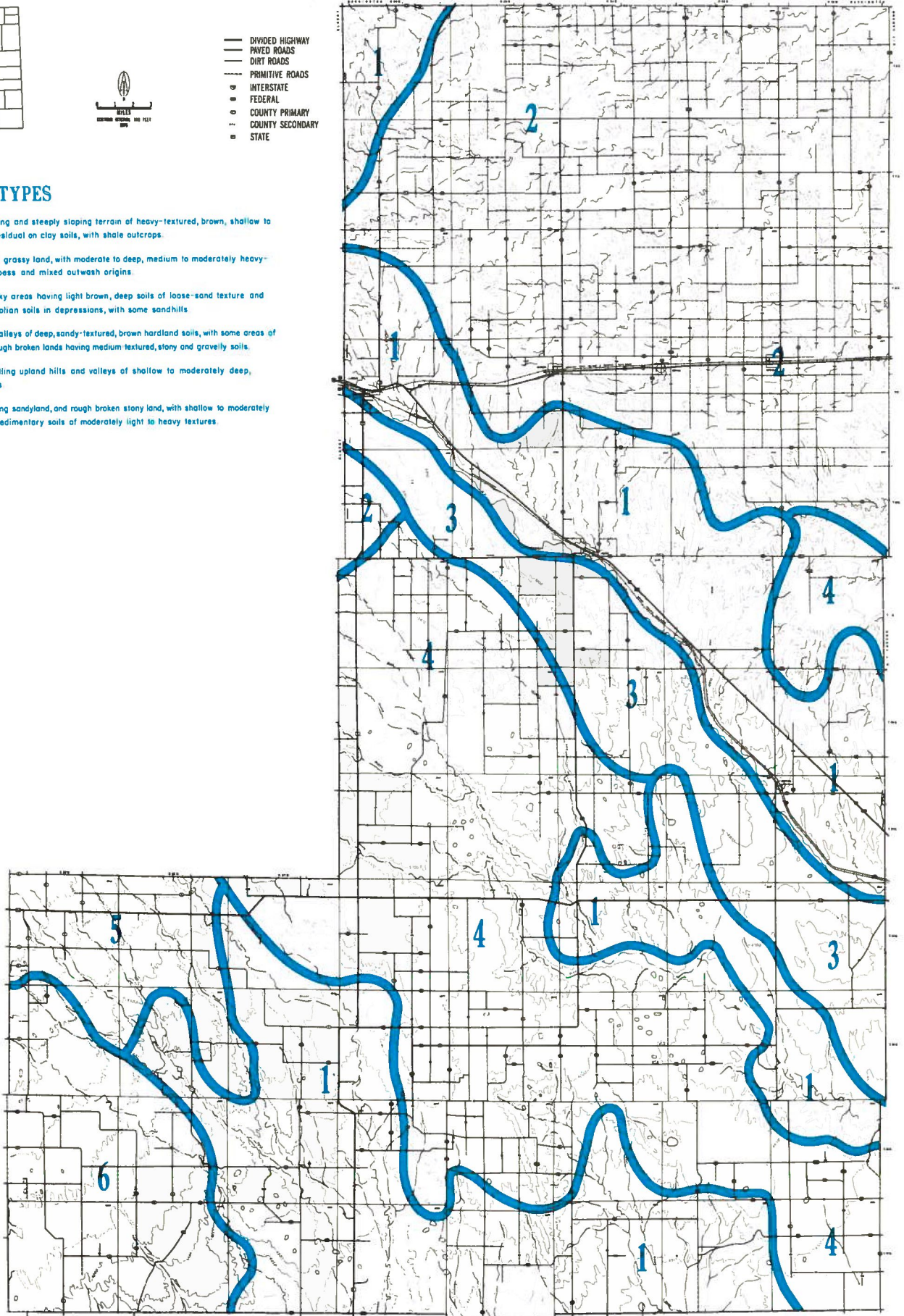
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GENERAL SOIL TYPES

- 1 Undulating to rolling and steeply sloping terrain of heavy-textured, brown, shallow to moderately deep residual on clay soils, with shale outcrops.
- 2 Level to undulating grassy land, with moderate to deep, medium to moderately heavy-textured soils of loess and mixed outwash origins.
- 3 Rolling to hummocky areas having light brown, deep soils of loose-sand texture and slightly heavier eolian soils in depressions, with some sandhills.
- 4 Upland hills and valleys of deep, sandy-textured, brown hardland soils, with some areas of steep slope and rough broken lands having medium textured, stony and gravelly soils.
- 5 Undulating and rolling upland hills and valleys of shallow to moderately deep, brown sandy soils.
- 6 Nearly level to rolling sandyland, and rough broken stony land, with shallow to moderately deep residual on sedimentary soils of moderately light to heavy textures.



III BACKGROUND

Population Characteristics

Lincoln County's 1960 Census population was 5,310 people. In 1965, the Colorado State Planning Office Demographic Study estimated the population as 5,094 people. Between 1950 and 1960, the county's population decreased 10.1 percent from 5,909 people to 5,310 people. During this time period, the population decline was due to a net out-migration of -24.5 percent, which is coupled with a natural increase of 14.4 percent to give the previously noted 10.1 percent decline in population. For the state as a whole, the population increased 32.4 percent between 1950 and 1960. This increase was based on a net migration of 12.4 percent, and a natural increase of 20.0 percent. Between 1960 and 1965, the county showed a projected decrease of 216 people, or -4.1 percent. This is figured by subtracting the natural increase 5.3 percent from the net migration of -10.4 percent to give the net growth of -5.1 percent. During this same time period, 1960-1965, the estimated state population showed an increase of 17.2 percent, based on a natural increase of 7.7 percent, and a net migration of 9.5 percent.

FIGURE I

Growth of the Population

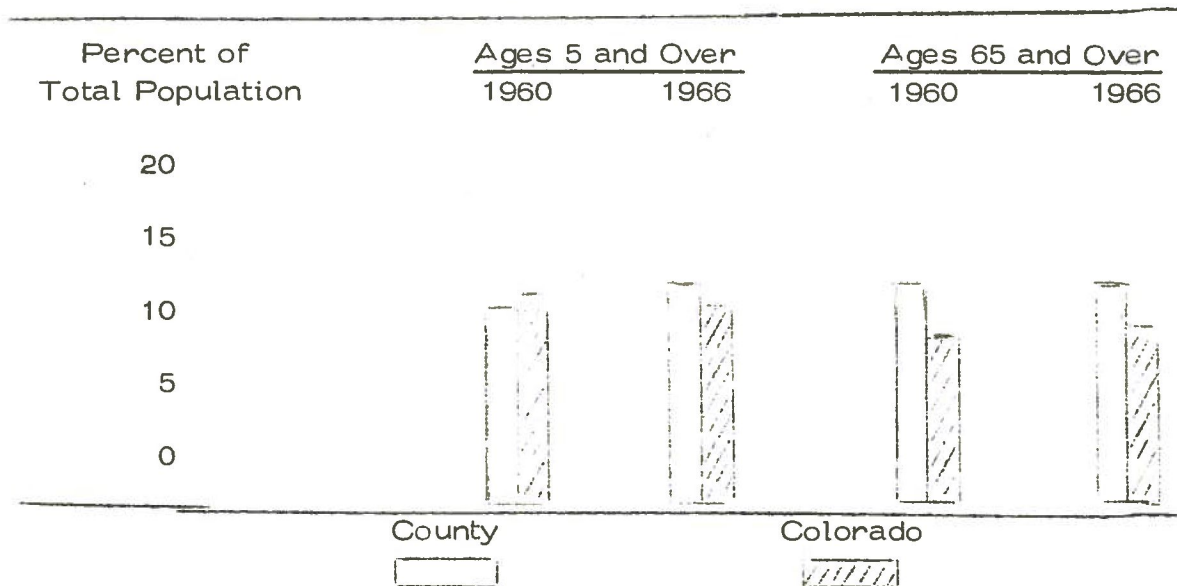
Percent change in:	1950-1960		1960-1965	
	<u>County</u>	<u>State</u>	<u>County</u>	<u>State</u>
Natural Increase	14.4	20.0	5.3	7.7
Net Migration	-24.5	12.4	-10.4	9.5
Net Growth	-10.1	32.4	- 5.1	17.2

Thus, although the county declined in population from 1960 to 1965, the rate of decrease during this period is almost exactly one-half of the rate of decrease between 1950 and 1960. As before, the population is declining due to the large net migration out of the county.

Next, Lincoln County's Age Distribution, Median Age, and Level of Schooling are investigated. First, the county's proportion of persons aged less than 5 years and over 65 years is shown on the following table.

FIGURE II

Age Distribution



In 1960, 10.6 percent of Lincoln County's population was under the age of five. By 1966, this figure had increased to 11.4 percent. Corresponding state-wide figures for this age group were 11.3 percent in 1960 and 10.0 percent in 1966. Thus, the county shows a slight increase in the percentage of children under the age of five, while the state shows a slight decrease in this same statistic. In addition, the 1960 U. S. Census showed that

11.4 percent of the county's population was over age 65. In 1966, this figure remained the same, at 11.4 percent of the total population. Corresponding state-wide figures for the same statistic were 8.3 percent in 1960 and 8.7 percent in 1966. Thus, the county's population is not increasing in age. In 1960, the census showed that there were no Negroes, and three members of "other races" (less than one percent of the total population) living in Lincoln County. In 1960, the county's median age was 31.1 years. By 1966 the Community Profile series prepared by the Office of Economic Opportunity showed that the median age had decreased to 28.7 years, or approximately 2.5 years between 1960 and 1966. Thus, there is a decreasing proportion of older people living in the county.

In 1960, 45.6 percent of the population aged 25 or over had completed four years of high school. This is about six percentage points lower than the state-wide figure of 52.0 percent for the same year. The median number of years of schooling for county residents aged 25 or over is 11.3. For the state as a whole, the median number of years of schooling is 12.1. Thus, the educational level of attainment for Lincoln County residents is somewhat lower than the level of attainment for the state as a whole.

