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HARD CHOICES

A Report on the Increasing Gap Between America's Infrastructure Needs and Our Ability To Pay for Them

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Appendix 14. NEW MEXICO

A CASE STUDY

PREPARED FOR THE USE OF THE

SUBCOMMITTEE ON ECONOMIC GOALS AND INTERGOVERNMENTAL POLICY

OF THE

JOINT ECONOMIC COMMITTEE
CONGRESS OF THE UNITED STATES

FEBRUARY 25, 1984

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Preface

Infrastructure problems are widespread. They do not respect regional or state boundaries. To secure a better data base concerning national and state infrastructure conditions and to develop threshold estimates of national and state infrastructure conditions, the Joint Economic Committee of the Congress requested that the University of Colorado's Graduate School of Public Affairs direct a twenty-three state infrastructure study. Simultaneously, the JEC appointed a National Infrastructure Advisory Committee to monitor study progress, review study findings and help develop policy recommendations to the Congress.

In almost all cases, the studies were prepared by principal analysts from a university or college within the state, following a design developed by the University of Colorado. Close collaboration was required and was received from the Governor's staff and relevant state agencies.

Because of fiscal constraints each participating university or college agreed to forego normal overhead and each researcher agreed to contribute considerable time to the analysis. Both are to be commended for their commitment to a unique and important national effort for the Congress of the United States.

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PUBLIC INFRASTRUCTURE NEEDS, 1982-2000

New Mexico Case Study

By

Lee B. Zink

Institute for Applied Research Services
The University of New Mexico
Albuquerque

September 1983

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This report is the contribution for the state of New Mexico to the National Infrastructure Analysis project of the University of Colorado at Denver and is primarily for the use of that project.

The report should also be specifically useful to New Mexico public officials, business executives, journalists and interested citizens. Some may be surprised at the rich material reflected here already available within the state on our infrastructure status and needs. Others may be dismayed to see how much yet remains to be done before we have an adequate picture of those needs. This report will provide the basis for developing that picture.

For the purposes of this study, infrastructure is defined as roads, railroad lines/crossings, airports, water/sewer supply and distribution systems, and solid waste disposal systems. This definition, used for purposes of this multistate study, omits many important facets of public infrastructure; e.g., prisons, jails, schools, universities and public office buildings.

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Chris Perry, then of the Governor's Office, gave me this assignment at the request of Governor Anaya. To both of them I give my thanks along with my hopes for an easier task next time.

I am especially grateful to Steve Reynolds, Tony Gonzalez and Bob White each of whom made special efforts to assure that the sections pertaining to their work were correct.

Many excellent staff members assisted in the physical preparation of the report. Special thanks is due my able assistant, Ms. Jess Phillips, for her

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Finally, as with most things I write, my wife, Patricia, assisted me in polishing the majority of this report. I appreciate her freely given assistance and her careful attention to detail. Her efforts on my behalf help all readers of the work.

Of course, all errors are mine, alone.

Lee B. Zink

August 1983

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INTRODUCTION

Public infrastructure is simply assumed in the United States today, or so it seems. Geographic areas which are growing rapidly assume that all of the highways, bridges, airports, water supply facilities, waste facilities, etc., will be available to accommodate new population and increased economic activity. A casual review of history reinforces the notion that indeed these public facilities have usually been made available in adequate supply. However, the path of history has changed from dynamic economic growth at the national level to relative stagnation. Even in areas of the country which continue to grow, the necessary infrastructure is not assured. Federal taxes bore much of the burden, historically, but the "New Federalism" indicates that that may no longer be the case. Hence, there is a real concern expressed by planners and politicians about necessary infrastructure.

Since the early 1970s New Mexico has been counted among the fastest-growing states in the United States. The state has been fortunate in having farsighted state agencies attempting to meet needs in advance of the appearance of critical problems. That situation has been particularly true in the vital areas of water and highways. Since New Mexico is a semi-arid state, water exerts greater influence on present and future economic conditions than any other factor. Projected water demand in future years significantly exceeds anticipated supplies. Unless major new supplies are developed (quite unlikely), the future will see a change in the pattern of use from lower to higher values. Irrigation now consumes a large percentage of all water available annually. The next twenty years will see that percentage reduced as more water is required for urban-industrial activities.

New Mexico is the fifth largest in area among the fifty states; most intrastate commerce is conducted by motor vehicle. For that reason, well-maintained highways are critical to future economic improvement, particularly in non-metropolitan areas.

Airports are tremendously important to the state. New Mexico has only two major airports, Albuquerque and Roswell, but is served by an important network of smaller airports. All of these are essential to commercial interchange in this large state.

The needs of municipalities and localities to provide good water and sewage facilities are significant. These needs are met somewhat unevenly around the state, but improvement is underway.

Public infrastructure is clearly an imperative ingredient in the recipe for economic improvement anywhere, anytime. What follows points to both New Mexico's strong areas and to areas in which improvement will be required.

I. Overview

New Mexico is sparsely populated relative to other states. In 1980 New Mexico's population density was 10.7 persons per square mile compared to a nationwide average of 57.4 persons per mile. Rapid population growth was experienced between 1970 to 1980. The population grew by 28 percent, which on an annual basis was almost 3 percent per year. More than one-third of the state's 32 counties experienced net outmigration from 1970 to 1980. This was offset by strong net inmigration in other counties, particularly metropolitan areas and counties with energy resources. (See Table 1 for additional details.)

New Mexico experienced significant economic growth during the 1970s. Much of this growth was based upon accelerated extraction of the state's mineral resources, particularly fuel resources. The state has significantly more government and mining and much less manufacturing employment than does the average state.

New Mexico's personal income is slightly more dependent upon transfer payments than is the U.S. average. Also, the traditional returns to investment are less in New Mexico than in the entire U.S. From 1970 to 1980 New Mexico's income grew faster than the U.S. average. (In 1981 that situation reversed.) However in per capita personal income comparisons New Mexicans are much below the national average and have been in that situation for some time.

In summary, employment and income data for 1970-1981 (Tables 2-9) show that New Mexico experienced relatively high rates of growth when compared to national averages. Nonagricultural jobs increased over 62 percent during the period while the national gain was only some 29 percent. Also, the state outpaced the national average in real per capita income growth from 1970-1981--32 percent to 26.4 percent.

Components of Population Change by County: 1970-1980

County	Population		Change 1970-1980		Components of Change			
	1980	1970	Number	Percent	Births	Deaths	Net Migration* Number	Net Migration* Percent
State	1,302,894	1,017,055	285,839	28.1	223,453	80,874	143,260	14.1
Bernalillo	419,700	315,774	103,926	32.9	62,988	22,776	63,714	20.2
Catron	2,720	2,198	522	23.7	381	200	341	15.5
Chaves	51,103	43,335	7,768	17.9	8,009	4,523	4,282	9.9
Colfax	13,667	12,170	1,497	12.3	2,170	1,241	568	4.7
Curry	42,019	39,517	2,502	6.3	9,830	2,838	- 4,490	-11.4
De Baca	2,454	2,547	- 93	- 3.7	327	326	- 94	- 3.7
Dona Ana	96,340	69,773	26,567	38.1	15,964	4,306	14,909	21.4
Eddy	47,855	41,119	6,736	16.4	7,728	3,748	2,756	6.7
Grant	26,204	22,030	4,174	18.9	4,987	1,818	1,005	4.6
Guadalupe	4,496	4,969	- 473	- 9.5	826	425	- 874	-17.6
Harding	1,090	1,348	- 258	-19.1	128	116	- 270	-20.0
Hidalgo	6,049	4,734	1,315	27.8	1,301	498	512	10.8
Lea	55,993	49,554	6,439	13.0	10,421	3,523	- 459	- 0.9
Lincoln	10,997	7,560	3,437	45.5	1,505	760	2,692	35.6
Los Alamos	17,599	15,198	2,401	15.8	1,836	492	1,057	7.0
Luna	15,585	11,706	3,879	33.1	2,766	1,459	2,572	22.0
McKinley	56,449	43,208	13,241	30.6	14,910	3,719	2,050	4.7
Mora	4,205	4,673	- 468	-10.0	737	417	- 788	-16.9
Otero	44,665	41,097	3,568	8.7	9,788	2,405	- 3,815	- 9.3
Quay	10,577	10,903	- 326	- 3.0	1,796	1,306	- 816	- 7.5
Rio Arriba	29,282	25,170	4,112	16.3	6,494	2,291	- 91	- 0.4
Roosevelt	15,695	16,479	- 784	- 4.8	2,806	1,418	- 2,172	-13.2
Sandoval	34,799	17,492	17,307	98.9	5,211	1,897	13,993	80.0
San Juan	81,433	52,517	28,916	55.1	15,912	3,965	16,969	32.3
San Miguel	22,751	21,951	800	3.6	4,508	1,979	- 1,729	- 7.9
Santa Fe	75,360	54,774	20,586	37.6	11,177	4,223	13,632	24.9
Sierra	8,454	7,189	1,265	17.6	889	1,449	1,825	25.4
Socorro	12,566	9,763	2,803	28.7	2,265	923	1,461	15.0
Taos	19,456	17,516	1,940	11.1	3,749	1,478	- 331	- 1.9
Torrance	7,491	5,290	2,201	41.6	964	506	1,743	32.9
Union	4,725	4,925	- 200	- 4.1	748	579	- 369	- 7.5
Valencia	61,115	40,576	20,539	50.6	10,332	3,270	13,477	33.2

* Net migration was calculated as a residual.
Source: Bureau of Business and Economic Research, University of New Mexico

Table 2

NONAGRICULTURAL WAGE AND SALARY EMPLOYMENT (JOBS) BY SECTOR
1970-1981

NEW MEXICO

Year	Manufacturing	Mining	Construction	TCU	Trade	FIRE	Services	Government	Total[1]
1970	21,400	17,000	17,400	20,400	62,000	12,200	53,000	89,200	292,600
1971	22,600	16,700	20,600	20,600	65,600	12,900	54,400	92,300	305,700
1972	26,100	16,200	25,000	21,200	70,600	13,900	38,600	96,000	327,500
1973	28,900	16,500	25,900	22,500	76,800	15,000	61,000	99,500	346,000
1974	29,600	18,700	25,900	23,300	80,200	15,900	64,000	102,500	360,200
1975	28,600	20,300	25,200	23,000	83,600	16,300	68,300	104,800	370,200
1976	30,300	21,500	26,100	23,400	90,400	17,000	73,300	108,000	390,000
1977	32,200	23,400	30,700	24,600	95,500	18,300	79,700	111,000	415,400
1978	33,400	24,400	35,000	26,600	101,200	19,800	87,300	116,600	444,300
1979	34,800	27,100	35,600	28,100	104,100	21,200	89,600	120,500	461,000
1980	34,400	29,400	32,100	28,300	103,400	21,100	91,800	125,000	465,400
1981	34,100	31,300	33,000	29,000	106,600	21,500	94,300	125,500	475,300

[1]Total nonagricultural establishment-based employment (i.e., jobs).
Note: Figures may not sum to total due to rounding.
Source: New Mexico Employment Security Department, Table B.

Table 3

NEW MEXICO AND U.S. NONAGRICULTURAL EMPLOYMENT PROPORTIONS

Employment Sector[1]	1970		1975		1980		1981	
	N.M.	U.S.	N.M.	U.S.	N.M.	U.S.	N.M.	U.S.
Government	30.5%	17.8%	28.3%	19.1%	26.9%	17.9%	26.4%	17.6%
Trade	21.2	21.2	22.6	22.2	22.2	22.5	22.4	22.6
Services	18.1	16.2	18.5	18.1	19.7	19.8	19.8	20.4
Manufacturing	7.3	27.4	7.7	23.8	7.4	22.4	7.2	22.1
Transportation & Utilities	7.0	6.3	6.2	5.8	6.1	5.6	6.1	5.7
Construction	5.9	5.1	6.8	4.5	6.9	4.9	6.9	4.6
Mining	5.8	0.8	5.5	1.0	6.3	1.1	6.6	1.2
Finance, Insurance & Real Estate	4.2	5.2	4.4	5.5	4.5	5.7	4.5	5.8

[1]Nonagricultural wage and salary establishment based-employment (i.e., jobs).
Source: New Mexico Employment Security Department; Bureau of Labor Statistics; and U.S. Department of Labor.

Table 4

NEW MEXICO/NATION COMPARISON

Sector	New Mexico 1970-1981 % of Total Job	United States[3] 1981 % of Total Job
Agriculture[1]	5.4%	3.8%
Nonagriculture:[2]		
Manufacturing	7.7%	22.1%
Mining	5.6	1.2
Construction	7.1	4.6
TCU	6.3	5.7
Trade	22.3	22.6
FIRE	4.4	5.8
Services	18.2	20.4
Government	28.0	17.6

[1]Figures represent agricultural employment as percent of all (agricultural and total nonagricultural jobs.)
[2]Figures represent the average ratio by sector to total nonagricultural establishment-based employment (i.e., jobs).
[3]Represents 1981, exclusively.
Note: Agricultural employment is defined as the total number of farm proprietors and farm wage and salary employment.
Source: New Mexico Employment Security Department; Bureau of Labor Statistics, Department of Labor, Employment and Earnings; Bureau of Economic Analysis, Department of Commerce, Regional Information Systems.

Table 5
NEW MEXICO NONAGRICULTURAL EMPLOYMENT:
PERCENT SHARES AND GROWTH RATES BY SECTOR

Job Sector	1970-1975 Share[1]	1970-1975 Rate[2]	1976-1981 Share[1]	1976-1981 Rate[2]	1970-1981 Share[1]	1970-1981 Rate[2]
Government	29.3%	3.4%	26.7%	3.3%	28.0%	3.2%
Trade	21.9	6.4	22.7	3.2	22.3	5.3
Services	17.9	5.3	19.4	5.0	18.7	6.0
FIRE	4.3	6.3	4.5	4.9	4.4	5.6
TCU	5.6	3.0	6.0	4.5	6.3	3.5
Mining	5.3	3.6	5.9	7.9	5.6	6.5
Construction	7.0	7.6	7.3	3.9	7.1	5.6
Manufacturing	7.8	7.0	7.5	2.4	7.7	4.3
TOTAL	99.1	5.0	100.0	4.0	100.1	4.7

[1]Proportion of sector jobs to total.
[2]Average annual growth rate during time period shown.
Source: New Mexico Employment Security Department.

Table 6

U.S. AND NEW MEXICO COMPARISON
CIVILIAN LABOR FORCE
1976-1981

Year	New Mexico		United States	
	Number[1]	% Change[2]	Number[1]	% Change[2]
1976	475	NA	96,159	NA
1977	518	9.05%	99,009	2.96%
1978	542	4.63	102,251	3.27
1979	556	2.58	104,964	2.65
1980	560	0.72	106,940	1.88
1981	575	2.68	108,670	1.62

NA Not applicable

[1]Totals in thousands.
[2]Percent change from previous year.
Source: New Mexico Employment Security Department; and Department of Labor, Bureau of Labor Statistics.

Table 7

MAJOR SOURCES OF PERSONAL INCOME
NEW MEXICO AND U.S.

Major Sources of Income	Percent of Total Personal Income[3]			
	1970		1980	
	N.M.	U.S.	N.M.	U.S.
Net Labor/Proprietors	75.81%	76.18%	70.95%	70.53%
Dividends, Interest and Rent	12.25	13.85	14.13	15.85
Transfer Payments[1]				
Retirement, Disability & Health Insurance	5.89	6.04	8.84	9.00
Unemployment Insurance	0.52	0.52	0.41	0.85
Income Maintenance	1.83	1.21	1.77	1.47
Retired Military, Vets & Dependents	2.54	1.32	2.46	1.25
All Other Transfer Payments[2]	1.17	0.87	1.44	1.03
Total Transfer Payments	11.94	9.97	14.92	13.62

[1]Transfer payments to persons is income for which services are not directly rendered.
[2]Includes business transfers, nonprofit institutions, educational and training assistance.
[3]Income by place of residence.
Source: Bureau of Economic Analysis, Regional Economic Information System; personal income by major sources: Table 5.00, April, 1982; transfer payments by major source: intermediate tables, April, 1982.

