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Infrastructure Needs Assessment

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The Draft Preliminary
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INFRASTRUCTURE NEEDS ASSESSMENT

This technical memorandum quantifies selected state capital infrastructure needs and projected revenue patterns. Infrastructure, as defined in the State Planning Commission Act, includes the following: water, sewer, transportation, solid waste, flood protection/storm water management; shore protections, and education. Capital Improvements can be defined as those sites and facilities which are associated with the expansion or retention of existing physical system. Capital Improvements do not include operational items such as personnel salaries, depreciation of equipment, and debt service.

The information presented in this memo was gathered utilizing a two step process. First, over 20 personal interviews were conducted with representatives of state agencies, educational institutions, and authorities. The purposes of these interviews were to assess the capital planning and revenue distribution process and to assess the cost of infrastructure required to support forecasted growth. The second step was to conduct telephone interviews with additional officials and authority-personnel. During both of these steps, data acquired during the oral interviews and additional data was requested in writing. In addition, all preliminary data was reviewed with Office of State Planning personnel.

The data collected during the in-person and telephone interview processes has several weaknesses. First, the planning horizon year of

2010 usually exceeded any agency or authority capital planning or need projections. The gap between projections and the horizon year was filled utilizing a number of techniques which included trend analysis, calculation of ratios between usage levels and capital program/need, and preliminary internal staff projections. The second weakness was that some authorities or agencies do not utilize capital program/need projections. In these cases, trend data was the only basis for projections. A third weakness involved the availability of data on a sub-state basis. For instance, major maintenance cost associated with small public/private water purveyors was not available. For roads/ bridges, water, sewer, and flood control/storm drainage a 1984 report assembled by the State of New Jersey County and Municipal Government Study Commission was utilized to assess need at a sub-state level. A fourth problem involved the inconsistency of projections in terms of years and dollars. Where necessary, projections were redefined in 1985 constant dollars. Also, projections were grouped into short- and long-term periods -- 1983-1993 and 1994-2010. A fifth weakness occurred for those projections not based upon any agency/authority master plan. Agencies such as the Department of Transportation and Department of Environmental Protection (Division of Water Resources; both have adopted plans upon which projections were based. However, many agencies/ authorities do not have adopted master plans. The sixth and last weakness involved the inability of some agencies/authorities to release internal projections or estimates. This makes projecting capital expenditures difficult, if at all possible by outside technicians.

Infrastructure is grouped based upon its relative importance to converting raw land to urban densities. The following is a listing of the groups, ranked in descending order starting with those with the greatest impact on growth:

Transportation
State/County/local roads and bridges
NJ Turnpike Authority
HJ Highway Authority
NJ TRANSIT
Aviation
Freight
Delaware River Port Authority
Delaware River and Bay Authority

Sewer age
State program
Passaic Valley Authority

Hate Supply/Distribution
 NJ Hater Supply Authority
 North Jersey Hater Supply Commission

Flood Protection/Haste Hater Management
* State program

Solid Haste
* State program

Shore Protection
* State program

Education
* State program

The following paragraphs summarize projected capital needs and revenues for each of the above Infrastructure types.

Transportation

Although the Department of Transportation has the legislative responsibility to develop and maintain a statewide transportation system plan, there are numerous governmental bodies, autonomous authorities, and agencies involved in serving the transportation interests of the

state. The following paragraphs discuss each of these differing group's capital need and revenue projections.

State. County. Local Roads/Bridges

New Jersey's road system is extensive and represents a massive public investment by the citizens of the state. Over the years, the system has grown significantly; today it amounts to over 2,200 miles of state roads and over 31,000 miles of county, municipal and other roads. An integral part of this roadway system is the 6,000 bridges which are located throughout the state, of which almost 2,200 are under state jurisdiction. The replacement cost of this road system is estimated to be more than \$20 billion.-*/

Local streets and roads are those roads which fall under the jurisdiction of a municipality. Local streets and roads make up the predominant component of the state's road and highway network, accounting for 92 percent of the state's center have miles (linear road miles independent of the number of lanes) and nearly 53 percent of all vehicle miles traveled in New Jersey each year*/. Over half of all municipal road miles are in suburban municipalities (as defined by the Division of State and Regional Planning), with one quarter in urban municipalities and another in municipalities characterized as rural.