The 1960 U. S. Census data shows that of the 1,416 families living in Lincoln County, 387 (27.3%) had incomes below the \$3,000 poverty level. This figure is considerably above the state-wide level of 18.3 percent for the same category. At the other end of the scale, 168 families or 11.9 percent of the 1,416 families in the county had incomes above \$10,000 per year. In terms of the state as a whole, this is below the state-wide distribution of

14.6 percent for families having incomes above \$10,000. Thus, the county has more families with incomes below \$3,000, and also fewer families with incomes over \$10,000 than the state as a whole.

The county's 1960 median family income was \$4,580. This figure is \$1,200 below the 1960 state-wide median income of \$5,780. The 1965 per capita personal income, as determined by the Colorado State University study on personal income was \$2,108 for Lincoln County. The following table gives the per capita personal income for Lincoln County and the state of Colorado for 1960, 1963, and 1965.

Figure III

	Per Capita Personal Income			
	Income		Percent increase (decrease) from 1960	
	Lincoln County	Average of all Colorado Counties	Lincoln County	Average of all Colorado Counties
1960	\$2,111	\$2,303	—	—
1963	2,074	2,502	-2%	9%
1965	2,108	2,706	0	7

Thus per capita personal income in Lincoln County decreased between 1960 and 1963, but had increased back to its original level by 1965. Further, the actual figure is considerably below the all-county average of \$2,303 in 1960, and \$2,706 in 1965. More recent income estimates have been made by Sales Management Inc. This organization calculates an Effective Buying Income (EBI) per household, based on all family resources, less tax expense. On this basis, Lincoln County, with an EBI of \$8,591 is approximately \$600 below the state-wide EBI, which is \$9,194. Thus, by these two measures,

Lincoln county's income position is below the rest of the state.

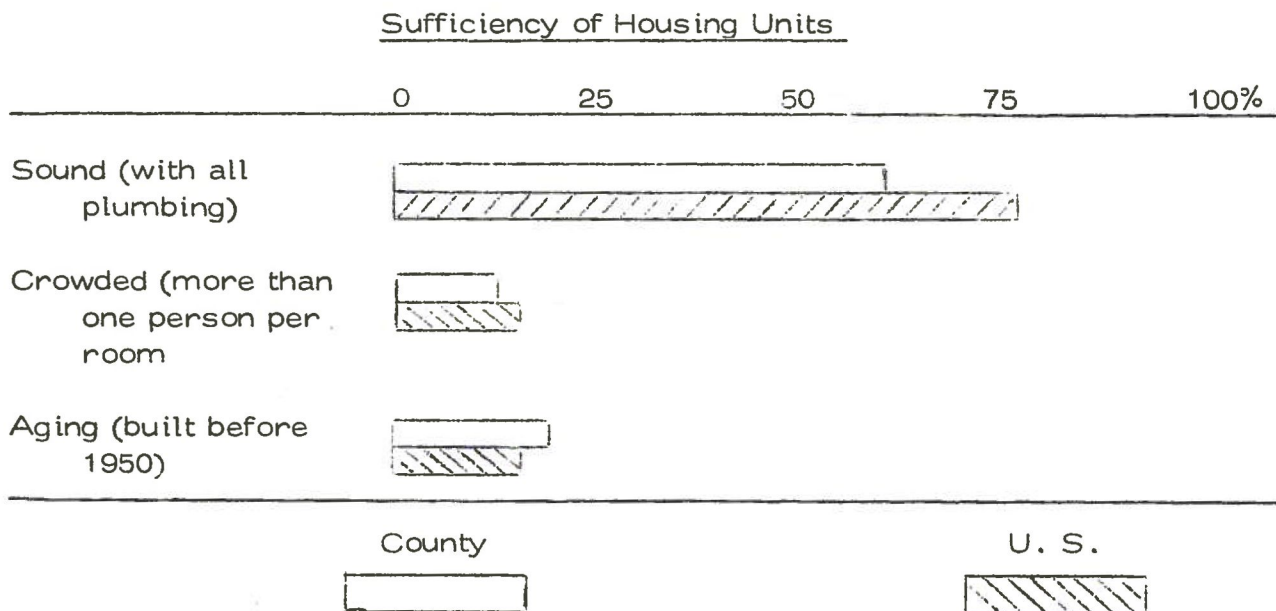
Based on the Office of Economic Opportunity's definitions of the minimum income necessary for family survival in a predominately rural residential setting, the poverty cut-off level for Lincoln County in 1960 was \$2,177. There were 219 (15.5% of all county families) living below this level in 1960. By 1966, the poverty level had risen to \$2,221 and 16.7 percent of the county's families were living below this level. In 1966, 20.1 percent of all families in Colorado were living below the poverty cut off level. A summary of the preceding poverty indicators shows that residents of Lincoln County have a generally lower level of income than residents of the state as a whole.

Housing Characteristics

In 1960, there were 1,934 housing units in Lincoln County. Of these, 1,689 housing units (87.2%) were occupied. Of the 1,689 occupied units, 1,185 (70.1%) were owner occupied, and 504 (29.9%) were renter occupied. The median value of the owner occupied units was \$8,400. Further, 1,288 housing units, 66.6 percent of the total number of housing units, were sound and had all plumbing facilities. This percentage is 10 percentage points below the state-wide average, which shows that 71.4 percent of the housing units are sound and have all plumbing facilities. Two Hundred and Eighty dwelling units, 14.5 percent of the total number, were built after 1950. This figure compares with the U.S. average of 11.5 percent. Thus, the county has more dwelling units built after 1950 than the U.S. as a whole. Of the 1,934 housing units in Lincoln County, 188 (9.7 percent) had an average of more than 1.01 occupants per room. For the U.S. , 11.5 percent

of the housing units had an average of more than 1.01 occupants per room. Thus, the county is somewhat below the U. S. figures for this statistic. The following table summarizes the sufficiency of existing housing units.

Figure IV



Services

Lincoln County is part of the Colorado Health Department's I-5 planning district, which includes El Paso, Teller, and Lincoln counties. Presently the county is served by the 12-bed Lincoln Community Hospital at Hugo. There is a 26-bed long-term care unit attached to this facility. In addition, there is a 52-bed private nursing home located at Limon. There are no tuberculosis or rehabilitation facilities in Lincoln County. The Lincoln County hospital is presently 3 beds below its optimum programmed size. The long-term care center attached to this facility is 6 beds below its optimum size. Thus, the county is nearly meeting the state health department's hospital bed requirements.

Public school services in Lincoln County are provided in five school districts: Re-1, Hugo; Re-45, Limon; Re-13, Genoa; Re-23, Karval; and Re-31, Arriba. Each of these districts serve the towns mentioned, as well as a considerable amount of the surrounding area. In the fall of 1967, there were a total of 1,309 students enrolled in Lincoln County schools. Of these, 731 (55.5%) were in Elementary School (Grades K-6), and 578 (46.5%) were in Secondary school (Grades 7-12). Overall, the county showed an increase of 8 students (0.6%) between 1966 and 1967.

Lincoln County's recreational service potential is limited by the very

flat terrain and lack of surface water resources. Thus, the individual towns provide most of the county's recreational facilities. Hugo has a swimming pool, a golf course, two parks, a tennis court, and a baseball field. Limon has two city parks, a swimming pool and a golf course. The State Game Fish and Parks Department has built two small lakes which are stocked with fish. In the fall, there is some antelope hunting available near Hugo, and the annual Limon Days Rodeo is held each July 3-4. In addition, the Lincoln County Free Fair and Rodeo is held each fall in Hugo.

Economic Characteristics

The 1960 Census showed that the total work force in Lincoln County was 2,086 people. Of this number, 2,032 (97.5%) were employed, and 54 (2.5%) were unemployed. Most of the male unemployed persons were classified as operatives, while most of the female unemployed persons were service workers. The following table shows the employment distribution in Lincoln County.

Figure V

Lincoln County Employment

Rank	Category	No. of Employees	Percentage
1	Agriculture	781	38.4
2	All Services	496	23.9
3	All Retail Trade	429	21.1
4	Transportation, Communi- cation, and Utilities	145	7.1
5	Construction	77	3.8

Figure V continued:

Rank	Category	No. of Employees	Percentage
6	Wholesale Trade	50	2.5
7	Manufacturing	32	1.6
8	Not Reported	32	1.6
		-----	-----
	Total	2032	100.0

This table shows the heavy concentration of Agricultural and Service employees in Lincoln County. Combined, these two employment groups account for 62.3 percent of all employees in Lincoln County.

Thus, the towns in Lincoln County provide services to people living on the surrounding farms. This statement is supported by noting that retail trade provides jobs for 429 people or 21.1 percent of the total number of employees in Lincoln County. Transportation, Communication, and Utilities rank 4th, with 145 employees. Construction ranks 5th, Wholesale Trade 6th, Manufacturing 7th, Not Reported 8th and Mining last, with no employees.