Table 8

U.S. AND NEW MEXICO COMPARISON
PERSONAL INCOME
1970-1981

Year	New Mexico		United States	
	Amount[1]	% Change[2]	Amount[1]	% Change[2]
1970	$ 3.14	9.40%	$ 803.92	7.54%
1971	3.45	9.87	861.90	7.21
1972	3.87	12.17	944.85	9.62
1973	4.36	12.66	1,058.90	12.07
1974	4.88	11.93	1,162.20	9.76
1975	5.56	13.93	1,258.64	8.30
1976	6.31	13.48	1,385.20	10.06
1977	7.03	11.41	1,532.01	10.60
1978	8.07	14.79	1,716.61	12.05
1979	9.16	13.51	1,939.75	13.00
1980	10.27	12.12	2,160.63	11.39
1981	11.32	10.22	2,405.60	11.34

[1]Billions of dollars.
[2]Percentage change from previous year.
Source: Bureau of Economic Analysis, U.S. Department of Commerce.

Table 9

NEW MEXICO NOMINAL/REAL PER CAPITA INCOME
1970-1981

Year	Income Per Capita		Real Income Per Capita[1]	
	N.M.	U.S.	N.M.	U.S.
1970	$3,072	$ 3,945	$3,321	$4,265
1971	3,278	4,167	3,397	4,318
1972	3,593	4,515	3,593	4,515
1973	3,944	5,010	3,371	4,740
1974	4,321	5,448	3,712	4,680
1975	4,785	5,842	3,819	4,662
1976	5,280	6,367	4,012	4,834
1977	5,742	6,984	4,116	5,014
1978	6,448	7,775	4,325	5,215
1979	7,153	8,655	4,407	5,326
1980	7,878	9,480	4,404	5,290
1981	8,654	10,491	4,468	5,394

[1]Deflated by personal consumption expenditures (PCE) index, component of the GNP implicit price deflator (1972=100).

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System, April, 1982.

Recent data indicate that some of these positive trends may have been reversed due to the long national recession beginning in 1980 and to international market conditions affecting New Mexico's mineral resources base. In 1978 45 uranium mines were operating in New Mexico; in the fall of 1982 the figure was 9. The number of uranium miners dropped from 8,000 to 4,000 during that period. The copper industry in southwestern New Mexico has been severely hurt by both the national recession and conditions in international copper markets. Some 3,000 miners were on lay-off status in 1982. Oil and gas activity slowed in response to the world-wide oil glut and to decreases in natural gas demand in the California markets.

Population Projections

Population growth will be one of the major generators of infrastructure needs during the rest of this century. Table 10 presents projections that indicate continued population growth for New Mexico to the year 2000. The pace will slow somewhat. From 1980 to 1990 an increase of over 26 percent is anticipated and from 1990 to 2000 that increase slows to some 18 percent. U.S. rates for that same period are roughly one-half of those anticipated for New Mexico.

Table 11 presents county population projections for 1980-2000 in 5-year increments. These county-level projections are based, in part, upon projected economic changes in the various counties. As shown in Table 12, few counties are expected to maintain 1970-1980 growth rates over the next 20 years. In the metropolitan areas Bernalillo County's rate of growth falls slowly while in Dona Ana the decline is more rapid. Significant reductions in growth are expected in some energy resource areas (Cibola and McKinley counties) and in some recreation areas (Lincoln and Santa Fe counties).

Table 13 presents projected nonagricultural employment for each county based upon assumed local economic conditions. Table 14 presents similar

projections for real per capita income. Table 15 is percentage comparisons of the data presented in the two preceding tables. Total nonagricultural employment is expected to grow about 2.64 percent per year from 1980 to 2000. For the same period real per capita income is forecast to grow at 2.1 percent annually. From 1970 to 1981 nonagricultural employment grew approximately 5 percent annually; real per capita income grew 2.8 percent per year during the same period. These projections are based on several assumptions, four of which are important to note. First, a gradual slowdown is anticipated in the rate of growth in tourist activity at the most popular areas. Second, minimal recovery is expected in uranium mining activity. Third, oil and gas exploration and production are forecast to continue to decline. Finally, the other mineral products of the state are expected to remain relatively depressed. Manufacturing employment will lead all sectors in growth from 1980-2000, followed by employment in the services sector. Overall economic improvement will continue in New Mexico until the end of the century, but that improvement will be at a slower pace than was experienced during 1970-80.

Table 10

NEW MEXICO PROJECTED POPULATION AND CHANGE

	1980-1985	1985-1990	1990-1995	1995-2000
Beginning Population	1,309,600	1,479,700	1,657,000	1,810,400
End Population	1,479,700	1,657,000	1,810,400	1,953,400
Population Change:				
Number	170,100	177,300	153,300	143,000
Percent	13.0	12.0	9.3	7.9

Source: Bureau of Business and Economic Research, The University of New Mexico.

Table 11

POPULATION PROJECTIONS BY COUNTY
1980-2000

County	1980[2]	1985	1990	1995	2000
NEW MEXICO[1]	1.309,600	1,479,700	1,657,000	1,810,400	1,953,400
Bernalillo	422,000	479,600	539,500	584,200	625,900
Catron	2,700	2,900	3,200	3,300	3,500
Chaves	51,300	56,500	60,900	63,400	65,400
Cibola	30,500	33,600	36,600	39,800	42,900
Colfax	13,700	14,500	15,300	16,200	17,200
Curry	42,200	46,000	49,600	52,800	56,000
De Baca	2,500	2,600	2,800	2,900	3,000
Dona Ana	96,800	109,300	122,900	136,600	149,700
Eddy	48,100	53,200	57,700	61,100	64,400
Grant	26,300	29,100	31,700	34,000	35,900
Guadalupe	4,500	4,800	5,100	5,300	5,500
Harding	1,100	1,200	1,300	1,500	1,800
Hidalgo	6,100	6,600	7,100	7,700	8,200
Lea	56,600	72,200	88,900	101,800	114,400
Lincoln	11,000	11,500	12,000	12,500	12,900
Los Alamos	17,600	17,900	18,200	20,800	23,300
Luna	15,600	16,400	17,200	18,200	19,000
McKinley	56,600	60,400	63,800	68,300	72,600
Mora	4,200	4,100	3,900	4,000	4,000
Otero	44,800	48,700	52,600	55,900	58,600
Quay	10,600	11,300	12,000	12,900	13,700
Rio Arriba	29,400	31,200	33,100	35,600	37,900
Roosevelt	15,700	16,600	17,700	18,900	20,000
Sandoval	35,000	40,600	48,600	55,200	59,100
San Juan	82,500	109,700	138,300	167,100	195,800
San Miguel	22,800	24,700	26,600	27,700	28,500
Santa Fe	75,600	80,500	85,700	89,200	92,300
Sierra	8,500	8,900	9,200	9,500	9,800
Socorro	12,600	13,600	14,600	15,600	16,500
Taos	19,600	23,100	26,800	29,400	31,900
Torrance	7,500	8,300	9,100	9,900	10,700
Union	4,700	5,000	5,300	5,900	6,500
Valencia	30,900	35,300	39,800	43,300	46,600

[1]Detail may not sum to total due to rounding differences.

[2]The 1980 totals represent census counts adjusted forward to July 1.

Source: Bureau of Business and Economic Research, The University of New Mexico.

Table 12

PERCENT CHANGE IN POPULATION BY COUNTY
1970-2000

County	1970-1980	1980-1990	1990-2000
NEW MEXICO	28.1%	26.5%	17.9%
Bernalillo	32.9	27.8	16.0
Catron	23.7	16.8	8.9
Chaves	17.9	18.7	7.4
Cibola	51.1	19.8	17.3
Colfax	12.3	11.4	12.5
Curry	6.3	17.5	12.9
De Baca	- 3.7	12.2	7.8
Dona Ana	38.1	26.9	21.8
Eddy	16.4	20.1	11.6
Grant	18.9	20.5	13.3
Guadalupe	- 9.5	13.0	8.9
Harding	-19.1	23.1	30.7
Hidalgo	27.8	17.7	14.5
Lea	13.0	57.0	28.7
Lincoln	45.5	9.2	7.6
Los Alamos	15.8	3.4	28.5
Luna	33.1	10.3	10.3
McKinley	30.6	12.6	13.8
Mora	-10.0	- 6.3	2.0
Otero	8.7	17.3	11.5
Quay	- 3.0	13.4	14.3
Rio Arriba	16.3	12.6	14.7
Roosevelt	- 4.8	12.7	12.9
Sandoval	98.9	38.9	21.5
San Juan	55.1	67.7	41.5
San Miguel	3.6	16.7	7.1
Santa Fe	37.6	13.4	7.8
Sierra	17.6	9.0	5.7
Socorro	28.7	15.6	13.4
Taos	11.1	36.8	18.8
Torrance	41.6	20.8	17.7
Union	- 4.1	12.8	21.7
Valencia	50.2	28.8	17.1

Source: Bureau of Business and Economic Research, The University of New Mexico.

Table 13

TOTAL NONAGRICULTURAL EMPLOYMENT BY COUNTY[1]
1980-2000

County	Year				
	1980	1985	1990	1995	2000
Bernalillo	182,710	208,600	252,350	284,650	315,900
Catron	500	412	420	440	450
Chaves	16,755	19,970	23,270	25,760	27,900
Cibola	NA	4,603	4,910	5,690	6,220
Colfax	4,874	5,041	5,380	5,870	6,400
Curry	11,187	11,430	12,560	13,800	15,160
De Baca	538	513	560	620	680
Dona Ana	29,550	35,240	41,680	47,600	54,900
Eddy	16,658	20,930	24,210	26,750	29,130
Grant	8,690	10,400	11,770	13,260	14,760
Guadalupe	1,221	1,137	1,190	1,260	1,320
Harding	233	298	320	340	370
Hidalgo	1,667	1,924	2,140	2,370	2,610
Lea	24,256	32,770	40,060	45,720	50,480
Lincoln	3,799	4,716	5,150	5,540	5,960
Los Alamos	12,915	13,440	14,060	15,370	16,970
Luna	3,381	3,420	3,650	3,930	4,230
McKinley	19,645	14,205	13,540	14,420	15,500
Mora	473	398	340	340	340
Otero	12,973	14,600	16,510	18,400	20,140
Quay	3,194	3,146	3,340	3,510	3,690
Rio Arriba	5,870	6,045	6,400	6,780	7,180
Roosevelt	4,380	4,502	4,730	4,970	5,230
Sandoval	4,059	4,500	5,450	6,150	6,820
San Juan	31,334	39,170	56,220	66,740	82,690
San Miguel	6,156	6,810	7,520	8,060	8,480
Santa Fe	28,689	32,180	35,270	37,380	38,980
Sierra	1,714	1,879	2,090	2,290	2,500
Socorro	3,652	4,071	4,430	4,770	5,140
Taos	6,159	8,040	8,960	9,510	10,000
Torrance	1,219	1,406	1,620	1,790	1,980
Union	1,085	1,198	1,320	1,480	1,700
Valencia	NA	7,370	8,790	9,750	10,860

NA Not applicable.

[1]Establishment based (i.e., jobs).

Source: Bureau of Business and Economic Research, The University of New Mexico.

Table 14

REAL PER CAPITA INCOME BY COUNTY[1]
1980-2000

County	Year				
	1980	1985	1990	1995	2000
Bernalillo	$ 4,999	$ 5,490	$ 6,201	$ 7,016	$ 7,918
Catron	2,890	3,103	3,256	3,409	3,560
Chaves	4,476	4,910	5,421	5,985	6,608
Cibola	NA	4,219	4,496	4,904	5,348
Colfax	4,276	4,476	4,882	5,324	5,806
Curry	4,500	4,813	5,249	5,725	6,244
De Baca	4,482	4,711	5,138	5,603	6,111
Dona Ana	3,537	3,951	4,369	4,798	5,269
Eddy	4,566	4,977	5,377	5,810	6,277
Grant	4,179	4,221	4,426	4,773	5,205
Guadalupe	3,181	3,309	3,478	3,655	3,842
Harding	3,962	4,113	4,323	4,611	5,041
Hidalgo	4,387	4,538	4,947	5,395	5,884
Lea	5,414	6,074	6,657	7,260	7,918
Lincoln	4,278	4,762	5,414	5,960	6,421
Los Alamos	7,784	8,244	8,991	9,806	10,694
Luna	3,904	4,314	4,629	4,913	5,215
McKinley	3,372	3,500	3,724	4,061	4,429
Mora	2,500	2,563	2,628	2,661	2,694
Otero	3,868	4,082	4,437	4,822	5,241
Quay	4,171	4,319	4,539	4,771	5,014
Rio Arriba	3,124	3,344	3,558	3,786	4,029
Roosevelt	4,243	4,604	4,839	5,085	5,345
Sandoval	2,703	2,782	2,934	3,100	3,275
San Juan	4,640	5,457	6,148	6,788	7,494
San Miguel	2,736	3,062	3,340	3,643	3,973
Santa Fe	4,602	4,918	5,424	5,982	6,599
Sierra	4,042	4,393	4,810	5,246	5,721
Socorro	2,999	3,144	3,387	3,649	3,931
Taos	3,425	3,992	4,520	4,898	5,277
Torrance	3,363	3,740	4,060	4,374	4,712
Union	5,485	5,813	6,162	6,531	7,094
Valencia	NA	4,392	4,809	5,544	6,242

NA Not applicable

[1] 1972 = 100.

Source: Bureau of Business and Economic Research, The University of New Mexico.

Table 15

PERCENT CHANGE IN JOBS
AND REAL PER CAPITA INCOME
1980-2000

County	Employment[1] 1980-1990	Employment[1] 1990-2000	Real Per Capita Income[2] 1980-1990	Real Per Capita Income[2] 1990-2000
Bernalillo	38.1%	25.2%	24.0%	27.7%
Catron	-16.0	7.1	12.7	9.3
Chaves	38.9	19.9	21.1	21.9
Cibola	NA	26.7	NA	18.9
Colfax	10.4	19.0	14.2	18.9
Curry	12.3	20.7	16.6	19.0
De Baca	4.1	21.4	14.6	18.9
Dona Ana	41.0	31.7	23.5	20.6
Eddy	45.3	20.3	17.8	16.7
Grant	35.4	25.4	5.9	17.6
Guadalupe	- 2.5	10.9	9.3	10.5
Harding	37.3	15.6	9.1	16.6
Hidalgo	28.4	22.0	12.8	18.9
Lea	65.1	26.0	22.9	18.9
Lincoln	35.6	15.7	26.5	18.6
Los Alamos	8.9	20.7	15.5	18.9
Luna	8.0	15.9	18.6	12.6
McKinley	-31.1	0.0	10.4	18.9
Mora	-28.1	22.0	5.1	2.5
Otero	27.3	10.5	14.7	18.1
Quay	4.6	10.5	8.8	10.5
Rio Arriba	9.0	12.2	13.9	13.2
Roosevelt	8.0	10.6	14.0	10.5
Sandoval	34.3	25.1	8.5	11.6
San Juan	79.4	47.1	32.5	21.9
San Miguel	22.2	12.8	22.1	18.9
Santa Fe	22.9	10.5	17.9	21.7
Sierra	21.9	19.6	19.0	18.9
Socorro	21.3	16.0	12.9	16.1
Taos	45.5	11.6	32.0	16.7
Torrance	32.9	22.2	20.7	16.1
Union	21.7	28.8	12.3	15.1
Valencia	NA	23.5	NA	29.8
STATE	33.3	24.9	22.0	23.2

NA Not applicable

[1]Establishment-based (i.e., jobs).

[2]1972 = 100.

Source: Bureau of Business and Economic Research, The University of New Mexico.

II. Highways, Roads and Streets

Current Situation

There are more than 70,000 miles of streets and highways in New Mexico and more than 80 percent of them are classified as being locally maintained. The largest system is that maintained by counties which provides access to arterial routes for rural residents. The interstate system crosses the state for more than 1,000 miles in East-West and North-South directions. Major federally-aided primary and secondary roads serve as major and minor arterials and collectors which connect urban places in the state. This system has been supplemented by several state highways which provide shorter access routes between remote places. These state highways were built and are maintained using only state funds. In the country's fifth largest state, highway transportation is essential to every aspect of its economy.