County roads by definition are those roads falling under the¹ jurisdiction of the individual county's. In 1982, County roads totaled

- I/ 1984 New Jersey Transportation Plan.
- II From 1982 Survey of County and Municipal Study Commission of County/Municipal officials.

6,818 center lane tiiles and accounted for 35 percent of all state vehicle miles.

In terms of state roads, and bridges (county, state and agency), this Infrastructure can be defined ln terns of reoccurring and non-reoccurring. Reoccurring need is annual maintenance performed on state roadways (including interstates). Non-reoccurring need is made UD of three components: 1) capacity improvements such as road widenings; 2) non-Interest freeway gaps; and 3) Interstate gaps.

Projected Revenue. Recently the Governor unveiled the Trust Fund Renewal Program, a program of Innovative financing methods designed to pump \$3.2 billion dollars Into New Jersey's transportation infrastructure over a four year period (1988-1991). This rehabilitation and Improvement program would encompass the state highway system, the state public transportation system (NO TRANSIT), and provide aid to local governments for highway and public transit purposes.-/

The sources of revenue supporting this Initiative are presented in Table 1. The bulk of the funds are projected to come from a new five cent gasoline tax. Although this program has not been approved, for the purposes of projecting future revenue, lt has been assumed that this program will be available and that annual funding levels will continue

I/ New Jersey Transportation Trust Fund Proposed Renewal (12/1/86).

to 2010 at a level which equals future need. Between 1988-1993 the Department of Transportation is projected to receive \$5.3 billion or \$875 Billion annually, and between 1994-2010 total revenue is projected to be \$3.98 billion or again \$234 Billion per year.

Table 1. ROAD/BRIDGE REVENUE FORECASTS, NEW JERSEY, 1988-2010

Revenue Source	Trust Fund II ^{1/}						1988-1993		1994-2010	
	1988	1989	1990	1991	1992	1993	Total Revenue	Avg Annual Revenue	Total Revenue	Avg. Annual Revenue
State General Fund	\$88,000	\$88,000	\$88,000	\$88,000	\$88,000	\$88,000	\$528,000	\$88,000	\$518,000	\$30,000
Existing heavy truck registration fees	30,000	30,000	30,000	30,000	30,000	30,000	180,000	30,000	177,000	10,000
Toll road authorities ^{2/}	25,000	25,000	25,000	25,000	25,000	25,000	150,000	25,000	150,000	9,000
New revenues ^{3/}	195,000	195,000	195,000	195,000	195,000	195,000	1,170,000	195,000	1,147,000	67,000
Trust Fund Authority financing	187,000	187,000	187,000	187,000	187,000	187,000	1,122,000	187,000	1,102,000	65,000
Federal funding	455,000	455,000	455,000	455,000	455,000	455,000	2,730,000	455,000	2,678,000	158,000
Less NJ TRANSIT Allocation	105,000	105,000	105,000	105,000	105,000	105,000	630,000	105,000	1,785,000	105,000
Total	\$875,000	\$875,000	\$875,000	\$875,000	\$875,000	\$875,000	\$5,250,000	\$875,000	\$3,987,000	\$234,000

Notes: Data in thousands of 1986 constant dollars.

- ^{1/} Proposed Trust Fund II revenues. Assume annual revenues for 1994-2010 period equal total projected need.
- ^{2/} Collections from authorities (Trust Fund II):
 Garden State Parkway \$0.025 on every \$0.25 collected.
 NJ Turnpike Authority \$0.02 on every \$0.25 collected.
 Atlantic City Expressway \$0.04 on every \$0.25 collected.
- ^{3/} Five cent increase on gasoline tax (Trust Fund II).