As noted previously, Agriculture is an important part of Lincoln County's economy. A more detailed analysis shows that there were 454 commercial farms in Lincoln County in 1964. Of these, 54 (11.9 percent) had total sales of under \$2,500; while 206 (45.4 percent) had total sales of over \$10,000 per year. The average size of a farm in Lincoln County is approximately 4.7 square miles. Further, 356 farms (78.4 percent) are over 1,000 acres (1.6 square miles). The total dollar value of all crops produced

in Lincoln County for 1968 is as follows:

All Wheat	\$ 1,489,670
All other crops	799,303
Sorghum, Grain and Forage	330,570
Corn, Grain, and Silage	92,650
Barley	<u>6,620</u>
Total	<u><u>\$ 2,718,813</u></u>

The category of "All Other Crops" includes Dry Beans, Sugar Beets, Oats, Hay, Potatoes, Rye, Broomcorn, Seeds, Fruits, and Vegetables. The individual figures for each of these categories for 1968 are not available. However, the 1967 figures show that no Sugar Beets, Oats, or Potatoes were produced. Hay production had the largest dollar value, with Dry Beans second, and only minor amounts of production in the remaining crop categories. Combining these figures gives a total 1968 crop value of \$2,718,813. This figure represents an increase of nearly one million dollars over the 1967 figure. Most of this increase is accounted for by the three-fold increase in Wheat production between 1966 and 1967. Even with the substantial increase in the dollar value of farm produce, Lincoln County ranks 38th out of 63 counties in field crop production. The value of livestock produced in 1967 and 1968 for Lincoln County is not available. However, in 1964, the dollar value of livestock and livestock products produced in Lincoln County amounted to \$7,078,000, as opposed to \$1,158,000 for field crops. This represents approximately 6 times as much as the field crop production, and points to Lincoln County's importance as a producer of livestock. Finally, the average

dollar yield per farm for produce and livestock in 1964 was \$15,425.

Retail sales figures for Lincoln County show that the total value of retail trade has risen 21.8 percent from \$6,823,000 in 1958 to \$8,317,000 in 1963. More recent yearly retail sales figures have been compiled by the Colorado Retail Council.

Figure VI
Total Retail Sales

	1967	1968	% Change
Colorado	4,189,822,000	4,700,226,000	12.2
Lincoln County	13,183,000	14,169,000	7.5
Limon	10,361,000	11,241,000	8.5
Hugo	1,943,000	1,821,000	-6.3

This table shows that Lincoln County's retail sales have increased at a rate only slightly more than 1/2 the state's rate of increase. In 1968, Limon accounted for 79.3 percent of the total county sales, with Hugo a distant second having 13.6 percent of the total retail sales. Thus, Limon has by far the largest share of the county's retail sales. Further, Hugo has experienced a 6.3 percent drop in retail sales from 1967 to 1968. However, the increase in Limon's sales was enough to offset the decrease in Hugo to give the county an overall increase in retail sales. Limon shows peak sales values in the Automotive, Food, Public Utilities, and Other Retail Sales categories. Manufacturing has increased 23.6 percent from \$813,000 in 1967 to \$1,005,000 in 1968. The other major retailing categories, in

descending order of importance are: General Merchandise, Furniture,
Lodging, Lumber, Apparel, and Personal and Professional Services.

IV LAND UTILIZATION

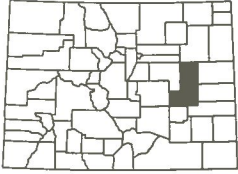
Land Ownership

Total Land in Lincoln County	1,659,520 acres
Total in Private Ownership	1,519,962 acres
Bureau of Land Management	2,165 acres
State School Lands	133,911 acres
County and Municipal	3,482 acres
Total in Public Ownership	139,558 acres

Most of the land in Lincoln County is held under private ownership. Specifically, 139,558 acres or 8 percent of the total land area is in public ownership. The State school land accounts for nearly all of the publically owned land.

LINCOLN COUNTY COLORADO

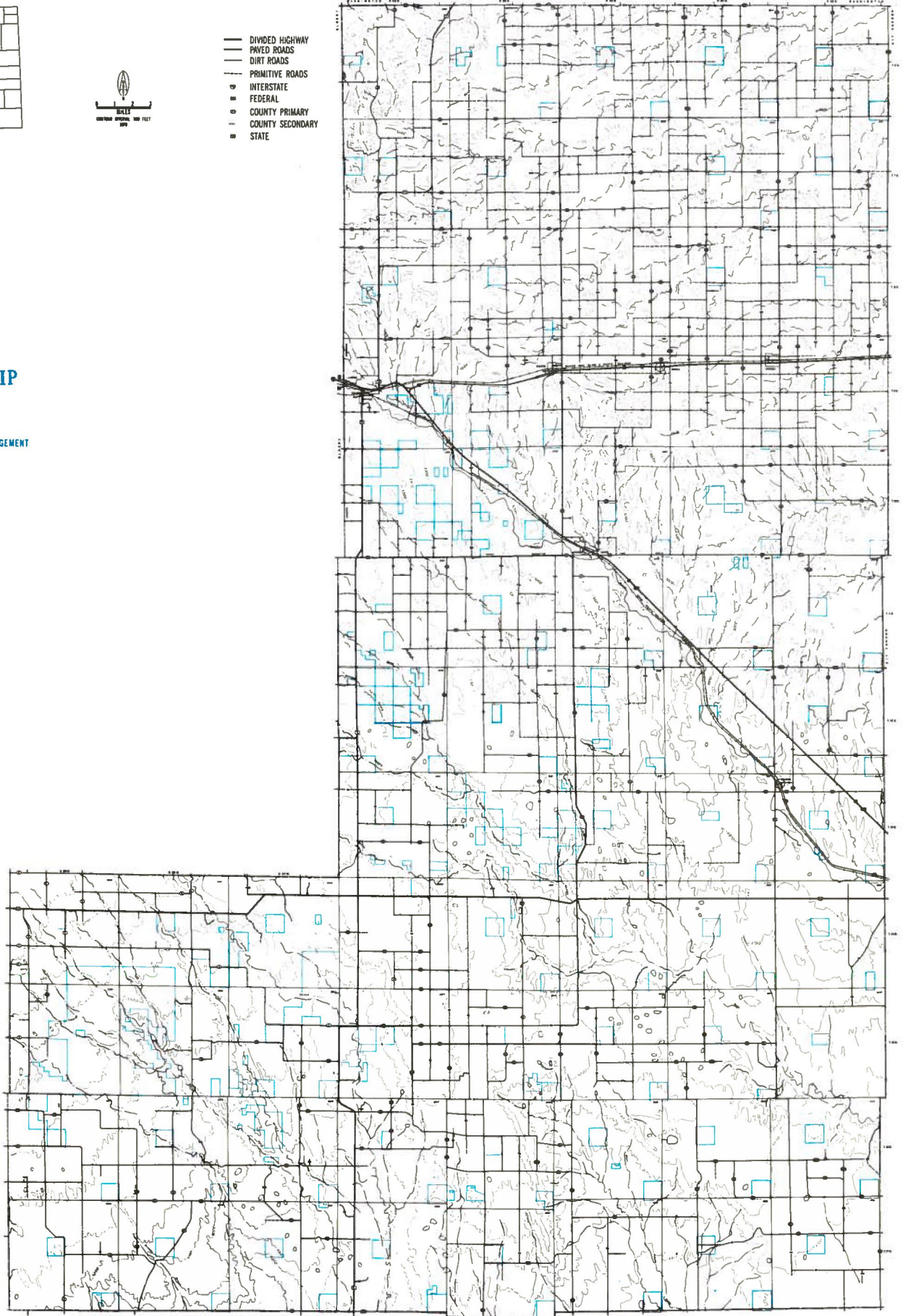
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PUBLIC OWNERSHIP

- STATE
- BUREAU OF LAND MANAGEMENT



Transportation Facilities

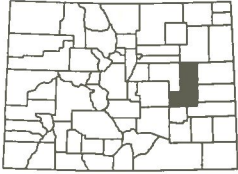
Lincoln County is served by two major U.S. highways. U.S. 24 enters the county at its western boundary one mile west of Limon. This route will eventually be converted to four lanes and redesignated I-70. Approximately two miles outside of Limon, the routes divide, with U.S. 40 heading in a southeasterly direction across the county towards the town of Kit Carson. Running north and south from Limon is Colorado Route 71. This route intersects with Colorado 94, which runs due east from Colorado Springs. These are the major Colorado and U.S. highways in Lincoln County. In addition, there is a grid network of paved and unpaved county roads to service the remainder of the county. Two railroads cross Lincoln County. The C.R.I. & P. railroad route parallels U.S. 24 across the north central portion of the county. The Union Pacific Railroad runs approximately parallel to U.S. 40 as it cuts diagonally southeastward from Limon. The county has two small private airports, one at Limon and one at Hugo.

Land Use

Lincoln County has three basic natural land uses: Dry Crop Land, Grassland, and Sage Brush. Land used for dry crops covers approximately 24 Townships, or 33.3 percent of the county, Grassland covers approximately 44 Townships, or 61.1 percent of the county. The remainder of the county, 4 Townships, (5.6 percent) is covered with sagebrush. Generally speaking, the dry crop land is located in the northern one-third of the county with grassland covering the rest of the area, with the exception of a wedge of sage brush running from the southeastern corner of the county