The following tables (16-21) contain data relating to receipts and expenditures of counties, municipalities and the state highway department. Receipts are from all sources; expenditures include construction, maintenance and administration. Years covered in most cases are state fiscal (July 1-June 30) for five consecutive years, 1977-1981.

Table 16 indicates that counties receive most of their funds for roads and streets from the state and that the source is highway user taxes. Another important fund source is county general fund appropriations. Property taxes provide little revenue for county roads. Federal funds became increasingly important over the five-year period but in the latest year accounted for less than 10 percent of total funds available. Counties spent more than 80 percent of disbursements each year on maintenance. Relatively little was spent on new construction during the period. (See Table 17.)

Data from municipalities were harder to obtain, but the two-year base, 1977 and 1980, gives an indication of the overall picture. Municipalities spent larger amounts of their general revenues for roads and streets than did counties but allocations from state highway user taxes remained quite important. Federal funds were insignificant. Another funding source for municipalities was sale of bonds which appeared to be increasing in importance. As with counties, the largest percentage of available funds was spent on maintenance. However, a significant portion of total expenditures went to new construction. Debt service was also an important expenditure category. (See Tables 18 and 19.)

Tables 20 and 21 indicate that the state had a complex array of sources of income, including various user taxes, severance taxes, federal funds and other miscellaneous revenues. Federal funds were important to state highway receipts, accounting for more than one-third of all revenues in most years. State highway expenditure patterns differed from those of local governments in that for most years a majority of funds was spent on capital outlay.* However maintenance expenditures were significant each year. General administration also accounted for a substantial portion of money spent by the State Highway Department.

The data presented indicate that in 1980 $245 million was spent by all levels of government for all purposes building and maintaining streets, roads and highways in New Mexico. When compared with an overall state budget of nearly $1 billion that same year the importance of highway expenditures becomes clear. Table 22 presents information which indicates the significant dependence upon federal funds to build and to maintain the various highway systems in the state. In the early days of the present federal administration, aid to states in all

*Capital outlay includes expenditures on right-of-way acquisition, preliminary and construction engineering and construction. Maintenance includes monies spent on maintaining roads and structures, snow removal and sanding, and other miscellaneous nonconstruction items.

areas appeared to be scheduled to decrease drastically. However, the recent enactment of the 5¢ per gallon increase in gasoline taxes and the formula developed to share monies with the states appears to continue federal presence in highway finance. Clearly without significant federal money New Mexico would engage in little other than maintenance.

Table 16

RECEIPTS OF COUNTIES FOR ROAD & STREET PURPOSES, NEW MEXICO, FY 1977-81
($000)

CATEGORY	1977	1978	1979	1980	1981
Receipts from local sources					
Property Taxes	139	35	213	158	214
General Fund Appropriations	2,482	3,046	4,588	4,310	2,178
Other	--	--	--	1,547	1,673
Subtotal	2,621	3,081	4,801	6,015	4,064
Receipts from state government					
Highway User Taxes	7,405	7,907	9,607	10,115	9,289
Miscellaneous	475	573	661	--	--
Subtotal	7,881	8,480	10,269	10,115	9,289
Receipts from Federal Government[1]	577	807	1,310	1,507	2,961
Total Receipts	11,079	12,368	16,380	17,637	16,314
Balances at Beginning of Year-- Capital and Operating Funds	6,270	7,160	9,486	11,362	11,244
Total Funds Available	17,349	19,528	25,865	28,999	27,558

[1]Does not include Federal-Aid Highway funds.

Source: New Mexico State Highway Department.

Table 17

DISBURSEMENTS BY COUNTIES FOR ROADS & STREETS, NEW MEXICO FY 1977-81*
($000)

CATEGORY	1977	1978	1979	1980	1981
Direct Highway Disbursements, County Roads					
Right-of-Way	10	30	17	--	11
Construction	931	812	1,583	2,509	1,958
Total	941	843	1,600	2,509	1,968
Maintenance of Condition	8,352	8,400	12,506	14,817	15,613
Other					
Highway Equipment	624	549	--	--	--
General Administration & Engineering	135	237	397	430	332
Miscellaneous	137	12	--	--	--
Total	896	798	397	430	332
Total Disbursements During Year	10,189	10,042	14,503	17,755	17,914
Capital & Operating Funds	7,160	9,486	11,362	11,244	9,644
Total Funds Accounted For	17,349	19,528	25,865	28,999	27,558

*Detail may not add to total due to rounding.

Source: New Mexico State Highway Department.

Table 18

RECEIPTS OF MUNICIPALITIES FOR ROADS & STREETS, NEW MEXICO, FY 1977 & 1980
($000)

CATEGORY	1977	1980
Receipts from Local Sources		
Property taxes & special assessments	4,402	3,149
General fund appropriations	7,853	12,475
Parking funds	13	6
Income on Investments	66	1,392
Other	532	436
Subtotal	12,866	17,458
Receipts from State Government		
Highway-user taxes	9,349	10,556
Other state funds	1,344	992
Subtotal	10,693	11,548
Receipts from Federal Government [1]	----	6
Proceeds of sale of bonds	1,588	6,933
Total Receipts	25,146	35,945
Balances at Beginning of Year		
Capital and operating funds	9,568	8,998
Debt and sinking funds	1,324	617
Total	10,893	9,615
Total Funds Available	36,039	45,559

[1] Does not include Federal-Aid Highway funds.

Source: New Mexico State Highway Department

Table 19

DISBURSEMENTS OF MUNICIPALITIES FOR ROADS & STREETS, NEW MEXICO, FY 1977 & 1980[1]
($000)

CATEGORY	1977	1980
Direct Highway Disbursements		
Capital Outlay--Construction	2,029	7,634
Maintenance		
Maintenance of Condition	9,235	12,625
Traffic Services	1,108	715
Subtotal	10,343	13,341
General Administration & Engineering	743	4,941
Total	13,115	25,916
Debt Service on Local Obligations		
Bonds		
Interest	1,063	1,276
Redemption	4,134	7,654
Total	5,197	8,930
Disbursements & Transfers for Non-Highway Purposes	5,961	30
Total Disbursements During Year	24,273	34,876
Balances at End of Year		
Capital & Operating Funds	9,717	10,054
Debt & Sinking Funds	2,050	629
Total	11,766	10,683
Total Funds Accounted For	36,039	45,559

[1]For each year ending June 30.

Source: New Mexico State Highway Department

Table 20

RECEIPTS, NEW MEXICO STATE HIGHWAY DEPARTMENT, FY 1977-81
($000)

Income Source	1977	1978	1979	1980	1981
State motor fuel taxes	55,480	58,603	58,594	59,083	66,667
State registration, license fees, etc.	9,833	10,965	15,342	22,517	31,720
State motor carrier taxes	13,508	15,137	15,834	18,340	22,862
Other state taxes					
Severance	--	--	11,324	20,315	19,020
Electrical Energy	--	--	2,249	572	1,155
Community assist.	--	--	--	344	--
Total	--	--	13,573	21,230	20,175
Federal Funds					
Fed. Highway Adm.	47,810	73,731	84,644	54,850	94,164
Interstate	22,269	35,336	38,965	28,485	46,600
Consolidated Primary	10,843	16,021	17,684	10,338	29,439
Rural Secondary	2,435	6,920	4,537	3,419	5,005
Urban	2,918	4,255	5,548	1,992	5,411
Other	9,345	11,199	17,910	10,616	7,709
Other federal	1,130	7,700	1,192	6,616	5,596
Bur. Indian Affairs	920	7,363	882	6,463	5,304
Urban Mass Transit	--	386	310	18	57
Other	210	--	--	135	235
Counties/Municipalities	1,779	1,104	1,028	803	438
Miscellaneous Income	1,380	7,422	12,144	4,800	6,618
Total Income	130,920	174,662	202,352	188,239	248,241

Source: New Mexico State Highway Department.

Table 21

STATE HIGHWAY EXPENDITURES, NEW MEXICO, 1977-81[a]
($000)

Category	1977	1978	1979	1980	1981
Capital Outlay					
Right-of-Way	17,012	5,234	4,353	4,888	3,928
Preliminary & Construction Engineering	11,971	3,417	2,457	3,327	11,636
Construction of Roads	34,024	89,047	76,041	91,330	129,013
TOTAL	63,008	97,698	82,852	99,545	144,577
Maintenance					
Maintenance of Condition--Roads	42,302	91,967	51,407	29,414	35,996
Maintenance of Condition--Structures	455	11,742	11,352	574	593
Snow Removal, Sanding, etc.	910	--	--	2,131	2,526
Traffic Control & Service Facilities	1,819	--	--	--	--
TOTAL	45,486	103,709	62,759	32,120	39,114
General Administration					
General Admin. & Engineering	9,626	25,828	23,713	33,204	43,374
Highway Planning Research	3,651	2,497	1,784	1,817	2,010
Miscellaneous	3,319	308	955	3,559	15,602
TOTAL	16,597	28,633	26,452	38,579	60,987
TOTAL, ALL CATEGORIES	125,091	230,040	172,063	170,244	244,678

[a]Includes federal funding

Source: New Mexico State Highway Department

Table 22

FEDERAL AID IN HIGHWAY CONSTRUCTION, BY SYSTEM TYPE, AS OF JANUARY 1, 1981

System	Percent Federal Aid
Interstate	
General	92.49
Resurfacing	92.49
Gap-Closing	92.49
Primary	
Old	78.63
Rural	78.63
Consolidated	82.20
Discretionary	82.20
Resurfacing	82.20
Secondary	
Old	Various
Rural	82.20
Resurfacing	82.20
Urban	82.20
Urban Extensions	Various
Metropolitan Planning	80.00
Bridge Replacement	80.00
R/R Crossings	90.00
Pavement Markings	100.00
Safety Construction	90.00
Off-System Roads	78.63
Safer Off-System Roads	82.20
Forest Highways	100.00
Beautification	90.00
Bureau of Indian Affairs	100.00

Source: New Mexico State Highway Department

Future Needs

Highway needs during the period 1980 - 2004 are presented in Table 23. The data in that table are the result of detailed evaluations of needs by the New Mexico State Highway Department. These evaluations were based, in part, upon analyses of present conditions which show that 33 percent of the system is inadequate for the needs and demands of today's traffic. Each five-year forecast carefully accounts for new capital needs, maintenance of deteriorating roads and structures during each specific period, administrative costs and an annual inflation rate of 8 percent.

An examination of the data in Table 21 indicates that during the years 1977-1981 capital outlay varied from 42.47 to 59.09 percent of total highway expenditures. The average of the five years was 52 percent of total expenditures for capital outlay.

To make the data of Table 23 comparable with other data in this study the annual 8 percent inflation adjustment was eliminated and the years 2001 through 2004 were removed. The total of New Mexico highway needs from 1980-2000 in 1982 dollars, after these adjustments, becomes $3,936,695,000. Assuming that past trends will hold and that approximately 50 percent of these expenditures will be for capital requirements, some $2 billion will be required to meet needs between now and the year 2000.

Another recent study done by the New Mexico Governor's Council of Economic Advisors attempts to estimate highway construction only for 1985 through 2000. Table 24 presents the results of that study. If expenditures bear any relationship to needs, the results of that work appear to come to results similar to those described above.

No projections of needs for county roads or municipal streets appear to be available in a standard form. Individual units have undoubtedly made such

Table 23

NEW MEXICO HIGHWAY NEEDS[a], 1980-2004

System	Miles[b]	Projected Costs, Thousands of Dollars					
		1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	Total
Rural	11,712	1,457,919	714,470	973,731	473,179	722,775	4,342,074
Urban	1,221	744,651	280,776	536,221	181,605	312,804	2,056,057
Total	12,932	2,202,570	995,246	1,509,952	654,784	1,035,579	6,398,131

[a]Highway and structure needs, maintenance and administrative costs, assumed annual inflation rate 8%.
[b]As of January 1, 1980

Source: New Mexico State Highway Department, Planning Bureau.

Table 24

NEW MEXICO PROJECTED HIGHWAY CONSTRUCTION EXPENDITURES, 1985-2000

(Millions 1980 Dollars)

Expenditure Level	1985	1990	1995	2000
High	116	116	116	116
Medium pt	104	104	104	104
Low	91	91	91	91

Source: Projection of the New Mexico Economy by Major Sector: 1980-2000, Governor's Council of Economic Advisors, 1982.

projections for specific purposes, but nothing is available at the state level. In 1980 some $18 million was spent by counties and municipalitites on construction and related costs. If the same level of expenditure holds through the year 2000, some $400 million in 1982 dollars would be expended from 1983-2000. That figure appears to be rather conservative, particularly in view of the needs of major municipalities.

In summary, capital needs from 1982-2000 for New Mexico's highways, streets and roads total approximately $2.65 billion in 1982 dollars. This estimate is based upon past relationships which may or may not prevail in the future. It should also be noted that total future needs, including maintenance which is often similar to new construction, are more likely to be at least double the estimate above.

Revenues Available

State sources of revenue for capital expenditures on highways, roads and streets are: the motor fuel tax, the special fuel tax, the motor vehicle registration fees, the motor vehicle excise tax, motor carrier fees, and drivers' license fees. The two following tables give projections of revenues available from those sources for the next five years.

Table 25

REVENUE PROJECTIONS, NEW MEXICO STATE ROAD FUND, 1982-87

(Thousands of 1980 Dollars)

Fiscal Year	Projected Revenue
1982[1]	$126,842
1983	136,616
1984	147,828
1985	152,724
1986	155,359
1987	158,161

[1] Actual

Source: "A Forecasting Model for State Road Revenues", New Mexico State Highway Department, August 1982.

Table 26

REVENUE PROJECTIONS
County-Municipal Distributions
from
New Mexico State Highway Department Funds
($000)

Fiscal Year	Projected Revenue
1982[1]	$ 25,298
1983	26,800
1984	28,197
1985	28,574
1986	28,669
1987	28,767

[1]Actual

Source: "A Forecasting Model for State Road Revenues", New Mexico State Highway Department, August 1982.

The motor fuel tax which is the largest single source of state funds ($63.8 million in fiscal 1982) is projected to start declining in fiscal 1985. That descent is based upon a forecast of declining gasoline sales beginning in fiscal 1984. Should that trend continue beyond 1987 without an increase in the tax rate, revenues would diminish significantly. The same rate, 11¢ per gallon, was used in all of the calculations upon which the projections in Tables 25 and 26 were made.

The New Mexico Highway Department has not projected revenues beyond fiscal 1987. For the purposes of this study, some tentative projections have been made. We have assumed that the increase in the other five sources of revenue (noted on preceding page) would offset part of the decline in the motor fuel tax and that within the next few years the state would also raise the tax rate on motor fuels. These actions would produce revenues at approximately the 1987 level for the 13 years. For fiscal years 1988 through 2000, state road fund revenues would be $2.1 billion. County-municipal distributions for the same period would $374 million. Both figures are in 1982 dollars. Add to those

figures the $891 million from Tables 25 and 26 (Fiscal 83 to 87) for a total in revenues for 1982-2000 of $3,365 million in 1982 dollars. Based on historical data approximately 50 percent of those dollars should be available for capital outlay: $1,682 million.

Federal funding has played an important role in financing highway construction for many years. Table 27 presents data about that funding for fiscal years 1983 and 1984. If federal funding is diminished in the future, as has been indicated by the present administration, New Mexico's highway infrastructure will suffer.

Bridges

New Mexico now has a total of 3,611 bridges of which 3,074 are on interstate, national or state highways and 537 are county or municipally controlled. Of the 3,074 in the first category, 580 or 18.8 percent are judged to be substandard. This compares to a national average of 23.8 percent. Of the 537 county and municipal bridges, 214 (39.8 percent) are substandard. The national percentage is 54.7 percent. In both categories the state appears to be in a better position than most other states.