Sources: New Jersey Department of Transportation and Hamner, Siler, George Associates.

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Table 2. STATE ROAD/BRIDGE CAPITAL REVENUE/NEED PROJECTIONS, NEW JERSEY, 1988-2010

Need/Revenue	1988	1989	1990	1991	1992	1993	1988-1993		1994-2010	
							Total Revenue/Need	Avg Annual Revenue/Need	Total Revenue/Need	Avg Annual Revenue/Need
Recurring Need										
State road roads	NA	NA	NA	NA						
Local/County roads 1/	\$71,500	\$71,500	\$71,500	\$71,500	\$71,500	\$71,500	\$429,000	\$71,500	\$1,216,000	\$71,500
Subtotal	\$71,500	\$71,500	\$71,500	\$71,500	\$71,500	\$71,500	\$429,000	\$71,500	\$1,216,000	\$71,500
Non-recurring Need										
State/County bridges 2/	NA	NA	NA	NA	NA	NA	\$5,597,000	\$932,833	\$0	\$0
State roads 3/	NA	NA	NA	NA	NA	NA	\$2,338,000	\$389,667	\$2,338,000	\$138,000
State road construction 4/										
Capacity improv.	NA	NA	NA	NA	NA	NA	\$151,000	\$21,571	\$0	\$0
Non-Interstate gap	NA	NA	NA	NA	NA	NA	\$210,000	\$30,000	\$431,000	
Interstate gap	NA	NA	NA	NA	NA	NA	\$210,000	\$30,000	\$609,000	\$36,000
Non-recurring Subtotal	0	0	0	0	0	0	\$8,506,000	\$1,215,143	\$609,000	\$36,000
Total	\$71,500	\$71,500	\$71,500	\$71,500	\$71,500	\$71,500	\$8,935,000	\$1,276,429	\$3,987,000	\$235,000
Project revenues 5/	\$875,000	\$875,000	\$875,000	\$875,000	\$875,000	\$875,000	\$5,250,000	\$875,000	\$3,987,000	\$235,000
Surplus (deficit) gap	\$803,500	\$803,500	\$803,500	\$803,500	\$803,500	\$803,500	(\$3,685,000)	(\$526,429)	\$0	\$0

1/ Defined by Municipal Government Study Commission.

2/ See Appendix Table A-1.

3/ The Governor's Management Improvement Program report cited a current state road rehab backlog of \$2.3 million and projected improvement life to last 13 years. Based upon this schedule this rehab program would need to be repeated during 1994-2010.

4/ Assume completion of 35% of the program in Period I (1988-1993) and 65% completion in Period II (1994-2010).

5/ Derived in Table 1.

Notes: Data in thousands of 1966 constant dollars.

Sources: State of New Jersey County and Municipal Government Study Commission, "New Jersey Local Infrastructure: An Assessment of Needs"; Governor's Management Improvement Program, Inc., "Report to the State of New Jersey"; and Hamner, Siler, George Associates.

Projected Need. Needs can be grouped into recurring and non-recurring. Recurring needs are defined as annual needs required to maintain the system. Non-recurring need is a one-time or periodic expenditure for such items as road completion, bridge rehabilitation or, expressway expansions. These two types of needs are summarized in Table 2.

Recurring local and county road need as projected in a report by the County and Municipal Government Study Commission. In this report total need between 1988-1993 is \$429 million and between 1994-2010 is 1.2 billion.

Non-recurring need can be subdivided into state/county bridge need and state road need. Need for both of these groups is summarized in Table 2. Total state/county bridge need is projected to total over \$5.5 billion between 1988-1993 (see Appendix Table A-1 for calculations). The appendix table presents cumulative bridge need over the period 1988-1998. It is assumed that bridge repairs will be made by on or before 1993.

1 OSP Editor's Note (1/88);

1 A Revaluation of local and county bridge and road needs has been prepared in the OSP TRD on "Infrastructure Needs Assessment-Transportation". 1/88 This recalculation yields a higher figure than \$3.9 billion for total road and bridge needs, and for the short-term revenue gap (\$1.1 billion, and \$5.9 billion respectively).