LINCOLN COUNTY COLORADO

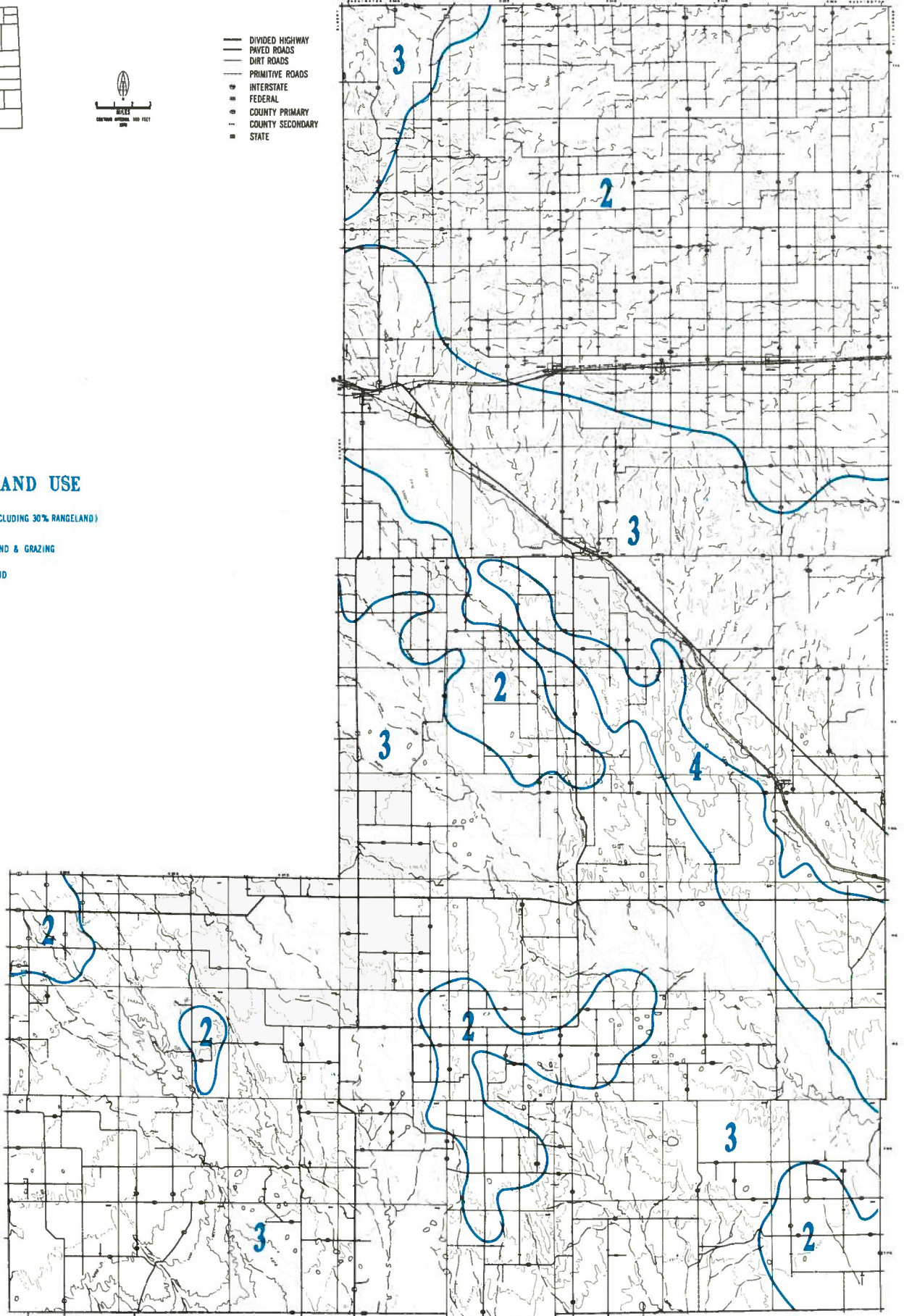
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GENERALIZED LAND USE

- 2 DRY CROPLAND (INCLUDING 30% RANGELAND)
- 3 PASTURE, GRASSLAND & GRAZING
- 4 SAGE & BRUSHLAND



to the town of Hugo. Urban land uses include the incorporated towns of Limon, with a population of 2,000; Hugo, with a population of 890; Arriba, with a population of 300; and Genoa, with a population of 165. Other than these four towns, the rest of the population is located in the unincorporated towns of Punkin Center or Karval, or on individual farm dwellings scattered throughout the county. In total, these urban land uses account for approximately .1 percent of the total land area in Lincoln County. This is a very small portion of the county, which reinforces the overwhelmingly rural aspect of Lincoln County.

Water Resources

Nearly all of Lincoln County's water resources are sub-surface. The following table records the 1964 water yield from the various types of wells around the county.

Type of Well	Number	Total Rate of Yield (gallons per minute)	Average Rate of Yield (gallons per minute)
Stock	187	1,938	10
Domestic	110	1,399	13
Irrigation	81	64,541	796
Municipal	7	1,530	219
Wells with unknown yields	7		
Dry Wells	2		

Thus, the predominate type of well in Lincoln County is used for watering livestock. However, these wells also have the smallest yield in gallons per minute. The next largest number of wells are used for domestic purposes, and yield an average of 13 gpm. In terms of volume, irrigation wells are by far the greatest utilizers of underground water, averaging 796 gpm. Finally, the seven municipal wells in the county provide an average of 219 gallons per minute. This amount of flow is deemed adequate to serve the towns of Arriba, which has two wells with an average flow of 50 gpm, and Genoa, which has five wells with an average flow of 215 gpm. In addition, Hugo and Limon have wells producing 153 and 200 gpm respectively.

V COUNTY GROWTH

County Growth

Lincoln County's population has declined during the years from 1960 to 1970. In 1960, Lincoln County's census count showed 5,310 people. The State Planning Office estimates show a decline of 327 people (6.1 percent) to 4,983 persons in 1968. The preliminary 1970 Census County shows a further decline of 319 (6.4 percent) to 4,664 people. Although these preliminary census figures are subject to final adjustments as observed earlier in this report, most of the population decline was due to out migration. From 1970-1980, the State Planning Office foresees a slow population growth from 4,664 persons in 1971 to 4,850 persons in 1980. This represents an increase of 186 people or 3.9 percent. Thus, the overall pattern shows a slow decline reversing to become stable or show a slight increase after 1970.

The comprehensive plan prepared by Leo-A. Daly Company for Limon emphasizes the continued consolidation of existing farms into larger combines. This trend enables more land to be farmed by fewer people. In addition, increased mechanization has reduced the overall number of people necessary to run the farms. Thus, the rural population of the county would continue to decline or at best level off. On the other hand, increased technological methods require increased services, and if the more urbanized communities can provide these services, some stabilization and growth might be predicted for the towns.

Another critical element in considering growth is the water supply. Most industries require considerable amounts of water. Further, communities will have to expand their wells to serve more people. Thus, any significant industrial or residential growth will depend on careful conservation and management of water resources.

VI COMMUNITY/COUNTY
WATER FACILITIES

According to the Colorado State Health Department files, there are public water systems in the towns of Arriba, Genoa, Hugo, and Limon. The rest of the county is served by individual wells.

Arriba

Arriba's water system serves approximately 300 people which represents 90 percent of the total population. Service is provided by 122 taps. The four wells which supply water have a combined capacity of 35 gpm. Storage facilities are provided by an 18,000 gallon pressure tank, and by two ground level tanks of 50,000 and 100,000 gallons respectively. Chlorine is added by solution on the line to the feeder tank. Pressure is maintained in the 18,000 gallon tank by a booster pump. Line sizes are 2" and 4" steel pipe. The following financial statement shows the preliminary figures for 1968. These statements will show 1967 assessed valuation, total tax levy, municipal tax levy, and municipal revenues. On the expense side, municipal bonds, revenue bonds, and school bond debts are shown, in addition to determination of the value of all bonds per capita, and all bonds as a percent of the assessed valuation.

Revenues

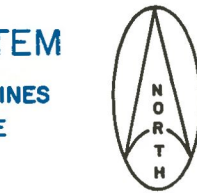
Assessed Valuation	\$ 280,610.00
Total Tax Levy	73.80 mills
Municipal Tax Levy	22.82 mills
1968 Municipal Revenue	\$ 6,404.00

Debts

General Obligation Bonds	\$ 2,000.00
All Bonds per capita	6.67
All Bonds as percent of assessed valuation	0.7%

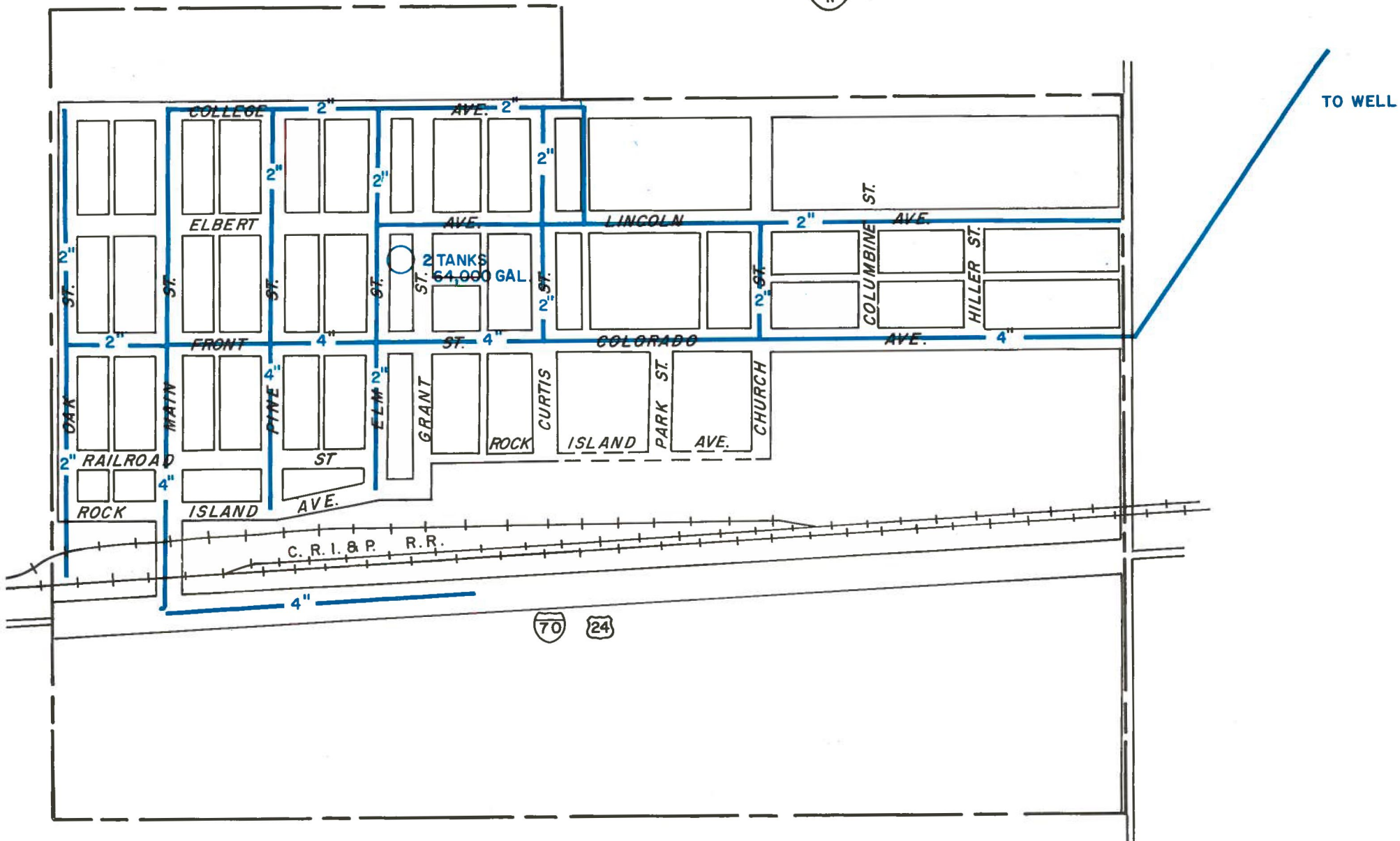
Town of Arriba

0 250' 500' 750'