The substandard classification is divided into two parts: bridges which are structurally deficient are considered to be near falling. Those classified as functionally obsolete require widening to meet current standards. New Mexico's substandard bridges are approximately 60 percent functionally obsolete and 40 percent structurally deficient.

New Mexico Highway Department estimates of future needs presented in Table 23 include funds to address the problems of substandard bridges. However, some county bridges no longer needed will never be repaired, widened or replaced.

Rio Grande Bridges

A problem in New Mexico worthy of special note is the need for bridges over the Rio Grande in the Albuquerque area. This has been a problem for many years and one that is extremely difficult to resolve due to disagreements

Table 27

PROJECTED FEDERAL APPORTIONMENTS FOR HIGHWAY PROGRAMS, NEW MEXICO AND ALL U.S., FY 1983-84
($000)

Category	N.M.	U.S.	N.M. as % of U.S.
		FY 1983	
Interstate construction	$ 18,002	$ 3,600,400	0.50
I-4R	31,941	1,901,446	1.68
Primary	22,351	1,803,934	1.24
Secondary	10,110	633,814	1.60
Urban	4,103	780,074	0.53
Bridge	3,420	1,368,001	0.25
Hazard elimination	1,471	193,383	0.76
Railroad crossings	1,355	186,201	0.73
Total	92,753	10,467,253	0.89
		FY 1984	
Interstate construction	$18,002	$ 3,600,400	0.50
I-4R	39,312	2,340,239	1.68
Primary	22,399	2,078,371	1.08
Secondary	10,110	633,814	1.60
Urban	4,103	780,074	0.53
Bridge	3,543	1,417,004	0.25
Hazard elimination	1,471	193,383	0.76
Railroad crossings	1,355	186,201	0.73
Total	100,295	11,229,486	0.89

Source: Discussion on House Floor of Conference Report to H.R. 6211, December 21, 1982, Congressional Record (Page H10717)

about locations for the bridges. However, the current rapid growth in the area which would be served by additional crossings appears to assure some fairly quick relief.

A commonly accepted figure for costs of the bridges and approach roads to meet the needs over the next twenty years is $250 million, in 1982 dollars. This estimate includes four new structures and the widening of two presently existing bridges. It represents the total cost required for all bridges to be fully operational.

Funding for these bridges will probably come from a combination of state severance tax bonds, state highway funds, local funds and some federal monies. At present some funds are committed. However, the majority of funding for these bridges will be allocated in the future.

Summary

The analysis presented above indicates that between 1982 and 2000 New Mexico's construction needs for highways will be in the range of $2.5 billion. State sources will likely fall short by approximately $1 billion of financing those needs. Should federal funds become unavailable or be drastically diminished, New Mexico's highways, streets and roads will suffer severely.

It should also be noted that in light of the large role federal funding has played in maintenance, should those funds be decreased, the state system would be in significant trouble. Maintenance has traditionally been important; it will likely be more important in the future.

III. Railroads

The only possible public railroad capital expenditures which may materialize in the state over the next twenty years arise from needs to foster improvement in the state's economy. Some coal fields in northwestern New Mexico are not now served by commercial rail. Also, in the southeastern part of the state, some remote chemical facilities would benefit from being served by rail.

The Starline railroad to the coal fields would cost approximately $100 million. The Monument 49er line in the southeast is estimated to cost $32 million. Proposals to fund these rail lines from the state's Severance Tax Permanent Fund* have been made in the state legislature. The 1983 session considered and rejected such appropriations. (The Cumbres and Toltec Scenic narrow gauge railroad is currently operated jointly by New Mexico and Colorado. The advent of other state-owned railroads appears somewhat unlikely, although possible.)

Railroad crossings are a small part of infrastructure in the state. Most of any consequence are under the jurisdiction of the State Highway Department. There are a total of 844 public crossings at grade in the state. Of these 182 are on state highway systems; 662 are on county roads and city streets. In addition there are 67 crossings under the road and 80 which cross over a road. There are also 614 private crossings. The Highway Department indicates no special problems with these crossings at this time. Any capital needs are part of the overall requirements of the Department as expressed in Table 23.

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*The Severance Tax Permanent Fund was established by the New Mexico State Legislature in 1973 to receive special severance taxes levied on the extraction of the states natural resources. The principal of the fund is to remain untouched and will serve as a source of income to be devoted to the capital needs of government for future generations after the state's natural resources are depleted. The Legislature may issue bonds which are paid from the income of the fund. To date most of the bonds so issued have been for capital improvements.

IV. Mass Transit*

Albuquerque is presently the only city in New Mexico served by public transportation (buses). That situation is likely to continue over the next twenty years, although service in Santa Fe and Las Cruces is possible, under a particular set of conditions.

Albuquerque capital costs for replacing the entire fleet of buses and for 25 additional buses is estimated at $20 million in 1982 dollars. This is based on a unit cost today of $150,000 and a current fleet of 107 units. The current fleet would need to be replaced over the next twenty years.

A just-released (June, 1983) five-year plan prepared by the Albuquerque Transit Department indicates captial needs that go beyond just replacement of buses. Two new bus storage facilities, two new transit centers, two park-and-ride lots, 24 radios and fareboxes, eight bus shelters and other miscellaneous captial equipment will be required by fiscal 1988. The additional cost of these items is approximately $5 million.

Total cost for mass transit equipment and facilities by the year 2000 is estimated at $25 million.

Buses have been purchased in recent years almost exclusively with federal monies. If those funds continue to be available over the next twenty years the city government will be able to continue to meet mass transit needs. Should they not be available, mass transit in Albuquerque would be funded from other sources of revenue, most probably general obligation bonds.

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*All data from the Albuquerque Transit Department.

V. Airports

Infrastructure Needs

The final report of the New Mexico Airport System Plan, issued by the Aviation Division of the state Department of Transportation in March 1983, provides estimates of airport infrastructure needs to the year 2000.

Table 28

PROJECTED NEW MEXICO AIRPORT CAPITAL IMPROVEMENT COSTS, 1985-2000
(thousands of 1982 dollars)

Airport Class	Number of Airports	Fiscal Year 1985	1990	2000	Total
General Transport[1]	2	8,000.3	3,646.2	6,975.6	18,622.1
Basic Transport[2]	13	23,531.1	13,729.9	11,829.7	49,090.7
General Utility[3]	1	563.3	182.0	299.4	1,044.7
Basic Utility, Public[4]	36	17,935.3	9,175.1	8,930.6	36,040.9
Basic Utility, Private	3	6,076.0	1,105.7	3,933.1	11,114.8
Other[5]	8	32,967.6	21,621.3	25,609.5	80,198.4
Total	63	89,073.6	49,460.2	57,577.9	196,111.6

[1]Accommodates scheduled, certificated air carrier jets up to 175,000 lb. Equipped with some navigational and approach aids. Only Albuquerque International and Roswell Industrial Air Center are in this category.

[2]Runway design standards divided into stages based on types of aircraft and their performance and weight factors with respect to useful load. One stage accommodates turboprop and turbojet aircraft with gross weights up to 30,000 lb; another up to 60,000 lb.

[3]Accommodates all propeller-driven aircraft in the general aviation fleet weighing less than 12,500 lb, with substantial use by aircraft over 8,000 lb. Represents only 3% of airports in the New Mexico system.

[4]Divided into two stages of airport development. The first accommodates about 75% of all general aviation aircraft, up to 12,500 lb. The second stage has longer runways and thicker pavement, and accommodates about 95% of all general aviation aircraft up to 12,500 lb. The most prevalent classification in the state, accounting for 77% of airports in the system.

[5]All other airports, including heliports.

Source: N.M. Department of Transportation, Aviation Division.

Infrastructure Financing

Work on the New Mexico Airport System Plan included a survey of funding sources and concluded that few cities or counties in the state were making use of all available sources of local funds to support airport improvements.

Suggested sources of local funds included:

- User Fees
  - hanger leases and rentals
  - fixed base operator and commercial use fees
  - groundleases (hangers and commercial activities)
  - concession fees (vending machines, food service, etc.)
  - airport terminal area advertising
  - agricultural leases
  - tie-down fees
  - local tax on aviation fuel sales
  - auto parking fees
- City and/or county sales tax (especially if area offers tourism and/or recreation)
- General revenue sharing funds (can be used to match federal grants)
- Revenue bonds (requires durable flow of revenue)
- General obligation bonds (requires simple majority vote)
- General fund
- Proceeds from sale or lease of industrial or commercial property
- Revenue from mineral rights on airport property

The report indicates that most New Mexico cities have established various user fees; however total revenue from the fees is usually inadequate to support total annual operating costs. Shortages are met through an annual allocation from the city general fund. Many airport operating budgets are too low to allow for regular maintenance.

The problems of these low operating budgets are compounded by neglected maintenance procedures. State and federal capital funds are available for reconstruction but not for maintenance. Therefore, at many airports pavement surface maintenance is postponed to the point that complete reconstruction is necessary. Operating costs are thus shifted into the capital category making the operating budget artificially low.

Capital costs at airports have grown rapidly in recent years. A new lighted general utility runway now costs well over $1 million. Many current annual airport budgets throughout New Mexico total considerably less than 1% of a single runway's replacement cost; i.e., less than $10,000.

A trend toward airport site industrial park development is occurring throughout the U.S. and New Mexico. Such development can yield significant benefits to both the airport and to the community. Industrial sites can be developed on airport property not needed for direct airport operations. Improvements to the site, utilities, and structures can be financed through Industrial Revenue Bonds (100% financing is possible.) Ground sale of lease proceeds can then be used for airport improvements. Former military airfields offer unique advantages to industrial prospects, but this type of development should not be limited to surplus federal lands. Industrial land use is often complementary to airport activities. The airport provides a landmark for industrial sites, and the industries located there use the airfield and terminal facilities. Careful planning is required to optimize benefits for both the airport, the industries, and the community.

The State Aviation Fund and the Federal Airport Improvement Program will remain the two principal capital improvements project funding sources through FY 1987. The federal program legislation expires then.

The state airport assistance program is supported by a 2.15% sales tax on jet fuel, a $0.10/gallon unrefunded aviation gasoline tax, and by aircraft registration fees. Registration fees vary by age and weight of private aircraft based in New Mexico. These state revenue sources are expected to generate $1.1 million in 1983:

Funding Source	1983 estimate	% of total
Unrefunded aviation gasoline tax	$ 310,000	28
Sales tax on jet fuel	700,000	64
Aircraft registration fees	90,000	8
Total	$1,100,000	100

Projections indicate that even though aircraft registration fees may increase in the future due to larger business aircraft being registered, sales tax on jet fuel will be the most important source of revenue for the State Aviation Fund in future years.

The federal airport improvement program (AIP) is funded by an 8% passenger ticket tax, a 5% freight way bill, a $3.00 international departure fee, a $0.12/gallon tax on general aviation gasoline, a $0.14/gallon tax on jet fuel, and a tax on tires and tubes. This program will provide the following revenues for New Mexico for the fiscal years indicated:

	(millions of dollars)				
Program	1983	1984	1985	1986	1987
Primary commercial service airports[1]	1.71	2.48	3.11	3.61	3.76
General aviation airports	1.37	1.82	2.09	2.33	2.33
Reliever airports	2.0	2.0	2.0	2.0	2.0
Non-primary commercial service airports	0.8	0.8	0.8	0.8	0.8
Total	5.88	7.10	8.0	8.74	8.89

[1]Albuquerque International and Farmington Municipal.

Looking at total funds from state and federal sources, New Mexico can reasonably expect to receive the following amounts for airport improvements in the fiscal years indicated:

(millions of dollars)

Type of Service	1983	1984	1985	1986	1987
Commercial					
Primary airports	1.71	2.48	3.11	3.61	3.76
Others	0.80	0.80	0.80	0.80	0.80
Total	2.51	3.28	3.91	4.41	4.56
General aviation					
Reliever airports	2.00	2.00	2.00	2.00	2.00
General aviation airpts.	1.37	1.82	2.09	2.33	2.33
State funds	1.10	1.10	1.10	1.10	1.10
Total	4.47	4.92	5.19	5.43	5.43

Total commercial service airport funds, 1983-87	18.7
Total general aviation funds, 1983-87	25.4
Total available, all sources, 1983-87	44.1

Capital investment required to implement the New Mexico airport system plan over the next five-year period has been estimated to be approximately $80 million. That figure omits development costs not eligible for federal funding participation. Items such as auto parking, terminal buildings, hangers, and private hanger taxiways are excluded. Therefore this $80 million is much below the total costs presented in Table 28 above.

Federal funds for primary commercial service airports, which include only Albuquerque International and Farmington Municipal, are expected to total $14.67 million over the next five years. The estimated construction costs for scheduled eligible improvement at these two airports over the same period are $6.8 million. It therefore appears that government funding will be adequate for primary airports in New Mexico at least until 1988.

There are presently eight non-primary commercial service airports in the state: Alamogordo, Carlsbad, Clovis, Gallup, Hobbs, Roswell, Santa Fe, and Silver City. Through 1987 approximately $13 million will be required for improvements at these airports. Considering state and federal funds, only $4.5 million will be available. These funds will meet only 34% of the non-primary commercial service airport needs.

Double Eagle II (Albuquerque), Southern Dona Ana County, Alexander, and possibly Coronado will qualify for funding from federal reliever airport funds. Developments planned for these airports through 1987 total $22.3 million. With approximately $11.1 million available (including local matching funds), only 50 percent of the need will be met.

The remaining general aviation airports in New Mexico will have available approximately $17.1 million. The cost for eligible improvements over the period is estimated at $38.1 million. Available funds will meet about 45% of the general aviation airport needs from 1983 to 1987.

The above figures clearly show that the monetary requirements for the short-term capital improvements to the state's airport system far exceed the funding available from federal and state sources. Federal funding would have to be tripled to accommodate the funding needs for non-commercial primary airports, and about doubled to accommodate relievers and general aviation airports.

Gross figures from Table 28 and the analysis following indicate that in 1982 dollars the needs for New Mexico airport infrastructure exceed 196 million dollars through the year 2000. If one assumes (hopefully) a continuation of federal funding at the fiscal 1987 level accompanied by the same situation for state funds, available monies from fiscal 1983 through

fiscal 1999 would approximate $165 million. New Mexico airports would face a deficiency of some 30 million dollars in what could be described as the best of circumstances. Should federal funding be reduced over the years the gap could be much larger.

Note: This section on airport infrastructure is based entirely on "Working Paper No. 5, Composite Report, February 1983", New Mexico Airport System Plan, The State of New Mexico, Department of Transportation, Aviation Division, prepared by Bucher, Willis, and Ratliff (consulting engineers, planners and architects), Final Draft, March 1, 1983.

VI. Water

Arid or semiarid land is sometimes defined as land where the average annual precipitation is less than 18 inches. Average statewide precipitation in New Mexico is roughly 13 inches annually, varying from approximately 8 inches in desert valleys to more than 30 inches in the high northern mountains. Water availability obviously is a key factor in economic and population growth of such an area.

Water Supply

New Mexicans get water from two sources: surface water and underground water. The largest river supplying water to the state is the San Juan in the extreme northwest corner of the state. Second largest is the Rio Grande running down the center of New Mexico from Colorado to Texas and Mexico. Other major rivers are the Gila and the Canadian. The Pecos and the Rio Chama, which are major rivers, are tributaries of the Rio Grande. All of these rivers are subject to interstate compacts.

The state receives approximately 5.0 million acre feet of water annually; about 3.0 million acre feet come from precipitation within the state and stream flow from other states provides about 2.0 million acre feet. Not all of this water is available to state consumers. Maximum consumption (depletion) allowed is about 3 million acre feet annually.

Approximately 3 billion acre feet of recoverable fresh water is estimated to be underground in New Mexico with more than four-fifths of it in the Rio Grande Basin. In some areas of the state, notably the High Plains of eastern New Mexico, water tables are falling steadily due to pumping more ground water than is being replaced. Some 15 billion plus acre feet of water possessing varying degrees of salinity (dissolved solids) is also underground in New Mexico. Approximately 1.4 billion acre feet of this water is categorized as slightly saline; the rest is increasingly unusable in its present state ranging from

moderately saline to very saline and finally to brackish or brine. As costs for fresh water increase, desalinization of at least some of this vast store of water becomes more economically attractive.