Table 10. STATE AVIATION CAPITAL NEED PROJECTIONS, NEW JERSEY, 1988-2010

Revenue Source 1/ 2/	1988	1989	1990	1991	1992	1993	1988-1993		1994-2010	
							Total Need	Avg Annual Need	Total Need	Avg Annual Need
Federal	\$10,573,447	\$8,471,386	\$6,115,950	\$7,383,060	\$8,136,000	\$8,136,000	\$48,815,643	\$8,135,974	\$138,312,000	\$8,136,000
State	877,413	644,630	529,775	520,170	643,000	643,000	3,857,968	642,998	10,931,000	643,000
Local	1,501,413	592,630	1,152,775	790,170	998,000	998,000	6,032,968	1,005,498	16,966,000	998,000
Total	\$12,952,273	\$9,708,646	\$7,798,500	\$8,693,400	\$9,777,000	\$9,777,000	\$58,706,819	\$9,784,470	\$166,209,000	\$9,777,000

Notes: Data in 1986 constant dollars.

1/ Post 1991 projections based upon average annual 1988-1991 Department capital need projections.
 2/ See Appendix Table D-1 for listing of projects for 1988-1991.

Sources: New Jersey Department of Transportation -- Division of Aeronautics; and Hamner, Siler, George Associates.

Non-recurring state road needs include capacity improvements, non-Interstate completions, and Interstate completions. It is assumed that total non-recurring state road needs, as defined in the Governor's Management Improvement study, will be phased over the 1988-2010 period, since this total amount is likely to be too ambitious to complete by 1993.

The addition of recurring and non-recurring need equal total need which is projected to total over \$8.9 billion during 1988-1993 and over \$5.2 billion during 1994-2010. This total need is subtracted from projected revenues derived in Table 1 to produce a total revenue deficit of over \$3.6 billion or \$526 million annually. During 1988-1993 a surplus is projected of \$9.6 billion or \$569 Billion annually during 1994-2010. It should be noted that the surplus is based upon continuation of Trust Fund II revenue.

New Jersey Turnpike Authority

The Authority was created by the State legislature in 1948. Its primary function was to build a 118-mile Turnpike from the Delaware Memorial Bridge to the George Washington Bridge, thereby linking Delaware, New Jersey, and New York. Since its opening in 1952 the Turnpike has been widened to 12 lanes along its northern 35 miles. In its first year of operation 17.9 million vehicles used the Turnpike. By 1984 this figure had increased to 156 million vehicles.

Capital Expenditure Trends. Capital expenditures between 1980-1987 are subdivided into maintenance expenditures and capacity increasing expenditures (see Table 3). During this period the Authority spent a

total of \$208 million dollars or \$26 million annually. During this period capacity Improvements Included the 1966 widening program and the beginning drawdowns of the 1985 \$2 billion widening program.

Table 3. NEW JERSEY TURNPIKE AUTHORITY CAPITAL EXPENDITURE TRENDS, NEW JERSEY, 1980-1987

Type of Expenditure	1980	1981	1982	1983	1984	1985	1986	1987	1980-1987	
									Total Expend	Avg Annual Expend
Capital Expenditures ^{1/}	\$9,486,600	\$7,361,800	\$7,635,700	\$7,735,500	\$11,561,800	\$14,109,100	\$13,208,500	\$16,000,000	\$87,099,000	\$10,887,375
Project Expenditures ^{2/ 3/}	11,993,700	7,805,300	2,062,300	2,309,800	1,649,500	0	46,757,300	48,029,300	120,607,200	15,075,900
Total	\$21,480,300	\$15,167,100	\$9,698,000	\$10,045,300	\$13,211,300	\$14,109,100	\$59,965,800	\$64,029,300	\$207,706,200	\$25,963,275

^{1/} For maintenance of existing facilities.