WATER SYSTEM

— WATER LINES
4" LINE SIZE



Genoa

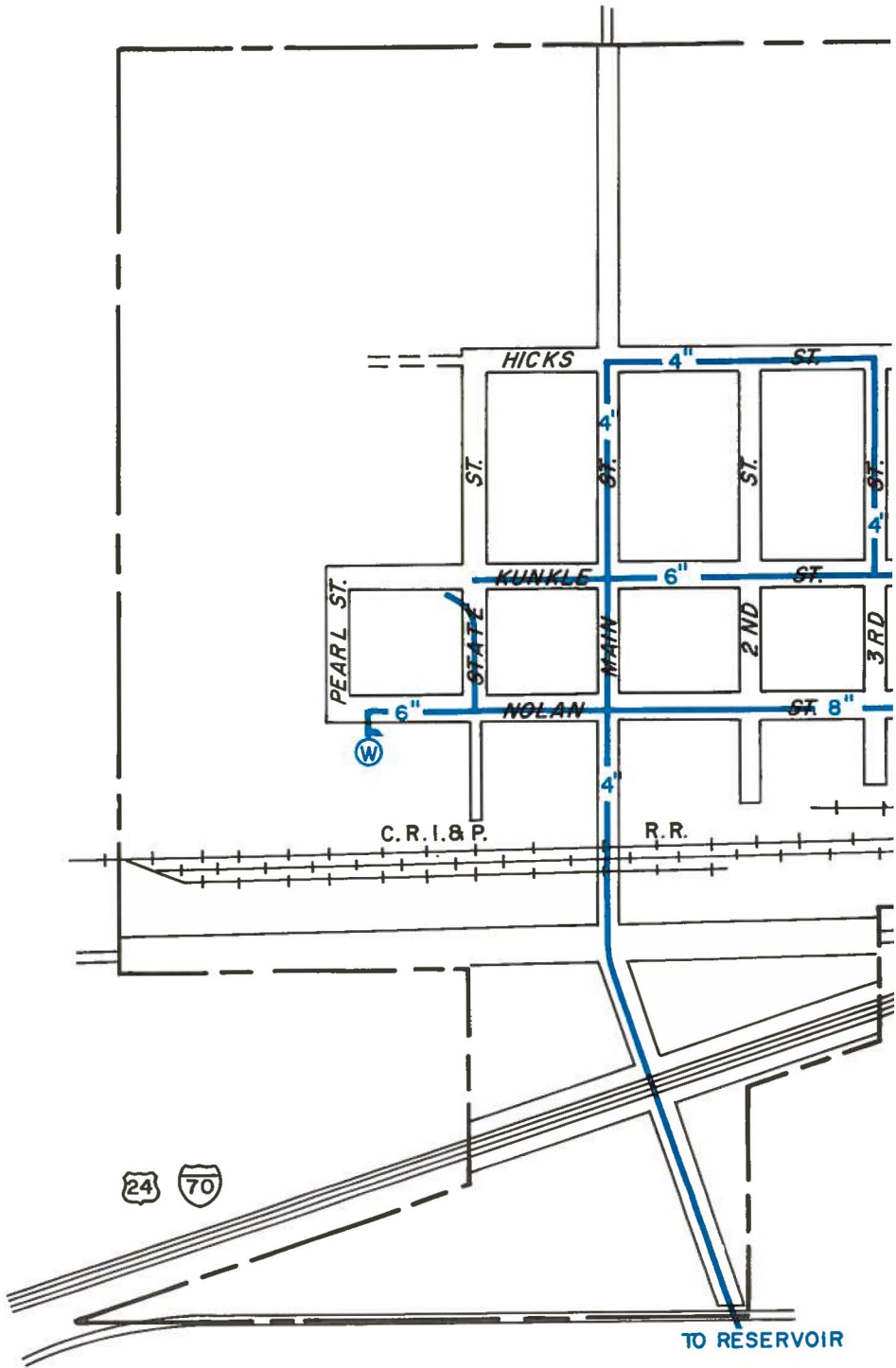
Genoa's water system serves 200 people through 60 taps. The system's rated capacity is 10 gpm from eight wells. Line size varies from 4" to 8" steel pipe. Maximum water consumption is 8 gpm, with average consumption rated at 6 gpm. H.T.H. Chlorine is added normally once a week at the 25' well. This system has two water reservoirs with capacities of 23,000 gallons and 66,000 gallons respectively. These reservoirs are located near wells number 1-4. The other wells are located north of town, and are serviced by a 30,000 gallon reservoir. Genoa's financial statement is as follows.

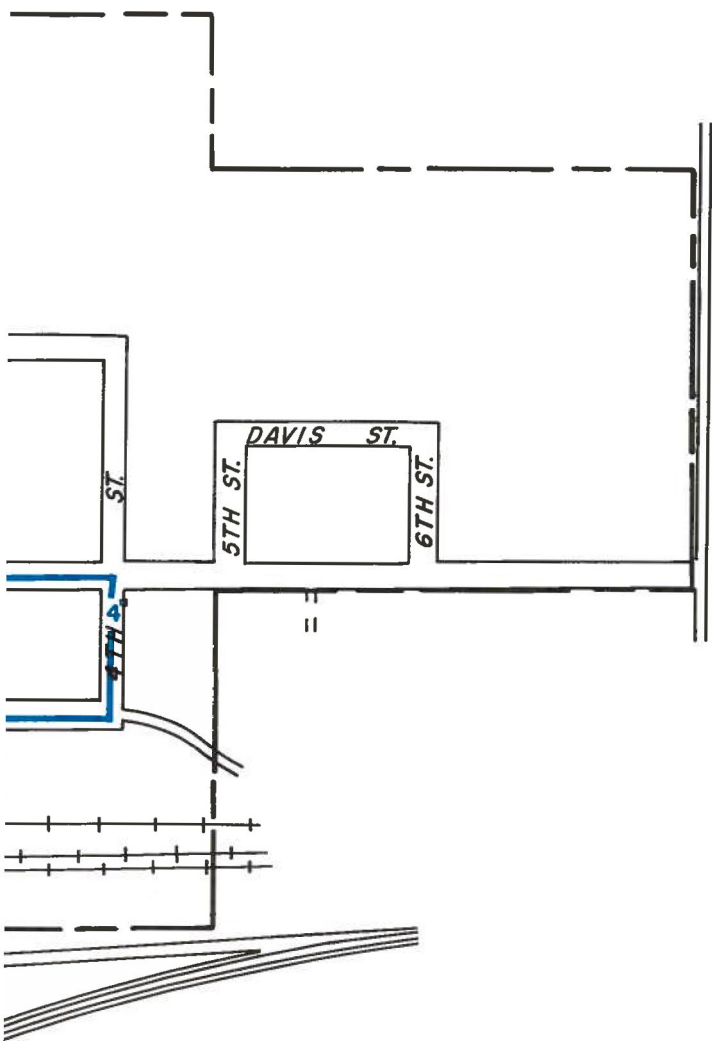
Revenues

Assessed Valuation	\$ 185,330.00
Total Tax Levy	85.88 mills
Municipal Tax Levy	32.12 mills
1968 Municipal Revenue	\$ 5,953.00

Debts

General Obligation Bonds	\$ 31,000.00
Revenue Bonds	—
School and Special District and County Bonds	2,000.00
All Bonds per capita	218.54
All Bonds as percent of Assessed Value	17.8%