Water Uses in 1980

Tables 29 and 30 refer to specific methods of examining water use in any area. Table 29 presents data on water "withdrawn", while Table 30 gives data on water "depletions". "Withdrawal" is taking water from its source for any use. "Depletion" refers to that part of the withdrawn water that is no longer available at the site. Depletion occurs because the water has either evaporated, transpired, been incorporated into products or crops, been consumed by man or livestock, or been otherwise removed. Data in these tables indicate that irrigated agriculture is by far the largest user of water in New Mexico. All other uses are insignificant when compared with irrigation. Although agriculture makes a relatively small contribution to the state's overall economy, it uses the largest amount of what is clearly a very precious resource.

Water Demand

A major water study completed in 1976 by the Interstate Stream Commission and the U.S. Bureau of Reclamation projected the following water depletion requirements based on available estimates of possible construction of power plants, mines and other facilities as well as water requirements for other purposes.

	Population (millions)	Depletion Requirements (million acre feet)
1970 (Actual)	1.0	2.2
2020 (Low)	1.6	3.6
(Medium)	2.7	3.8
(High)	4.6	4.1

The State Engineer told a U.S. Senate Committee in April 1977 that considering only what New Mexico is presently entitled to use, 3 million acre

Table 29

Summary of Water Withdrawals, New Mexico, 1980
(Thousands of Acre-Feet)

Use	Actual	Percent of Total
Urban	235.91	5.38
Rural	31.71	.72
Irrigated Agriculture	3,432.25	78.27
Agriculture (non-irrigated uses)		
Livestock	21.57	.49
Stockpond Evaporation	35.68	.81
Commercial	3.02	.07
Industrial	0.36	.01
Minerals	108.91	2.48
Military	13.20	.30
Power	72.37	1.65
Fish and Wildlife	42.04	1.07
Recreation (Land based only)	13.14	.30
Reservoir Evaporation	370.15	8.44
TOTAL	4,385.31	99.99

Source: Sorensen, Earl F., Water Use by Categories in New Mexico Counties and River Basins, and Irrigated Acreage in 1980, Technical Report 44, New Mexico State Engineer, Santa Fe, New Mexico, 1982.

Table 30

Summary of Water Depletions, New Mexico, 1980
(Thousands of Acre-feet)

Use	Actual	Percent of Total
Urban	114.74	4.46
Rural	15.19	.59
Irrigated Agriculture	1,853.54	72.07
Agriculture (Non-irrigated uses)		
Livestock	21.17	.82
Stockpond Evaporation	35.68	1.39
Commercial	1.82	.07
Industrial	.22	.01
Minerals	50.84	1.98
Military	7.92	.31
Power	54.79	2.13
Fish and Wildlife	37.42	1.45
Recreation (Land based only)	8.44	.33
Reservoir Evaporation	370.15	14.39
TOTAL	2,571.92	100.00

Source: Sorensen, Earl F., Water Use by Categories in New Mexico Counties and River Basins, and Irrigated Acreage in 1980, Technical Report 44, New Mexico State Engineer, Santa Fe, New Mexico, 1982.

feet annually will be available no matter what the requirements are. Should the state grow in population and economic activity to a population of even 1.6 million, some reallocation from present uses would be required. Since the population was 1.3 million in 1980, that situation will probably be faced well before the year 2000. Recent estimates in the overview section predict a population of some 1.95 million for the state by the year 2000. It therefore appears nearly certain that water use will move from irrigated agriculture to urban, industrial, minerals and other high value uses during the next 20 years. This eventuality does not necessarily imply that water will be used more efficiently in all uses as it becomes more expensive.

Threats to New Mexico's Water Supply

New Mexico faces two special situations which threaten to reduce its water supply relatively quickly over large geographic areas. One of these is the continuing depletion of the Ogallala aquifer in eastern New Mexico. The other is the so-far successful suit of the City of El Paso to compel the export of southern New Mexico water.

The Ogallala Aquifer

The Ogallala aquifer underlies much of the High Plains from West Texas to Nebraska, including portions of the six easternmost counties of New Mexico. This underground formation contains vast quantities of fresh water at accessible depths, and is the basis for the flourishing irrigated farming of the High Plains.

As a result, land use in the High Plains consists essentially of irrigated farming, dryland farming, and range. The acreages projected for these uses in the New Mexico portion of the High Plains are shown in Table 31 to the year 2000. According to these projections, the 1977 total of 440,818 irrigated acres will be reduced 24% by 2000, to 354,484 acres.

Table 31

Projected Land Use New Mexico High Plains, 1985-2000
(Acres)

Year	Irrigated	Dryfarming	Range
1977	440,818	504,660	9,732,103
1985	444,452	510,819	9,737,294
1990	413,923	546,882	9,733,160
2000	354,484	616,348	9,723,662

Source: Robert R. Lansford et al, "The High Plains-Ogallala Aquifer Study: New Mexico", The Southwestern Review of Management and Economics, Volume II, Number 2, (Spring 1982), pp. 112-114.

The difference of 86,334 acres represents land that will be converted from irrigated farming to dry farming or range due to depletion of the aquifer, with obvious great losses in productivity. The prospect is for eventual extinction of the irrigated area, although palliative measures could defer that end somewhat. There are no presently known cost-effective infrastructure measures, however, that could reverse that trend.

The El Paso Suit

New Mexico law treats unappropriated surface and underground water as public property which is available to private interests for productive use within the state. Once appropriated, water rights become items of commerce and can be bought on the open market and transferred to other locations within defined river basins or underground water basins. Underground water rights cannot be transferred out of the state, but are reserved for development within the state.

This doctrine has recently been challenged by the City of El Paso, which lies just south of the New Mexico-Texas boundary. El Paso has won in federal district court an injunction against the enforcement of a statute which prohibited the export of ground water from New Mexico to meet expected development needs in Texas.

New Mexico has appealed, and the issue is expected to be resolved eventually in the United States Supreme Court. Until then, it seems unlikely that plans can be made for new infrastructure for water resource development over a substantial area of southern New Mexico.

New Water Supply Projects

New Mexico's water situation is always in the process of some improvement where that is possible. Several new projects, largely funded by the federal government, are either underway or planned.

Projects Presently Underway

A major project underway in 1982 was Brantley Dam, located 14 miles north of Carlsbad. This project is almost entirely federally funded. However, under a joint powers agreement the state will repay to the Bureau of Reclamation at least $914,500 over 50 years, to apply to the cost of recreation facilities. Also, when irrigation water is available, the Carlsbad Irrigation District will repay the Bureau almost $1 million. The Bureau's September 1982 Definite Plan Report estimates the total project cost at $272 million.

Major Planned Projects

There are presently three major water storage projects in the planning stages that will affect New Mexico. Table 32 names these projects and presents a summary of their anticipated costs. A brief description of each follows the table.

Table 32

Planned Water Storage Projects, New Mexico, 1982-2000
(thousands of 1982 dollars)

Animas/La Plata	$ 555,000
Gallup-Navajo Indian Water Supply	326,832
Upper Gila (Conner Dam)	151,945
Total	$1,033,777

Source: U.S. Bureau of Reclamation

Animas/La Plata Project

This project would be located in the Upper Colorado River Basin in Colorado (La Plata and Montezuma counties) and northwestern New Mexico (San Juan County). The project was authorized by Congress as part of the Colorado River Basin Project Act (P.L. 90-537, 1968).

Animas/La Plata would be a multi-purpose water resource development. Municipal and industrial water would be furnished to Durango and the rural La Plata area in Colorado, to Farmington, Aztec, Bloomfield and possibly several smaller New Mexico communities, and to the Navajo Tribe in New Mexico.

Benefits to New Mexico would include the Ridges Basin Reservoir, located southwest of Durango, which would store water pumped from the Animas River by the Durango pumping plant. Water would be released from this reservoir as needed, back to the Animas, for New Mexico downstream municipal and industrial users.

The Southern Ute Reservoir, located offstream on the Colorado-New Mexico state line east of the La Plata River, would store water for the Southern Ute Tribe for resource development and for New Mexico irrigators.

Benefits to New Mexico would total 55,200 acre-feet annually, or 28% of the Animas/La Plata total storage. (See Table 33.)

Gallup-Navajo Indian Water Supply

This plan is recommended as one that will best meet the desires of the Navajo Tribe to supply long-term good quality water to its people in the eastern part of the reservation. The plan will also provide the city of Gallup, New Mexico with supplemental municipal water to meet future needs.

The plan is designed to deliver up to 42,260 acre-feet of water annually from the San Juan River to 32 Navajo communities and to the city of Gallup. A total of 42,720 acre-feet would be diverted from the river at Farmington, New

Table 33

Benefits to New Mexico From the Animas/La Plata Project

Municipal/Industrial (acre-ft annually)		
Farmington		19,700
Aztec		5,800
Bloomfield		5,300
Navajo Tribe		7,600
Total Municipal/Industrial		38,400
Irrigation	**Acres**	**Acre-feet**
Full Service		
Ute Mountain, Ute Tribe	380	800
Non-Indian	4,530	11,900
Total	4,910	12,700
Supplemental Service		
Non-Indian	3,720	4,100
Total Irrigation	8,630	16,800
TOTAL BENEFITS		55,200

Source: U.S. Bureau of Reclamation

Mexico, into a closed delivery system consisting of a water treatment plant, pipelines, pumping plants, and terminal storage tanks. Navajo Dam and Reservoir would provide the needed storage capacity and flow regulation at the point of diversion.

The water service area covers a major portion of two counties in northwestern New Mexico and smaller areas in Arizona and Utah. Of the 33 communities to receive project water, 27 are located in New Mexico, five in Arizona, and one in Utah. Service to 25 communities would be provided directly from turnouts along the pipeline system. The outlying Navajo communities of Sanostee, Tocito, Two Grey Hills, Toadlena, Mexican Springs, Strip and Saw Mill would receive water from pipeline laterals to be built by the Tribe.

A regional water treatment plant and associated costs are included in the plan, as requested by the Navajo Tribe. The plant would be a standard conventional design facility, capable of treating the water to meet requirements for a potable municipal and domestic supply. The structure would be located near the point of diversion.

These costs are intended to serve as a project cost ceiling for authorization purposes. Bureau of Reclamation engineering and design staff indicate that costs can be reduced substantially through "value engineering" in the final design. The construction period will be about eight years to complete all work, including two years of preconstruction activities.

Annual operation and maintenance of all project facilities would be delegated to the Navajo Tribal Utility Authority (NTUA), which is responsible for community water systems. It is assumed that the Navajo Water Commission would contract with the United States for repayment of the Tribe's share of project water.

Table 34

Gallup-Navajo Indian Water Supply Plan Cost Summary
(thousands of 1981 dollars)

Component	Construction Cost
Diversion dam	$ 4,515
Water treatment plant	23,373
Canals, conduits, pumps	188,423
Laterals and pumps and transmission lines, switchyards, substations	79,958
General property	6,353
Total	$302,622*

*Adjusted for inflation at 108% = 326,832 (1982 dollars)

Source: U.S. Bureau of Reclamation, Preliminary Draft, Gallup-Navajo Indian Water Supply Project, 4/14/83.

The city of Gallup would also contract with the United States for its share of the water. The city in turn would contract with the Tribe for a fair share of the annual operation, maintenance and energy costs for the main aqueduct and water treatment plant.

Annual cost for project operation, maintenance, replacement, and energy is estimated at $5,657,000, which includes a $16/acre-foot charge for water from Navajo Reservoir.

Expected benefits of the Gallup-Navajo Indian Water Supply Project include the supply of municipal and industrial water, a reduction in the salt load of the San Juan River, and area redevelopment. Annual benefit from the water supply is estimated at $35,340,000. The diversion of water from the San Juan River would reduce its salt content by an estimated 0.6 to 1.5 mg/liter, with annual benefit of $561,000. Area redevelopment benefits would result from using otherwise unemployed resources. Direct use of unemployed and underemployed labor on the reservation would provide an annual benefit estimated at about $2,359,000. Navajo residents of the area would fill an estimated 120 jobs at the peak of construction.

Total annual benefit is estimated at $38,259,000, compared with costs of $34,682,000 (ratio of 1.10:1), for a net annual benefit of $3,577,000. Estimated cost of project water delivered to the Navajo Tribe is $3.24 per 1,000 gallons, and $3.23 to the city of Gallup.

Upper Gila Project[1]

This study seeks the best means to supply 18,000 acre-feet of water to New Mexico without downstream economic injury or cost. Conner Dam and Reservoir would be located about 15.5 miles southeast of Gila, New Mexico. It would be a concrete gravity structure that would pass flood flows over the top of the dam instead of using a separate spillway.

Conner would control 2,800 square miles of drainage and some of the Duncan-Vivden and Safford floods, since high flows could be captured in an exchange with the Central Arizona Project (CAP) supply. Flood control benefits may be sufficient to allow adding flood control space to the reservoir. Flood damage studies would be required to evaluate this potential.

The reservoir would inundate a very narrow, steep-walled canyon, known as the Gila Middle Box. Development of riparian vegetation is limited by topography of the canyon, and consists mostly of seepwillow and young cottonwoods with occasional small isolated pockets of mature woodlands. The canyon has outstanding scenic qualities and presents a rugged wilderness character.

Compared with alternatives, Conner Dam offers lower construction cost, minor environmental impact, high net benefits and good flood control and hydropower potential. The cost of the project is estimated at $121 million.

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[1]Source: Upper Gila Water Supply Study, Stage 1, Arizona Project Office, Bureau of Reclamation. (Conner Dam and Reservoir appears to be the recommended plan in this study, so we use its cost figures and ignore the other options.)

Navajo Indian Irrigation Project (NIIP)

The Navajo Indian Irrigation Project was authorized by the Congress by Public Law 87-483 in 1962. The project, located in San Juan County, will furnish water for the irrigation of 110,630 acres of land and will provide a higher standard of living for an estimated 33,000 Navajo Indians. The project will receive its water supply from Navajo Reservoir.

The project has been under construction since 1963. The main canal from Navajo Dam to the project lands is complete and delivery of water to the first block of 10,000 acres of land was made in 1976. Construction has been completed for facilities to deliver water to an additional four blocks and a total of about 50,000 acres is under irrigation. Construction is proceeding at a reduced rate on block six. Appropriations for construction were drastically reduced in fiscal years 1982 and 1983.

The estimated total cost of the project in 1983 dollars is $519 million.

Modification of Ute Dam

Ute Dam and Reservoir on the Canadian River near Logan was completed in 1963 by New Mexico State Interstate Stream Commission with a total capacity of about 109,000 acre-feet.

The State Legislature has authorized the issuance of $21 million in severance tax bonds to finance additional construction to increase the storage capacity of the reservoir. In accordance with the authorization, the Interstate Stream Commission has undertaken the design and construction of a project to increase total controlled storage capacity of the reservoir to about 272,000 acre-feet. The Commission has contracted with the U.S. Bureau of Reclamation to prepare the design and to supervise the construction. The Commission has contracted with KNC, Inc., of Albuquerque for the additional construction required to modify Ute

Dam, and construction is scheduled to be completed in May, 1984. Based on the contract price to KNC, the total estimated cost of the additional construction of Ute Dam and Reservoir is about $16 million.

When the additional construction is completed, the estimated firm yield of Ute Dam and Reservoir will be about 27,000 acre-feet per year for a period of 25 years and then decline to a firm yield of about 16,000 acre-feet in the succeeding 25-year period due to reservoir sedimentation. The water supply will probably be used for municipal and industrial purposes. The City of Tucumcari has an option contract for 3400 acre-feet of the yield at Ute Reservoir.

The reservoir also provides recreation and fish and wildlife opportunities. Under contract with the State Game Commission, a minimum pool, which has a total capacity of about 50,000 acre-feet has been maintained in the reservoir since its original construction and will continue under the additional construction. This pool also serves the essential function of desilting the water supply.