^{2/} Between 1980-1984 expenditures made were associated with 1966 widening program. Expenditure in 1986 is for design/engineering associated with 1985 \$2 billion widening program.

^{3/} Includes 1984 \$12 million bond issue in addition to 1985 \$2 billion bond issue.

Sources: NJ Turnpike Authority and Hamner, Siler, George Associates

Projected Capital Expenditures/Need. Projected capital expenditures, which in the case of the Authority are synonymous with need, are presented in Table 4. Authority engineers indicated that capital maintenance expenditures during the 1980-1987 period are a good predictor of future expenditures. It is assumed that future maintenance expenditures will continue to increase over 1987 levels at an annual rate of 0.31 percent during 1988-1993 and 1.35 percent during 1994-2010 (see Appendix Table B-1). Authority engineers indicated that given this funding scenario, future needs should not exceed revenue for capital maintenance.

Table 4. NEW JERSEY TURNPIKE AUTHORITY CAPITAL EXPENDITURE/NEED PROJECTIONS, NEW JERSEY, 1988-2010

Type of Expenditure	1988	1989	1990	1991	1992	1993	1988-1993		1994-2010	
							Total Expend/Need	Avg Annual Expend/Need	Total Expend/Need	Avg Annual Expend/Need
Capital Expenditures	\$16,145,600	\$16,292,500	\$16,440,800	\$16,590,400	\$16,741,400	\$16,893,700	\$99,104,400	\$16,517,400	\$313,037,500	\$18,414,000
1985 Widening project 1/	635,000,000	635,000,000	635,213,400	0	0	0	1,905,213,400	317,535,567	0	0
Total	\$651,145,600	\$651,292,500	\$651,654,200	\$16,590,400	\$16,741,400	\$16,893,700	\$2,004,317,800	\$334,052,967	\$313,037,500	\$18,414,000

Notes: For capital maintenance expenditures Authority engineers indicate that current need is being met by annual expenditures. It is assumed that if expenditures increase at a similar pace to that witnessed during 1980-1987 that capital maintenance need will not exceed expenditures. Engineers could not speculate on future project expenditures beyond the 1985 \$2 billion widening program. (See Appendix Table B-1). Data in constant 1986 dollars.

1/ 1985-1990 highway widening program. Approximately \$94.8 million has been spent in 1986-1987. The remaining balance is projected to be spent in equal portions over the 1988-1990 period.

Sources: NJ Turnpike Authority and Hamner, Siler, George Associates.

The Authority-utilizes toll revenues to fund operations and capital Improvements and secures no state, federal, or local funding. Between capital maintenance expenditures and the existing widening project the Authority is projected to spend slightly over \$2 billion during 1988-1993 and \$313 million during 1994-2010.

New Jersey Highway Authority

The Authority operates the Garden State Parkway, a 173 mile limited access tollroad with connections in the south to U.S. Route 9 near Cape May and in the north to the New York State Thruway near Spring Valley, New York. The first portion of the Parkway was opened in 1954 and the entire road completed in 1957. Vehicular usage of the Parkway has steadily increased to a level of over 35 million in 1984.

Projected Capital Expenditures/Need. The Authority has assembled a five year capital maintenance road Improvement program (1987-1991) of \$571 million or \$114 million annually. Authority personnel indicated that they see this capital maintenance spending program continuing into the future allowing the Authority to meet its future needs (see Table 5).

Table 5. NEW JERSEY HIGHWAY AUTHORITY CAPITAL REVENUE/NEED FORECASTS, NEW JERSEY, 1988-2010

Type of Expenditure	1988	1989	1990	1991	1992	1993	1988-1993		1994-2010	
							Total Revenue/Need	Avg Annual Revenue/Need	Total Revenue/Need	Avg Annual Revenue/Need
Capital Improvement program 1/ 2/	\$114,214	\$114,214	\$114,214	\$114,214	\$114,214	\$114,214	\$685,284	\$114,214	\$1,941,638	\$114,214
Bridge renovations	10,000	10,000	10,000	0	0	0	30,000	5,000	30,000	1,765
Toms River widening	0	0	0	0	0	0	0	0	200,000	11,765
Essex County	0	0	0	0	0	0	0	0	NA	NA
Total	\$124,214	\$124,214	\$124,214	\$114,214	\$114,214	\$114,214	\$715,284	\$119,214	\$2,171,638	\$127,744

Notes: Data in thousands of 1986 constant dollars. All capital improvement expenditures are paid out of revenue collected by the Authority. NA means not applicable.