Town of Genoa



WATER SYSTEM

— WATER LINES

6" LINE SIZE



Hugo

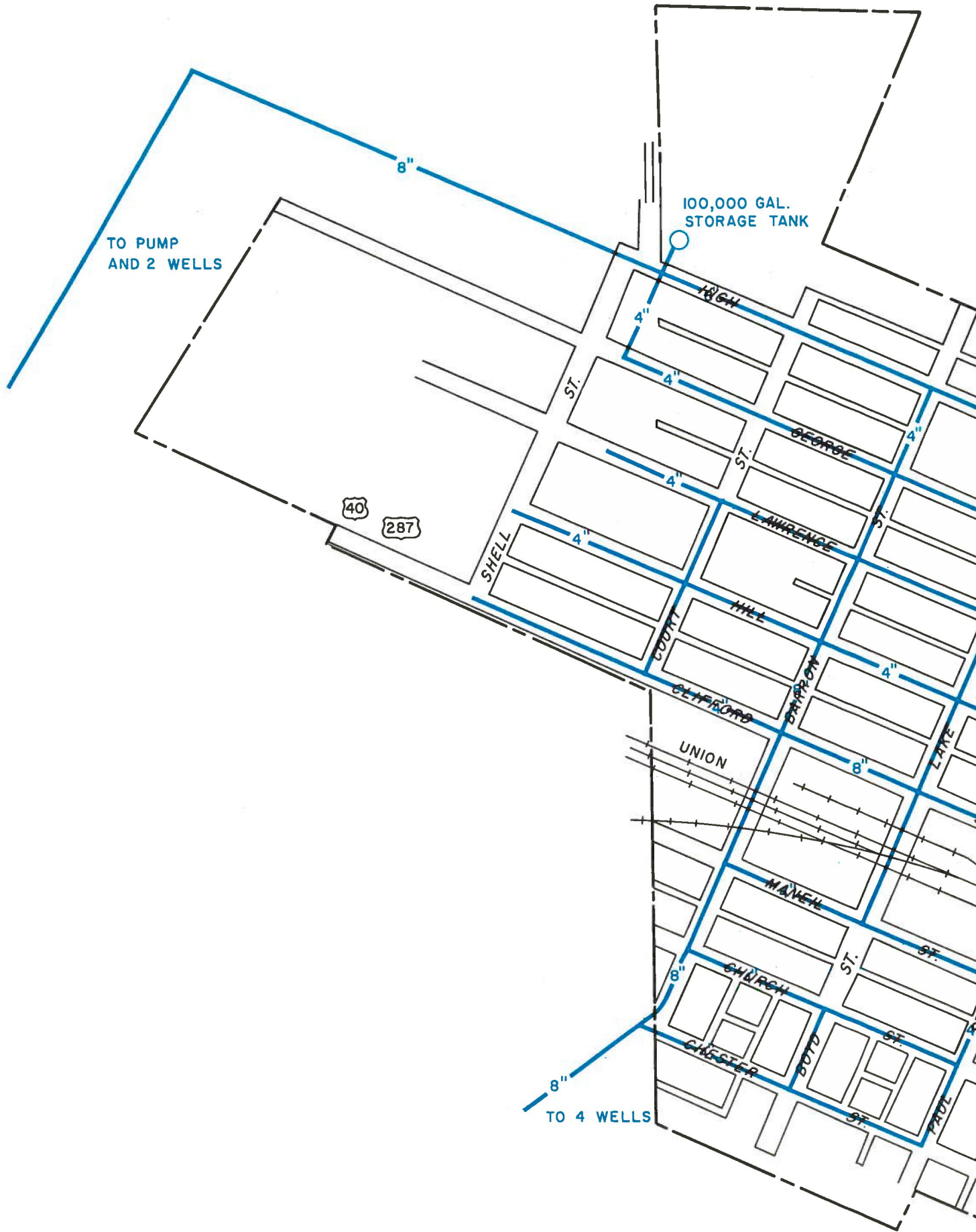
This municipal water system serves approximately 800 people from 320 taps. Maximum water consumption is rated at 146 gpm, with average consumption rated at 70 gpm. Total capacity of the system's eight wells is 600 gpm. There is a 100,000 gallon elevated covered steel storage tank to provide a constant flow of water to local residents. Chlorination is added from a W & T Gas V-Notch Chlorinator. In addition, there is a pump station to provide the pressure necessary to service the town. Line sizes vary from 2 inch to 8 inch diameter. Hugo's financial statement follows.

Revenues

1967 Assessed Valuation	\$ 818,350.00
Total Tax Levy	77.95 mills
Municipal Tax Levy	25.60 mills
Municipal Revenue	\$ 20,950.00

Debts

General Obligation Bonds	None
Revenue Bonds	\$ 11,000.00
School, Special District and County Bonds	\$ 94,000.00
All Bonds per capita	\$ 117.98
All Bonds as percent of Assessed Valuation	12.8 %



TO PUMP
AND 2 WELLS

100,000 GAL.
STORAGE TANK

40
287

TO 4 WELLS

HIGH ST.

GEORGE ST.

LAWRENCE ST.

HILL ST.

CLIFFORD ST.

UNION ST.

MANEIL ST.

CHURCH ST.

CHESTER ST.

SHELL ST.

COURT ST.

BARBON ST.

LAKE ST.

ST.

ST.

ST.

ST.

ST.

PRDL ST.

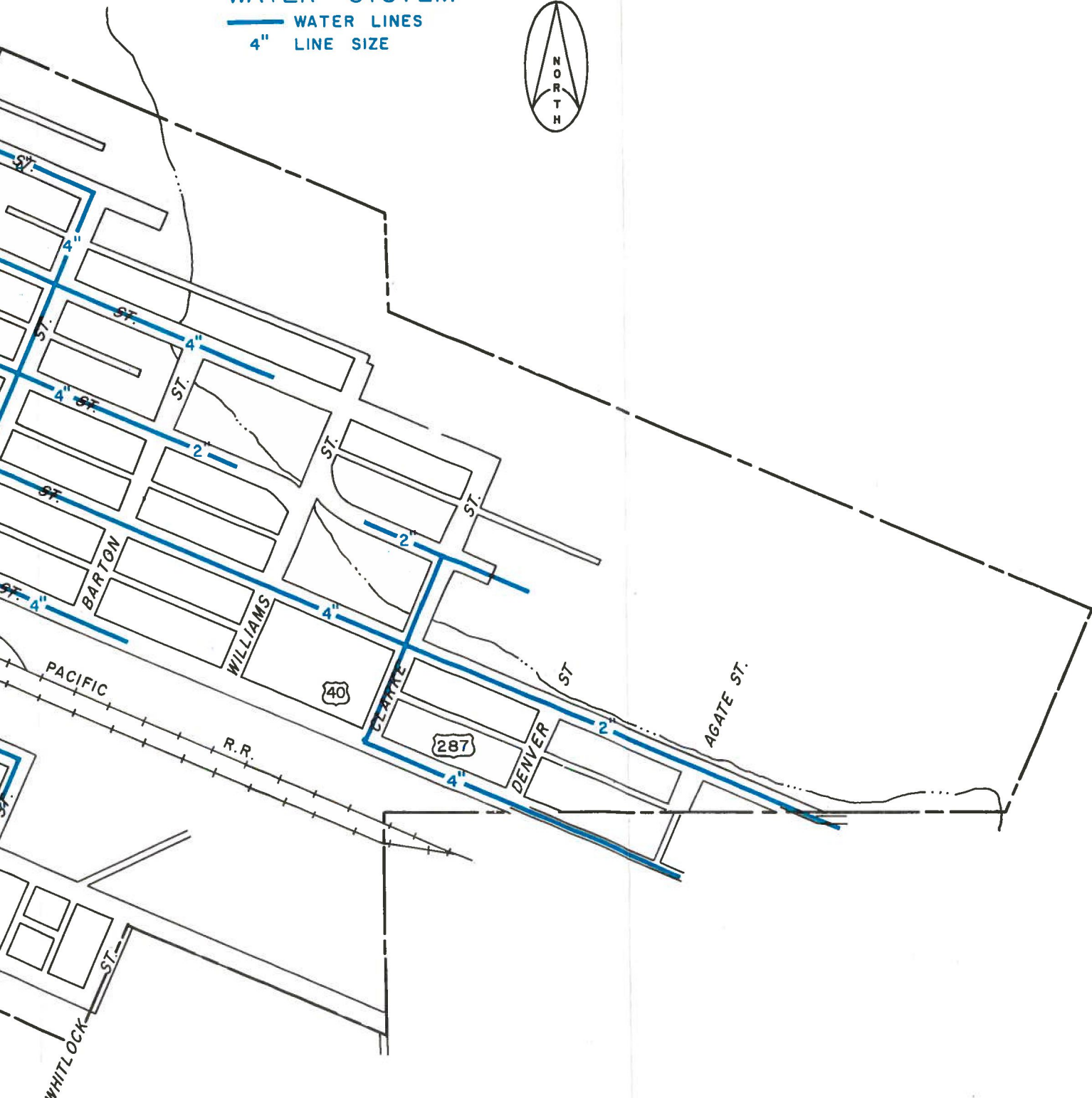
BUTL ST.