Summary of Anticipated Costs for New Water Supply Projects

At the present time the projects noted above, underway and planned, are all that are anticipated by the year 2000. The most recent estimates of the total costs of these projects is approximately $1.8 billion. All but a small portion of these costs will be financed by the federal government, with all but Indian irrigation costs repaid by project water and power users.

Municipal Needs

The Environmental Improvement Division (EID), a branch of the state Health and Environment Department, oversees municipal and private water systems. There are 613 Community Water Supply Systems in New Mexico of which 381 are publicly owned. Those which are privately owned are not eligible for state Water Supply Construction Act funds.

Projections for Water and Sewer--Albuquerque

In keeping with the national pattern, water and sewer infrastructure for the City of Albuquerque is paid for from user fees, plus some help from federal funding for certain projects. Water and sewer fees are paid by virtually all households in the city, and they are the subject of intense and lasting political interest, to the point where only foolhardy officials would risk revenue projections more than a year or so into the future. Yet revenues control rates of development.

Multi-year projections for water and sewer infrastructure investment are necessary working tools. The result is a list of planned projects with dollar amounts attached, based upon engineering design and cost analyses, designated by fiscal year over (in the case of Albuquerque) a six-year period.

If revenues drop below the levels needed to fund all the projects, some must be deferred. But major changes are seldom possible, because the City is committed to provide water and sewer service to its residents, and particularly to residents of new homes. If revenues drop, developers and builders and their allies will predictably exert political pressure for a rate increase. This untidy but effective system does keep revenues approximately in line with need. So, if need can be accurately predicted, it will usually be reasonable to assume that it can be met, although traditionally this relationship has proved more true of water projects than of sewer projects. And it may apply very imperfectly in smaller and poorer areas, particularly rural areas.

Table 35 shows projected capital expenditures and revenues for the Albuquerque Water Resources Department, which develops and operates both water and sewer systems in the City and in extensive adjacent areas.

Major Flood Control Projects Underway or Planned, 1980-2000

The U.S. Corps of Engineers is responsible for the flood control programs in

Table 35

Projected Capital Expenditures, Albuquerque Water Resources Dept., FY 83--FY 87[1]

Category	6-yr Appropriation	Expended	Remaining	FY 83	FY 84/85	FY 86/87
Water System	$ 80,423,599	$30,240,102	$50,183,498	$ 3,738,823	$17,931,937	$28,220,338
Sewer System	23,723,934	7,959,717	15,764,217	4,435,258	5,385,959	6,023,000
N & S Valley	28,513,195	19,881,332	8,631,863	4.401,863	4,230,000	---
Treatment Plant & Lift Stations	41,099,155	13,030,263	28,068,892	1,888,961	26,179,931	---
Total	$173,759,883	$71,111,414	$102,648,470	$14,464,905	$53,727,827	$34,243,338

[1]Fiscal year July 1-June 30

Water Resources Dept. Revenue Projections, FY 84

Water Revenues	$ 25,900,000
Sewer Revenues	17,800,000
Standby	850,000
Meters	1,130,000
Other[a]	530,000
Total	$ 46,210,000

[a]includes developers' advance payments

Source: Albuquerque Water Resources Department

New Mexico. It is currently involved in five projects, at various states of study or construction, that will have a major impact on parts of the state. Included in this report are only those projects already approved or likely to be approved. Excluded are those studies whose benefit/cost ratio would suggest disapproval. These projects would have a minor effect on the supply of water for various uses in some parts of the state.

All cost figures come from the Corps of Engineers. The division of federal and non-federal costs presents a problem due to the changing nature of the federal-state financial relationship. Where possible two calculations are given. The first, the Traditional Cost-Sharing, is based upon the standard state or local contribution of: (1) land, (2) easements, (3) rights-of-way, (4) relocation of buildings, roads, utilities. The second proposal, as yet unapproved, reflects Cabinet Council recommendations made to the President to institute a 65-35% cost-sharing arrangement on all flood control projects. The final, Summary Table, shows only the Traditional Cost-Sharing calculations.

Middle Rio Grande, Bernalillo to Belen

The recommended plan of improvement would provide protection from the 270-year frequency flood (42,000 cfs) by raising and rehabilitating 62.3 miles of levees. The recommended plan also includes preserving two existing wetlands and purchasing and managing 200 acres of fish and wildlife lands.

A major flood threat is present to 110 square miles of flood plain contiguous to the Rio Grande between Bernalillo and Belen, New Mexico. Approximately 150,000 residents and over $2.5 billion worth of property are located in this area which is subject to flooding from a 1,100 square-mile uncontrolled drainage area below the existing Cochiti Lake.

Table 36

Middle Rio Grande, Bernalillo to Belen
(October 1981 prices)

	Traditional Cost-Sharing	Reagan Administration Proposed Cost-Sharing
Federal		
Corps of Engineers	$ 39,200,000	$ 26,800,000
Non-Federal		
New Mexico		
MRGCD	2,100,000	14,500,000
Project Cost	$ 41,300,000	$ 41,300,000

Source: Middle Rio Grande, Bernalillo to Belen Study, U.S. Corps of Engineers

Santa Fe River Flood Control Project

The project is located in Santa Fe, New Mexico, and vicinity. The originally proposed plan of improvement provided for a combination of both structural and nonstructural elements to protect 300 urban acres, which includes 105 acres of public properties. The proposed structural elements consisted of improvements on the Santa Fe River and on Arroyo Mascaras. Nonstructural features were included to prevent future encroachment of damageable structures into the 100-year floodway. The project has been reformulated to include channel modifications and bridge replacement for the Santa Fe River only. The current plan of improvement for the Santa Fe River will provide 100-year flood protection by combination of channel modifications, within the existing channel, replacement and/or modification of six bridges; and construction of low architecturally treated walls.

Table 37

Santa Fe River Flood Control Project
(October 1981 dollars)

	Traditional Cost-Sharing	Reagan Administration Proposed Cost-Sharing
Federal		
Construction	$ 4,276,100	
Engineering and Design	470,400	
Supervision and Administration	384,800	
Total Federal Cost	$ 5,131,300	$ 4,036,500
State and Municipal		
Land and Damages	456,000	
Relocations	519,000	
Engineering and Design	57,000	
Supervision and Administration	46,700	
Total State and Municipal	$ 1,078,700	$ 2,173,500
Total Project Cost	$ 6,210,000	$ 6,210,000

Source: Santa Fe River Flood Control Project Study, U.S. Corps of Engineers

Gallup Flood Control Project

The project extends from the Gamerco Spur to Allison Road. It would reconstruct and realign portions of both the north and south levees of the Rio Puerco to increase their capacity. The levees would be faced with riprap. A rock knoll constricting the river would be removed to increase channel capacity to 25,000 cubic feet per second. Acquisition of a flooding easement of about 83 acres would prevent future development from reducing flow capacity.

Table 38

Gallup Flood Control Project
(October 1982 dollars)

	Traditional Cost-Sharing	Reagan Administration Proposed Cost-Sharing
Federal		
Flood Control	$ 1,824,000	
Mitigation	13,000	
Recreation	1,300	
Total	$ 1,838,300	$ 1,592,500
State and Municipal		
Flood Control	606,000	
Mitigation	4,000	
Recreation	1,700	
Total	611,700	857,500
Project Coat	$ 2,450,000	$ 2,450,000

Source: U.S. Corps of Engineers

Rio Puerco-Rio Salado Dam Projects

This project, for which planning studies are underway, would be on the Rio Puerco and Rio Salado in Valencia and Socorro Counties. The plan of improvement would comprise two earthfilled dams, one on the Rio Puerco about 18 miles above the confluence with the Rio Grande (Hidden Mountain site), and one on the Rio Salado, either three miles upstream of the U.S. Highway I-25 bridge (Loma Blanca site), or ten miles further upstream (La Jencia site).

Initially, the project will provide a high degree of flood protection for approximately 35,250 acres of urban, agricultural and miscellaneous use properties with an estimated value of $118,291,000 (October 1982). The protected area includes 250 acres of urban property; 10,900 acres of agricultural; and 24,100 acres of grazing, woodland and public rights-of-way. The Bosque del Apache

National Wildlife Refuge is also in the protected area. In addition to direct flood protection, evacuation and relief for the 640 persons living in the flood plain would be reduced during periods of high flows. The reservoir flood control capacities are based on reducing the maximum experienced flood. This flood occurred in September 1929 and destroyed 90 percent of the existing crops in the valley, portions of the AT&SF Railroad bed, dikes, and ditches. The entire villages of San Acacia, San Antonito, and San Marcial were also destroyed. The estimated damages based on October 1982 prices would be $30 million, should a flood of this magnitude reoccur.

Table 39

Rio Puerco-Rio Salado Dam Projects
(thousands of October 1982 dollars)

Costs	Rio Puerco	Rio Salado	Both
First Costs	$ 63,711	$ 40,919	$104,630
Interest	7,982	5,126	13,108
Total Cost	$ 71,693	$ 46,045	$117,738

Source: Rio Puerco-Rio Salado Dam Study, U.S. Corps of Engineers

Alamogordo Diversion Channel

This project consists of a diversion channel about six miles long aligned generally in a north-south direction on the east side of Alamogordo, New Mexico. The channel will intercept floodflows from the numerous arroyos which head on the western slopes of the Sacramento Mountains and carry them northward to Dillard Draw and thence westward to an area of "alkali flats" to be dissipated by evaporation and percolation.

Table 40

Alamogordo Diversion Channel
(October 1982 dollars)

	Traditional Cost-Sharing	Reagan Administration Proposed Cost-Sharing
Federal		
Relocations	$ 760,000	
Channels	7,700,000	
Engineering and Design	1,190,000	
Supervision and Administration	770,000	
Total	$ 10,420,000	$ 7,949,500
Non-Federal		
Land and Damages	1,010,000	
Relocations	800,000	
Total	1,810,000	4,280,500
Project Cost	$ 12,230,000	$ 12,230,000

Source: Alamogordo Diversion Channel Study, U.S. Corps of Engineers

Summary of Major Flood Control Projects

The five projects reported here all have a high benefit-cost ratio and a high probability of being implemented. Other studies have been excluded because of the low probability of their being funded.

Table 41

Summary Table: Major Flood Control Projects

	Federal	Non-Federal	Totals
Middle Rio Grande	$ 39,200,000	$ 2,100,000	$ 41,300,000
Santa Fe River	5,131,300	1,078,700	6,210,000
Gallup	1,838,300	611,700	2,450,000
Rio Puerco-Rio Salado	117,738,000	---	117,738,000
Alamogordo	10,420,000	1,810,000	12,230,000
Total			$179,928,000

Source: U.S. Corps of Engineers

VII. Waste Water

The Environmental Improvement Division of the New Mexico Health and Environment Department oversees the development of wastewater treatment facilities in the state. The state's water pollution control construction grants program helps to prevent the pollution of ground and surface water through the construction of publicly owned wastewater treatment facilities. Municipalities and special sanitation districts may apply for grants under this program. Funding comes from federal monies under the Federal Clean Water Act (PS97-117) and state monies appropriated to the Water Quality Control Commission under provisions of the New Mexico Water Quality Act (74-6-1 through 13 NMSA, 1978). The U.S. Environmental Protection Agency (EPA) and the N.M. Environmental Improvement Division (EID) jointly administer the program.

Since 1970 the State has provided just over $26,800,000 to municipalities in matching funds while federal sources provided $156 million. Fifty-six New Mexico cities have benefited from this program during the period 1970-1982. Many other cities received planning grant funds but did not go ahead to the construction phase. Total project costs have been shared 75 percent by the federal government, 12½ percent by the state and 12½ percent by local governments. Therefore, total project costs for wastewater infrastructure in New Mexico for the period 1970-1982 were approximately $210 million.

Table 42 provides information regarding projects judged to be eligible for state water pollution control funding (and therefore federal funding) in 1982. Table 43 lists other projects determined by EID to be ineligible. The latter projects are needed by the communities; they are not eligible for state or federal assistance from the EPA or from the state under the Water Quality Act.

Another source of funding for wastewater infrastructure in New Mexico is the Community Assistance Act passed in 1977 to aid areas of the state impacted

Table 42

Community Projects Determined by the State Environmental Improvement Division To Be Eligible for Water Pollution Control Funding, 1982

Municipality	Project Cost
Albuquerque	$ 66,094,000
Chama	2,300,000
Las Cruces	30,000,000
Pecos	750,000
Roswell	16,400,000
Santa Rosa	3,000,000
Taos	2,100,000
Total	$120,644,000

Source: N.M. Environmental Improvement Division

Table 43

Community Projects Determined by the State Environmental Improvement Division To Be Ineligible for Water Pollution Control Funding, 1982

Municipality	Project Cost
Grants/Milan	$ 4,000,000
Navajo Tribal Utility Authority, Shiprock	1,055,000
Hobbs	3,460,000
Gallup	391,000
Zuni Pueblo	2,377,500
El Valle de los Ranchos Water and Sanitation District	1,275,000
Anthony Water & Sanitation District	1,547,000
Eunice	1,930,000
Tatum	1,402,000
Cloudcroft	520,000
Vaughn	733,250
Estancia	660,000
Logan	410,000
Encino	612,000
San Jon	368,000
Pena Blanca Water & Sanitation District	430,000
San Ysidro	766,000
House	248,000
Mountain View	6,000,000
Raton	2,000,000
Total	$ 30,184,750

Source: N.M. Environmental Improvement Division

by energy and minerals development. Some $5,600,000 from this source was expended on wastewater projects from 1977-1981. These grant monies are

appropriated by the Legislature and have usually come from the sale of severance tax bonds. Some of these funds have been used to pay the local portion (12½ percent) of projects approved by EPA and EID for federal-state funding under the New Mexico Water Quality Act.*

Table 44 provides information taken from the 1982 National Needs Survey completed by the EPA. Results indicate that in 1982 at least $121 million was needed to meet federal standards regarding pollution control. By the year 2000 an additional $251 million dollars will be required.

Table 44

Investment Needs For Wastewater Disposal Systems (1982-2000)
(thousands of 1982 dollars)

Facilities Category	Backlog 1982	Projected 2000
Secondary Treatment	$ 73,404	$149,136
Advanced Treatment (AST/AT)	845	1,703
Major Sewer Rehabilitation	89	89
New Collectors	37,537	47,063
New Interceptors	9,344	52,602
Total	$121,219	$250,593

Source: U.S. Environmental Protection Agency, 1982 Needs Survey, Cost Estimates for Construction of Publicly-Owned Wastewater Treatment Facilities, December 31, 1982.

Another estimate of need was made by the New Mexico Water Quality Control Commission in a June 1982 report to the U.S. Congress. The report indicates that priority projects in New Mexico would face serious problems if the level of federal funding is changed. Under present law (75 percent federal funding) the state needs $105 million in 1982 dollars to meet current needs.**

Revenues Available

At present 75 percent of the wastewater expenditures in New Mexico are financed with federal funds from the EPA. Indications from proposed new

*An Account of Resource Development in New Mexico: Community Needs to 1985, A Guide for the New Mexico Community Assistance Program, prepared by the New Mexico Energy and Minerals Department, Resource and Development Division, June 1981.

**Health and Environment Department, Annual Report, New Mexico Water Pollution Control Construction Grants Program, 1982, p.8.

regulations and laws are that the federal share will be reduced to 55 percent. EPA officials have indicated to state officials that EPA funding levels are likely to continue to decrease. If that is the case the state and involved municipalities will be required to pay more of the costs involved in wastewater infrastructure.*

Summary

Considering the 1982 backlog of $105 million and the projected needs of $250,593 for the year 2000, overall state needs from 1982-2000 for wastewater treatment facilities total $356 million. The federal government has traditionally borne 75 percent of such costs; therefore $267 million in 1982 dollars will be required to meet these needs.

*Health and Environment Department, Annual Report, New Mexico Water Pollution Control Construction Grants Program, 1982, p. 8.

VIII. Solid Waste Management

Solid waste includes solid or semi-solid material discarded from residential, commercial, institutional, industrial or recreational sources, except sewage. It can also be any useless or worthless byproduct of a process or the like; refuse, or excess material.