Town of Hugo



WATER SYSTEM

— WATER LINES
4" LINE SIZE



Limon

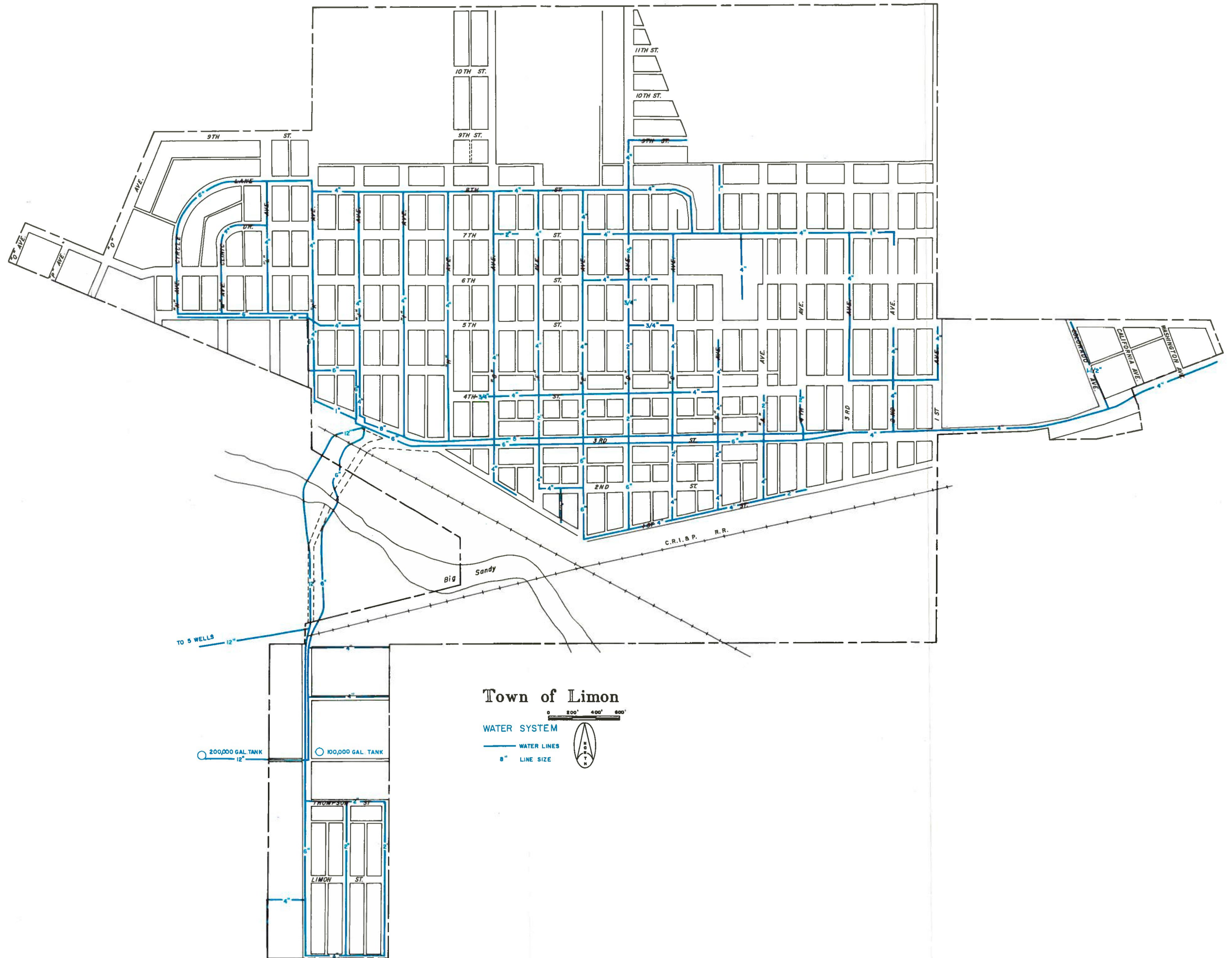
Limon's water system serves approximately 2,000 people in and around Limon. The 570 water taps in Limon provide a maximum water consumption of 800 gpm. Average water consumption for the system is 500 gpm. Water is supplied from four interconnected wells and stored in three elevated tanks providing storage capacity of 105,000 gallons, 90,000 gallons, and 200,000 gallons respectively. Chlorine is added as necessary from a W & T Automatic Chlorinator. From the wells, water is taken through a 12-inch pipe to a 200,000 gallon tank and from there to the distribution grid. Line sizes vary from 1 inch to 12 inches in diameter and are made of steel, copper, or plastic. Limon's financial statement is as follows:

Revenue

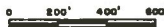
1967 Assessed Valuation	\$ 2,588,320.00
Total Tax Levy	86.81 mills
Municipal Tax Levy	27.75 mills
1968 Municipal Revenue	\$ 71,826.00

Debts

General Obligation Bonds	\$ 13,000.00
Revenue Bonds	\$ 90,000.00
School, Special District and County Bonds	\$ 170,000.00
All Bonds per capita	\$ 136.50
All Bonds as percent of Assessed Value	10.5 %



Town of Limon



WATER SYSTEM

— WATER LINES
○ 8" LINE SIZE



○ 200,000 GAL TANK
○ 100,000 GAL TANK

VII COMMUNITY/COUNTY
SEWER FACILITIES

There are municipal sewer systems in both Limon and Hugo. The rest of the county residents rely on individual septic tanks. The two existing systems are described as follows.

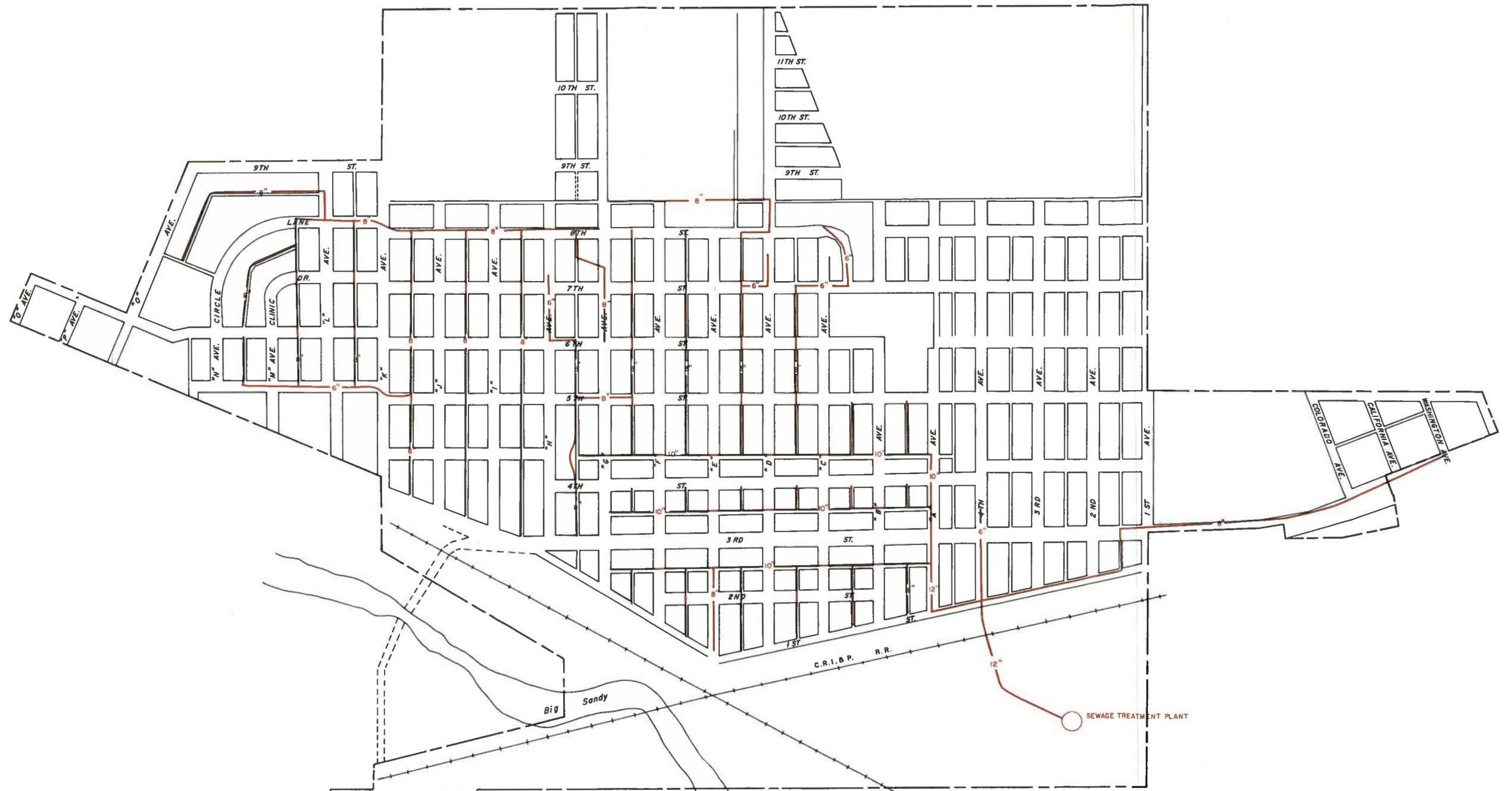
Limon

Limon's sewer system serves approximately 1,600 people, and provides treatment facilities to 75 percent of the total population. The system consists of one septic tank, which serves 380 people and is only used in emergencies. The remainder of the population is served by lagoons of four acres, eight acres, and fifteen acres in size. Line sizes vary from 6" to 12" in diameter. The lagoons discharge into Big Sandy Creek.

Hugo

Hugo's sanitary sewer system serves 850 people through a lagoon of 4.5 surface acres. This lagoon was found inadequate in 1960. As a result, the town purchased 15 acres of land, hired Robert A. Boyce to prepare a plan, and proceeded with construction of adequate sewage treatment lagoons in 1964.

The lagoons discharge into Big Sandy Creek. All sewer line sizes are 8" with a 10" outfall line to the lagoons.

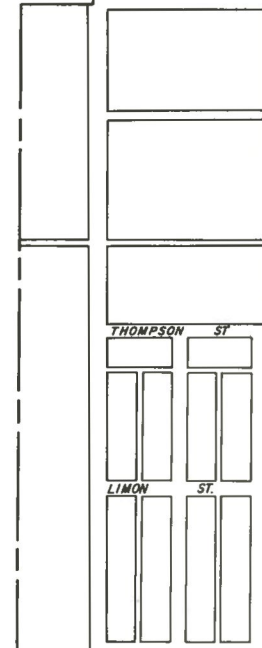


Town of Limon

0 200' 400' 800'

SEWER SYSTEM

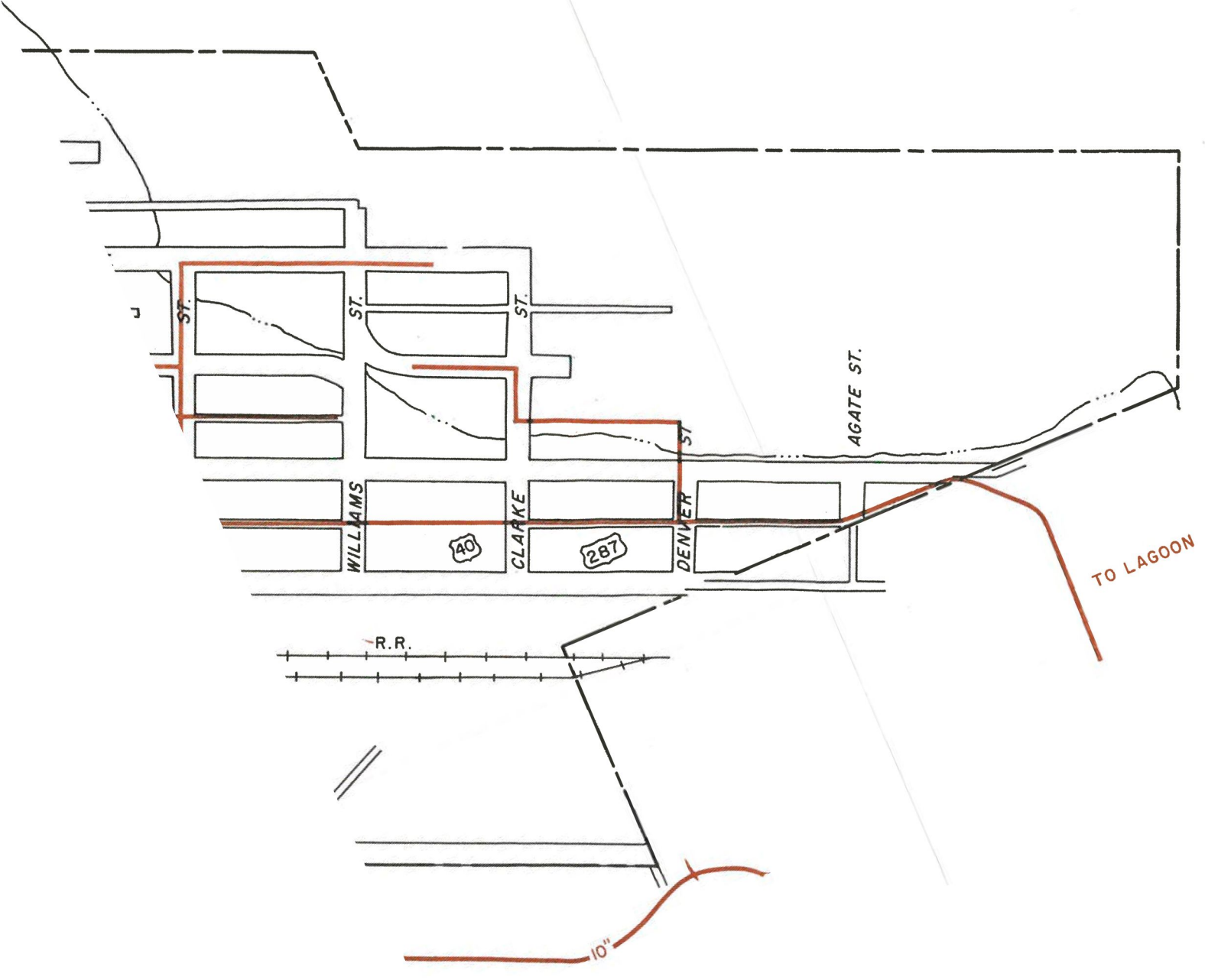
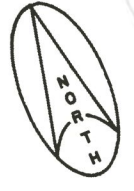
SEWER LINES
6" LINE SIZE





Town of Hugo

SEWER SYSTEM
— SEWER LINES
ALL SEWER LINES ARE
8" UNLESS NOTED



VIII COMMUNITY/COUNTY
WATER AND SEWER
PLAN RECOMMENDATIONS

Overall County Water Plan

Only slight population increases are projected for Lincoln County in the coming years. According to the Colorado State Health Department, the towns having a municipal water supply system are providing adequate domestic water supplies. Accordingly, necessary future improvements to the water systems will probably be limited to upgrading supply, providing better quality of water, maintaining or replacing portions of the distribution system and additional fire protection.

There are four towns in Lincoln County which provide municipal water. These are Arriba, Genoa, Hugo, and Limon. There are no rural water systems established in the county at this time. The rest of the county and the other communities are served by individual wells. All four towns in Lincoln County presently providing municipal water services are deficient in line size to provide adequate fire protection.

There are no immediate recommendations for the communities of Arriba, Genoa, Hugo, and Limon. Future recommendations, if and when feasible, are: Improvement of the quality of water through additional treatment facilities. Providing elevated storage facilities which will provide pressure to the fire hydrants of a minimum of 40 pounds per square inch for fire protection. Line sizing throughout the community should be studied by a qualified engineer to determine if sufficient quantity of water would be available during a fire. If sufficient quantity of water is not available, recommendations should be made by the engineer to upgrade the system to provide sufficient quantity. As a general recommendation, future line replacements

and line extensions should be limited to a minimum water line size of 6 inches, to provide capacity in the system for fire flow. Even though Genoa's present method of chlorination seems to be providing adequate treatment, it is recommended that a chlorinator be installed in the system to provide automatic chlorination. Limon appears to have sufficient elevated storage facilities to provide gravity flow during emergencies.

Overall County Sewer Plan

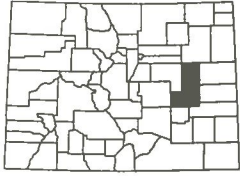
Under present and anticipated conditions, the sewage facilities in Lincoln County are expected to provide adequate service, and therefore no further plan recommendations are made. Limon presently has twenty-seven acres of lagoon surface area. The Limon facilities were tested by the Colorado Department of Health in July, 1970, and were found sufficient to meet that Department's requirements. Accordingly, barring any unforeseen growth of population, present facilities in Limon should continue to meet community needs in the future.

Similarly, Hugo's relatively new lagoon system provides adequate service for current and predictable needs. Arriba, having currently applied for a grant to construct a sewage system, will also be able to meet local needs with construction of the proposed system.

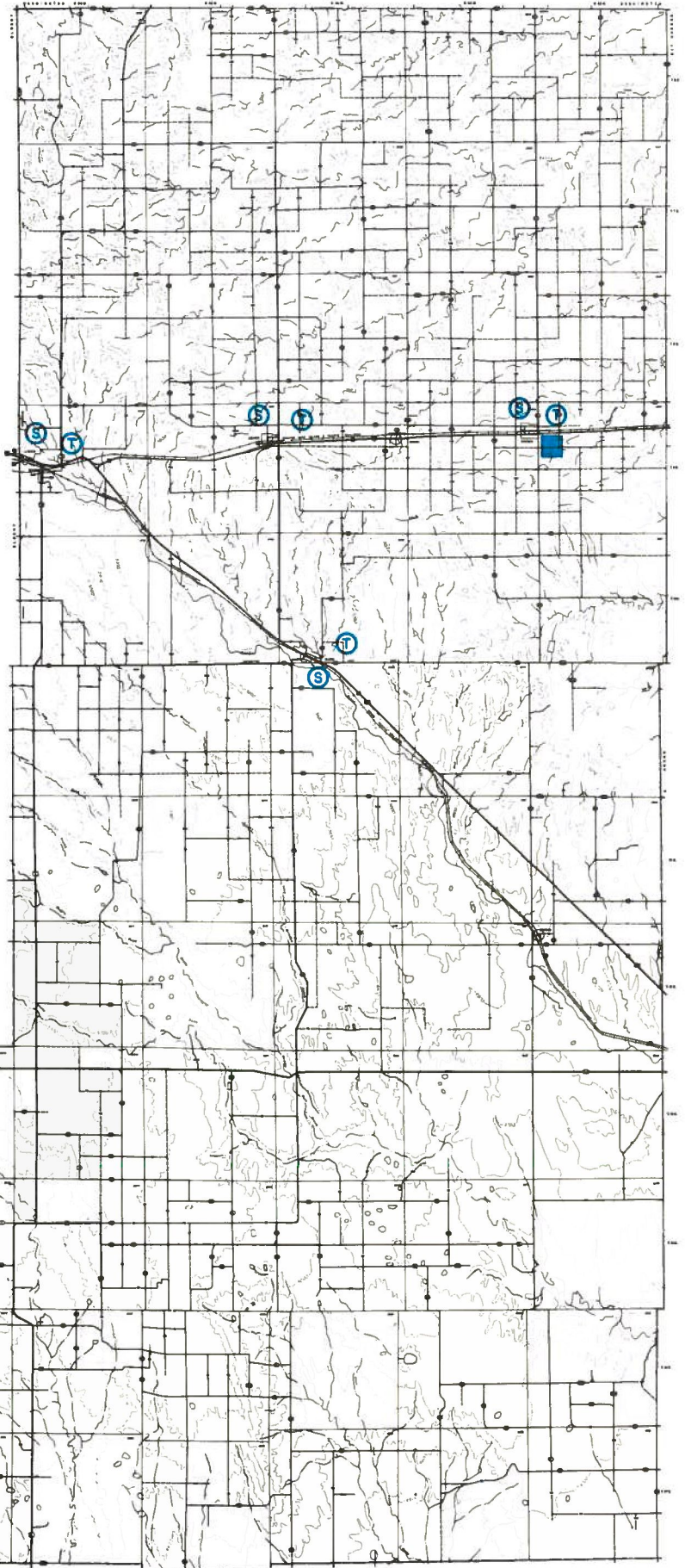
Elsewhere in the county, the relatively low density of current and predictable population indicates that individual sewage systems will continue to be the most feasible means of sanitation in the foreseeable future.

LINCOLN COUNTY COLORADO

Prepared by the Colorado State Planning Office / 700 State Capitol Annex / 1375 Sherman Street / Denver, Colorado / 80203



- DIVIDED HIGHWAY
- PAVED ROADS
- DIRT ROADS
- PRIMITIVE ROADS
- INTERSTATE
- ○ ○ ○ ○ FEDERAL
- ○ ○ ○ ○ COUNTY PRIMARY
- ○ ○ ○ ○ COUNTY SECONDARY
- STATE



COUNTY WATER & SEWAGE PLAN

- Ⓢ PROPOSED IMPROVEMENTS TO WATER STORAGE & DISTRIBUTION FACILITIES—LONG RANGE
- Ⓣ PROPOSED IMPROVEMENTS TO WATER TREATMENT FACILITIES—LONG RANGE
- PROPOSED SEWAGE TREATMENT FACILITY—SHORT RANGE