In October 1970 a plan was published for solid waste management for the state of New Mexico. In summarizing the findings of that plan, it should be noted that local governments in New Mexico included 96 municipalities and 32 counties.

The plan noted that less than half of the incorporated communities had adequate storage practices, that the frequency of collection in 57 municipalities was inadequate and that inappropriate methods of collecting wastes from commercial establishments were being used. While acceptable methods of solid waste disposal were available, 79% of incorporated municipalities were using open dumping, and only 22 counties provided disposal facilities for those living outside incorporated places.

Environmental Improvement Act

Before 1971 solid waste management was exclusively a local responsibility. There were no statewide efforts, standards or regulations addressing storage, collection, transport, or disposal of solid wastes. Oversight of solid waste management was provided by local officials and local sanitarians. The latter worked with local governments and organizations in attempting to correct solid waste related problems. However, the efforts and attitudes of some local governments and organizations and even of the sanitarians themselves about solid waste management were generally perfunctory.

In 1971 the legislature passed the Environmental Improvement Act, which created the Environmental Improvement Agency (now Division) and the Environmental Improvement Board. The current solid waste management regulations and statewide program for solid waste management are results of that legislation.

EID began its work on solid waste by concentrating on storage and collection deficiencies and then shifted its focus to correction of disposal practices. Threats were made against some communities of imposing daily fines to force them to comply with standards and regulations.

Local Government Landfill Operations

Waste Volume

Residents of New Mexico generate five to six pounds of refuse per person per day. (The national average was estimated at eight pounds per person per day in 1980.) Using the six-pound figure, one million people generate six million pounds, or 3,000 tons, of refuse each day. Several years ago about 40,000 of the 800,000 registered vehicles in New Mexico were junked each year. Some can be salvaged and recycled; the rest are scattered in back yards, arroyos and disposal sites throughout the state.

Regulation

EID regulations provide that municipalities may not dispose of solid waste by open burning. Any municipality with population over 3,000, or any entity serving more than 3,000 persons, must dispose of solid waste in at least one sanitary landfill. Each county, municipality or entity with less than 3,000 population must provide a sanitary landfill or modified landfill.

Federal Land

In New Mexico some landfills are located on U.S. Forest lands, BLM lands, and on military installations. Federal regulations say that no dumping is allowed on BLM property unless the sanitary landfill is covered every 24 hours.

This survey of local governments showed that 44 landfill sites are located on federal land. The federal government requires all landfill sites on federal land to conform to federal regulations by September 1984 or be closed. That means that communities and counties leasing federal land for refuse disposal will have to cover their waste daily or lose their leases. Over much of New Mexico the only suitable land for solid waste disposal is federally owned.

If sites on federal land are closed and suitable sites on private land cannot be found, the public may start dumping waste wherever they can: on roads, in forests, streams and arroyos.

Collection Costs

Conditions among local governments vary so considerably that cost comparisons are likely to be meaningless. We note that solid waste operations are financed in part by service fees and in part by general fund monies. The method of disposal and type of equipment depends mostly on size of the municipality or county. Salaries vary widely from one governmental entity to another.

Collection and transport of waste incurs costs for personnel, collection and/or transport equipment, fuel, and vehicle maintenance. If the collection is mechanically aided there is usually also a cost for dumpsters. The numbers of staff, vehicles, and receptacles depend mostly on the number of users, length of routes and frequency of collection. Savings on wages may eventually offset the cost of mechanical collection vehicles, but initial outlay for such vehicles and compatible containers is overwhelming, particularly for smaller systems.

The State Mandate

The regulations seem to make collection optional, but when they went into effect at least 19 municipalities over 3,000 population were providing collection and were thus subject to the minimum frequency of weekly collection and vehicle

standards. Of the municipalities under 3,000 population, at least 18 were collecting and were thus subject to vehicle standards.

In 1975 when the disposal standards went into effect, New Mexico had 94 incorporated municipalities and one metropolitan county. Twenty-five municipalities and the metropolitan county were in the over-3,000 population category and so had to operate or provide for at least one sanitary landfill; 69 municipalities were below 3,000 population and were required to operate or provide at least one modified landfill, with the option of going to a sanitary landfill.

System Costs

Whether the municipality contracts for use of a disposal site or operates a site on owned or leased land, the disposal requirements mean cost to the municipality. For those operating disposal sites, there is the cost of land acquisition, fencing, gates or cattleguards, earth-moving equipment operation and maintenance, fuel and payroll. For those operating modified landfills, there is also usually a cost for transporting the earth-moving equipment to the site to provide weekly or bi-weekly coverage, since the earth-moving equipment is usually employed on other municipal work such as street maintenance, parks, or utility jobs.

Local governments in New Mexico face expenditures for disposal of solid waste in sanitary landfills which can be classed as fixed costs (initial investment) or variable costs (operation and maintenance).

Fixed Costs

The initial investment, or capital expenditure, for a landfill will usually include purchase of land and equipment, access roads, fencing, facilities for workers, equipment shelter, utilities, communications, signs, drainage, grading, and landscaping.

Variable Costs

These include expenditures to operate and maintain the equipment and site; fuel, lubrication, parts and other such items to keep equipment in good running order; salaries, wages and fringe benefits; upkeep of the landfill site including building repairs, utility maintenance, road and fence repair, seeding completed areas of the landfill, supplies and other items needed to keep the operation functioning properly.

Most local governments in New Mexico meet the variable costs of their solid waste systems through user fees and general fund revenues. Exceptions are counties with large areas and with population concentrated at one end of the county and a single landfill at the other end. People will not drive 20 or 30 miles just to dump at the sanitary landfill under those conditions, but will probably dump in the nearest arroyo or roadway, and the fees for dumping will not be collected.

It is in the area of fixed costs that most local governments are in immediate need of financial assistance. Survey results indicate that the main priority needs are for land acquisition and for new equipment or replacement equipment.

Summary and Recommendations

Solid waste management transcends local jurisdictions and funding sources, and progress toward adequate improvements will require continued federal and state financial support to local governments. A few local governments charge user fees that cover all operating and maintenance expenses. A large number charge fees that cover perhaps 60 percent to 75 percent of the cost and subsidize the balance from general funds. Some local governments are so financially strapped, with tax base practically nil, that their general fund is very small. They reach out for any kind of help they can get from volunteers, adjoining local governments, and state agencies.

Most local governments with over 3,000 population need financial help to replace capital equipment and to purchase land. Equipment now in use by local governments ranges from new to ten years old.

Some county governments face unusual problems of distance and sparse population that make it difficult for them to comply with EID regulations. Catron County covers 6,898 square miles and has a population of 2,338, while Bernalillo County covers 1,169 square miles with a population of 363,118. No one standard solid waste system will meet such widely varying needs.

EID regulations require that landfills be covered daily, weekly, or monthly, depending on landfill type. Rio Arriba County, for example, reports nine landfill sites to be covered weekly and has an area of 5,883 square miles. It is impossible for Rio Arriba County to cover all nine sites weekly, due to the distances involved and lack of adequate staff and equipment.

User fees charged at the landfill or dump site are an impractical solution to the counties' solid waste problems. Residents will not travel 10 to 20 miles to their nearest county landfill site, and pay a user fee, to dispose of their refuse. The user fee system would also require on-site personnel during daylight hours seven days a week. This system would be difficult to manage properly and would cost additional county funds because it could not be self-supporting.

The method of financing a sanitary landfill operation should be carefully designed to ensure that fees collected will meet expenses. Usually several years' experience will be needed to establish the fee levels. Fees should be competitive to encourage maximum participation, yet high enough to avoid frequent rate increases. Table 45 gives estimated disposal costs by counties, to 2000.

Most local governments under 3,000 population are meeting minimum compliance with EID standards, and many entities are handling the operation and maintenance

Table 45

SOLID WASTE DISPOSAL COSTS, NEW MEXICO COUNTIES, 1980 and 2000
(1979 dollars)

County	1980 Population[a]	1980 est. Cost[b]	2000 Population[a]	2000 est. Cost[b]
Bernalillo	375,922	$14,285,036	625,900	$23,784,200
Catron	2,382	90,516	3,500	133,000
Chaves	49,155	1,867,890	65,400	2,485,200
Cibola	--	--	42,900	1,630,200
Colfax	13,296	505,248	17.200	653,600
Curry	41,118	1,562,484	56,000	2,128,000
De Baca	2,552	96,976	3,000	114,000
Dona Ana	82,615	3,139,370	149,700	5,688,600
Eddy	45,524	1,729,912	64,000	2,447,200
Grant	24,610	935,180	35,900	1,364,200
Guadalupe	4,894	185,972	5,500	209,000
Harding	1,208	45,904	1,800	68,400
Hidalgo	6,167	234,346	8,200	311,600
Lea	53,173	2,020,574	114,400	4,347,200
Lincoln	10,002	380,076	12,900	490,200
Los Alamos	19,530	742,140	23,300	885,400
Luna	14,450	549,100	19,000	722,000
McKinley	54,867	2,084,946	72,600	2,758,800
Mora	4,861	184,718	4,000	152,000
Otero	43,094	1,637,572	58,600	2,226,800
Quay	11,258	427,804	13,700	520,600
Rio Arriba	29,881	1,135,478	37,900	1,440,200
Roosevelt	16,735	635,930	20,000	760,000
Sandoval	23,771	903,298	59,100	2,245,800
San Juan	70,079	2,663,002	195,800	7,440,400
San Miguel	23,225	882,550	28,500	1,083,000
Santa Fe	62,941	2,391,758	92,300	3,507,400
Sierra	8,732	331,816	9,800	372,400
Socorro	10,237	389,006	16,500	627,000
Taos	20,832	791,616	31,900	1,212,200
Torrance	6,685	254,030	10,700	406,600
Union	4,902	186,276	6,500	247,000
Valencia	50,159	1,906,042	46,600	1,770,800
New Mexico	1,188,857	45,176,566	1,953,400	74,233,000

[a]Bureau of Business and Economic Research, UNM

[b]EID figured @ $38/person/yr, nationwide

of their solid waste systems with small fees and general fund subsidies. The main problem is funding the purchase or replacement of equipment (i.e., fixed costs).

Some smaller local governments (say, under 1,000 population) that are trying desperately to meet minimum compliance with EID standards, have financial problems that force them to pare down on other essential basic services. In these small local governments conventional methods of refuse collection and disposal appear too expensive to be practical. Perhaps EID could furnish more on-site technical help for mechanical and engineering problems. Meeting EID standards for many local governments will require additional revenue sources. The survey identified $9.5 million of needs over the next three years for local governments to remain in compliance with EID and EPA regulations.

IX. Hazardous Waste

History and Status

Hazardous waste management began in earnest in the United States in 1976, with passage of the Resource Conservation and Recovery Act (RCRA). The federal government issued regulations on May 19, 1980; they have been amended extensively since then.

The state of New Mexico became interested in regulating the disposal of hazardous waste in 1976 when several Texas firms asked about requirements they would have to comply with if they were to establish hazardous waste disposal sites in New Mexico for hazardous waste from Texas. New Mexico enacted legislation in 1977 to control hazardous waste and issued regulations in 1978.

In 1980 New Mexico decided to seek authority over the federal hazardous waste program under RCRA. The legislature extensively amended the statutes, and state government issued new regulations effective January 6, 1983. The state expects to receive interim authorization during 1983.

The new regulations will allow New Mexico to regulate disposal of the hazardous waste from some 450 generators, transporters and treatment storers, and disposers. The state can also determine the amounts of hazardous waste being generated within the state, not just by notifiers but also by currently exempted small-quantity generators (less than 1,000 kg/month).

Of the 450 generators and handlers who have submitted information to the state Environmental Improvement Division, 91 submitted information to be considered for permits as storage and treatment centers. Of these, about 25 will eventually receive permits.

Site Needed

New Mexico has no hazardous waste disposal site. Waste generated locally is stored and shipped out of state, adding to the cost of doing business here.

In 1982 a Texas firm sought to establish a hazardous waste disposal plant at Hatch, New Mexico. Opposition to this proposal forced the company to drop its plans. However, this incident brought together representatives of several universities and research organizations, who drafted a proposal for a $1.7 million, three-year study to meet the need for a disposal site or sites.

This study would focus on:

- o Siting. Establishing a list of scientifically researched sites deemed suitable for disposal of hazardous waste.
- o Inventory. Establishing an exact inventory of all generators of hazardous waste, including minor generators (less than 1,000 kg/month).
- o Technology assessment. Establishing a basis for determining the best disposal methods available.

With the results of such a study, the state could invite private companies using approved techniques to invest in a hazardous waste disposal plant at an approved site. No action has been taken on this proposal.

The Environmental Improvement Division sees no likelihood of the state constructing and operating such a plant unless illegal dumping of hazardous materials presents a public health danger.

WIPP

The federal government is building a Waste Isolation Pilot Plant (WIPP) near Carlsbad for the long-term disposal of low-level nuclear waste. While this issue has generated much debate within the state, there is no state participation in the construction or management of the site. The estimated $1 billion cost will be provided by the federal government.

X. Current Legislation

We note here two proposals: one at the state level and one at the federal level, to anticipate infrastructure needs and to provide local governments with help in funding their most pressing infrastructure projects.

1983 New Mexico Legislature

In the 1983 legislative session HB 234, signed by 18 of the 70 members of the House, authorized the state to issue severance tax bonds to establish and improve sanitary landfills needed by counties and municipalities. The proceeds must go to infrastructure construction and are not available to meet operational costs. The bill puts a limit of $3.5 million on the bond issue. The bill did not pass.

U.S. Senate

In February 1983 Senator Domenici of New Mexico, joined by Senators Bradley, Gorton, Randolph and Andrews, introduced S.532, the "Public Investment Incentive Act of 1983", to provide public works and infrastructure investment financing. The bill states that "private investment capital should play the predominant role in meeting public capital needs and the federal role should be to facilitate the flow of private investment capital through existing municipal markets to meet the long-term public investment needs."

The bill also recognizes that "there is diversity in public capital investment and no single solution should be sought to meet those needs, but rather public policy should permit flexible and diverse responses. The majority of public capital investment projects are state and local in focus, and therefore the major role of federal public policy should be to provide an incentive for state and local capital investment with minimum federal investment..."

Title II of the bill, the "Federal-State Infrastructure Partnership Program Act", establishes State Infrastructure Banks to employ "a broad variety of

financing techniques to assist the public infrastructure capital needs of the state and its local municipalities". The bill would authorize a total of $10 billion to be appropriated from FY 1984 through FY 1986, for apportionment to the states to establish and maintain capital investment loan funds to the Infrastructure Banks.

The banks could then make loans to local government units, and buy and refinance municipal debts, and guarantee local obligations at market interest or below.

The bill provides for establishment of a public capital investment revolving fund by the states, with wide discretion to meet needs of local governments. Federal supervision over the states in administering the banks and loan funds is provided for, but is kept to a minimum.

Title III of the bill establishes a National Infrastructure Council, to assure that the Act will be properly administered and that regulations and policies will be consistent with other applicable federal statutes, policies and regulations. The Board of Directors of the Council would include the Secretary of the Treasury, the Administrator of the Environmental Protection Agency, the Secretary of Transportation, the Chairman of the National Governors Association, the President of the National Conference of State Legislators, the President of the National League of Cities, the President of the United States Conference of Mayors, and two members from the private contracting and construction industry.

XI. Summary and Conclusions

This study has attempted to examine the condition of infrastructure in New Mexico in 1982 and to assess needs and available resources to meet those needs from 1982 to 2000. The challenge of completing this work was immense, due primarily to lack of appropriate data and to the inadequate time and resources with which to pursue the project carefully. Nevertheless, the results are an important beginning.

Table 46 summarizes the entire work. Highways, roads, streets and bridges is the largest category requiring nearly a billion additional dollars by 2000 to meet needs. A great deal of money will be spent on increasing the state's water supply, but all of that money is now committed. Wastewater is a significant concern for New Mexico municipalities and will require some $267 million more than will be available. Unfortunately, an estimate of need for municipal water distribution systems was not available. Total needs of the various components examined are $5,616 million. Estimates reveal that $4,173 million will be available to meet those needs, leaving a gap of $1,443 million.

This study is only a beginning in the work of addressing a very large problem. New Mexico is an old state in many ways, but new in many others. If population continues to grow at rates above the national average, state infrastructure will become increasingly important. Indeed, the availability of adequate infrastructure may decide whether or not the state's economy continues to improve in the future.

Table 46

Summary of Capital Needs and Available Revenues
New Mexico, 1982-2000
(Millions of 1982 Dollars)

Stem	Capital Needs	Revenues Available	Capital Needs Gap
Highways, Roads, Streets & Bridges	$ 2,650	$ 1,680	$ 970
Railroad	None	None	None
Mass Transit	200	25	175
Airports	196	165	31
Water Supply			
State	1,034	1,034	None
Municipal	Unknown	Unknown	Unknown
Flood Control	180	180	None
Wastewater	356	89	267
Solid Waste Management	Unknown	Unknown	Unknown
Hazardous Waste	Unknown	Unknown	Unknown
WIPP	1,000	1,000	None
TOTALS	$ 5,616	$ 4,173	$ 1,443

APPENDIX

The following maps will assist the reader not familiar with New Mexico geography to better understand this fifth largest state. Figure 1, Population Density 1975, emphasizes the sparse population distribution over a large land mass. Figure 2, Land Use, shows the various patterns of land use in the state. Figure 3, Land Ownership, indicates an important characteristic of New Mexico: much of the state's land is publicly owned. Figure 4 describes available public transportation facilities. Figure 5 shows the state's major highway systems and traffic patterns.

Figure 1. population density 1975

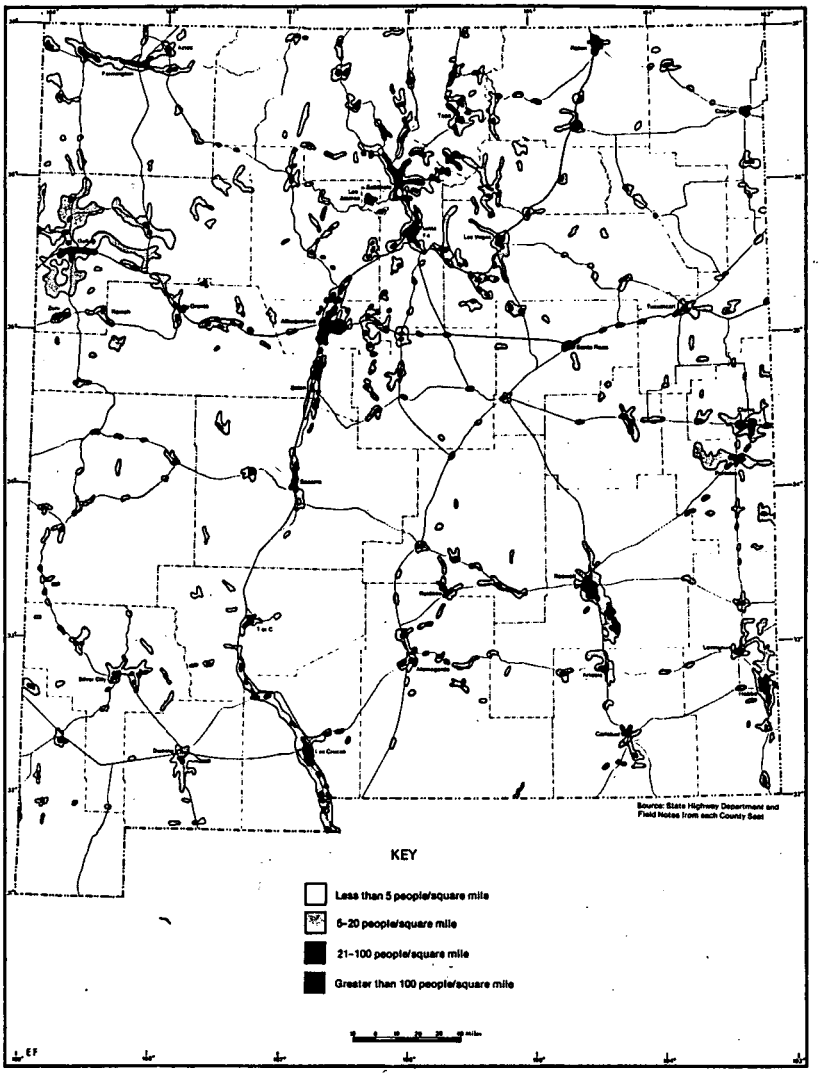


Figure 2. land use

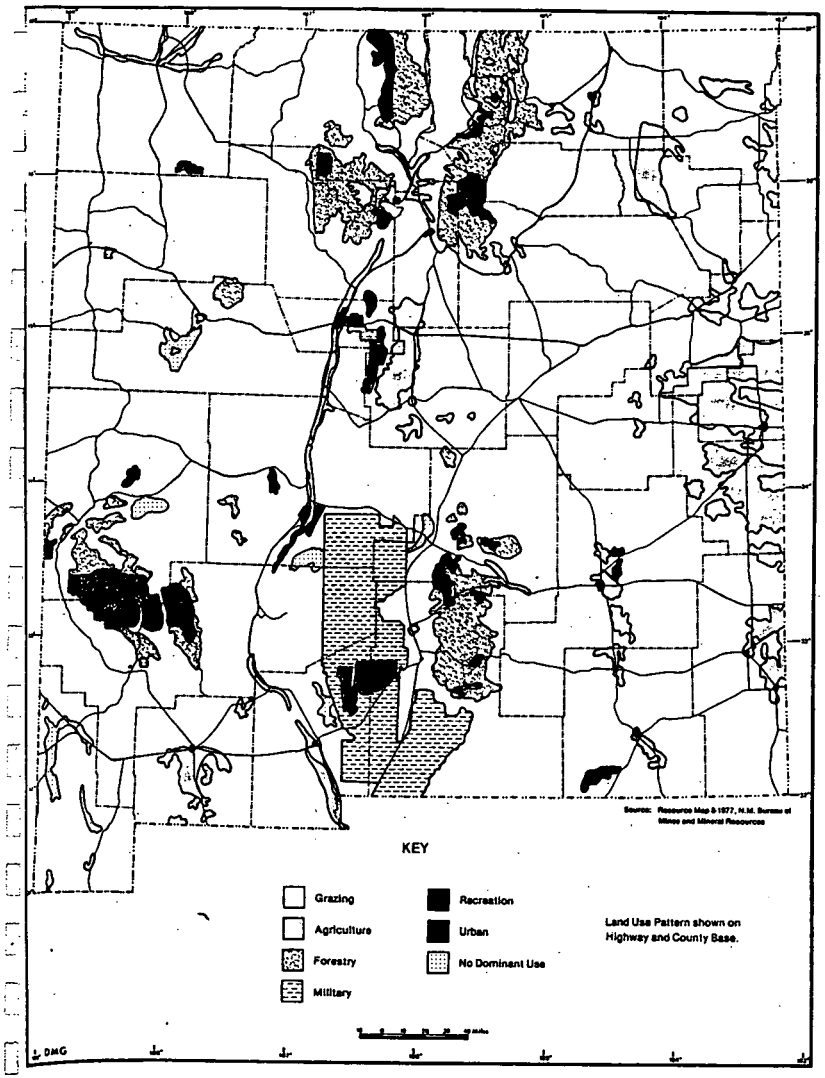


Figure 3. land ownership

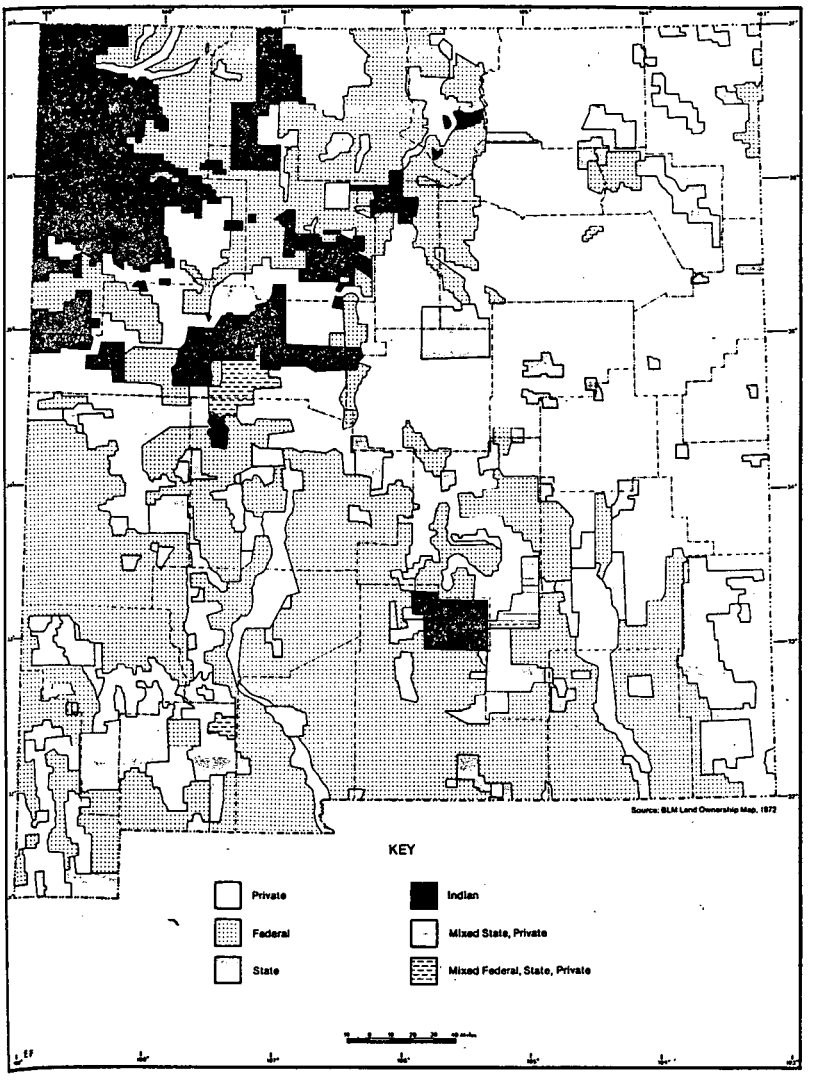


Figure 4. public transportation

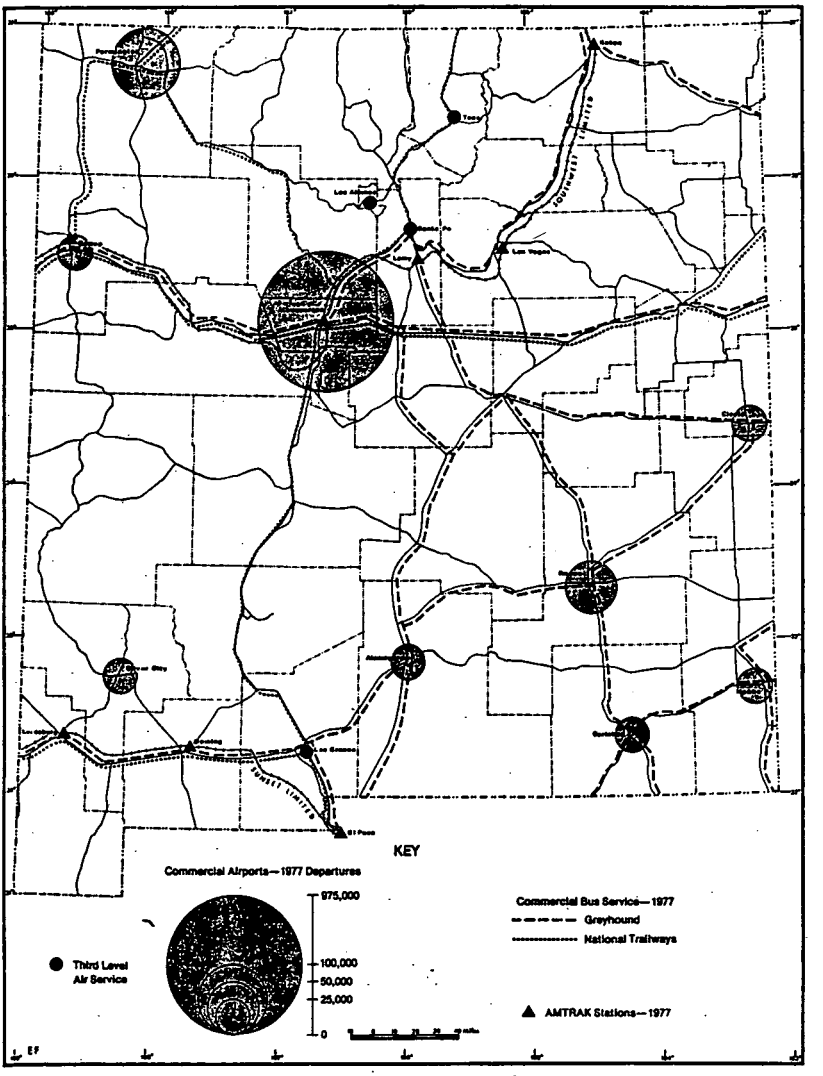
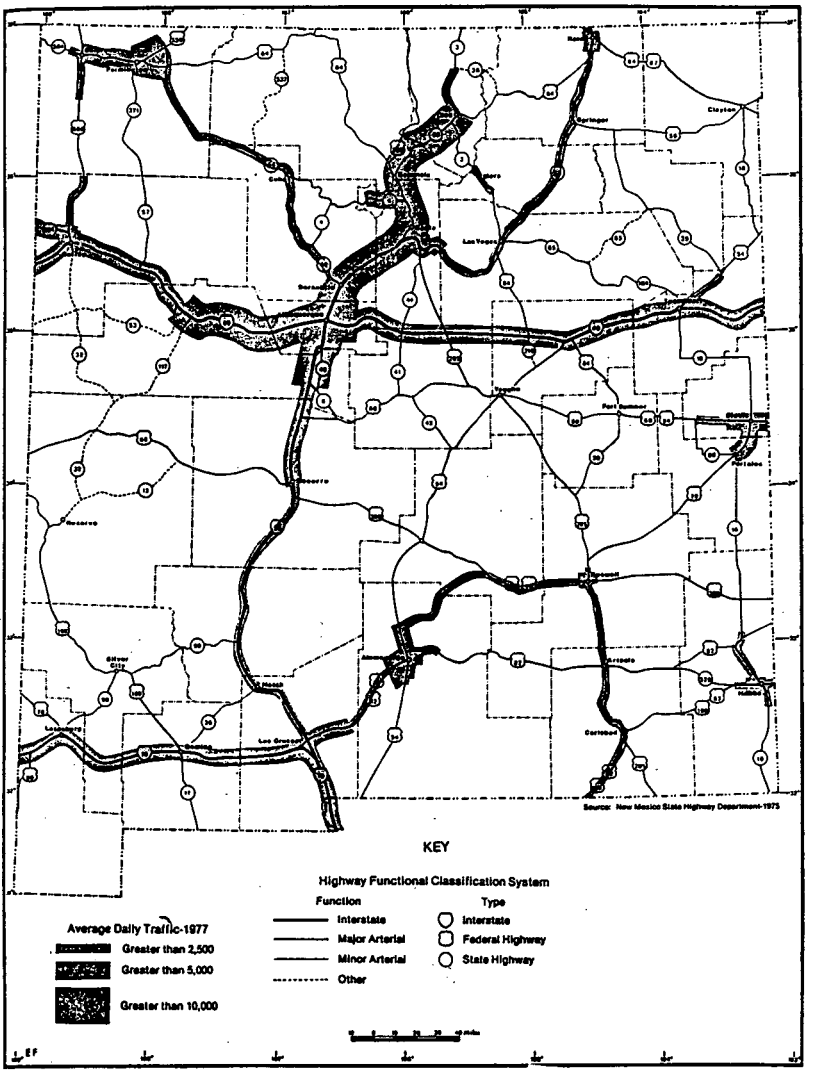


Figure 5. highway traffic



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