- 1/ Authority officials indicate that current need is being met by annual expenditures. It is assumed that if expenditures increase at the present level, capital improvement needs should be met in the future.
- 2/ The Authority's 1987-1991 Capital Improvement program totals \$571.07 million. Authority engineers estimate that this need will continue indefinitely.

Sources: NJ Highway Authority and Hamer, Siler, George Associates.

In addition -to road maintenance program, maintenance will be required on all Authority bridges. Authority personnel have Identified \$25-530 million of needed bridge maintenance. It is assumed that \$30 million will be spent during 1988-1993 and the program will be repeated during 1994-2010. The Authority »ay, at some future point, widen the Tom River portion of the Parkway at a cost of 5200 million. They estimate that this could be done sometime near 1995.

Given these three capital expenditure categories, the Authority is projecting to spend a total of \$715 million or \$119 million annually during 1988-1993 and \$2.2 billion or \$127.7 million annually during 1994-2010. As was the case with the Turnpike Authority, the Highway Authority pays for capital expenditures from toll revenues.

NJ TRANSIT

The New Jersey Transit Corporation, called NJ TRANSIT, is. a public corporation created by the State Legislature in 1979. The corporation is charged with coordinating and improving bus and rail services throughout the state. It is one of the nation's largest public transit agencies, providing 170 million passenger trips annually. It has three subsidiaries, NJ TRANSIT Rail, NJ TRANSIT Bus, and NJ TRANSIT Mercer. The rail provides operating subsidies to seven private bus companies and capital assistance to 140 private carriers.

Capital Expenditure Trends. In 1986 NJ TRANSIT spent approximately \$261 million on capital items (see Table 6). Over the 1980-1986 period capital expenditures increased by \$9.4 million annually (1986 constant dollars) or by 4.8 percent.

Table 6. NEW JERSEY TRANSIT CAPITAL EXPENDITURE TRENDS, NEW JERSEY, 1980-1986

<u>Expenditure</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1980-1986</u>	
								<u>Annual Change</u>	<u>Annual Change</u>
								<u>Amount</u>	<u>Percent</u>
Capital expenditures <u>1/</u>	\$148,900	\$275,300	\$284,600	\$262,500	\$212,000	\$249,200	\$260,800	\$16,000	10.7%
1986 growth factor	1.309	1.188	1.120	1.087	1.051	1.015	1.000	****	****
Capital expenditures in 1986 constant dollars	\$194,900	\$327,100	\$318,800	\$285,300	\$222,800	\$252,900	\$260,800	\$9,400	4.8%

Notes: Data in thousands of 1986 constant dollars.

1/ Capital maintenance/upgrading of existing facilities.

Sources: NJ TRANSIT and Hamer, Siler, George Associates.

During 1980-1986 NJ TRANSIT received revenue from five separate sources (see Table 7). The largest contributor was the Federal Government which supplied an average of \$165 million in revenue per year. The next largest contributor was the NY/NJ Port Authority.

Table 7. NJ TRANSIT REVENUE TRENDS NEW JERSEY, 1980-1986

Source of Revenue	1980	1981	1982	1983	1984	1985 1/	1986 1/	1980-1986	
								Total Revenue	Avg Annual Revenue
Federal	\$135,900	\$201,500	\$162,700	\$205,400	\$176,200	\$157,800	\$118,500	\$1,158,000	\$165,400
1979 Bond	10,100	43,100	20,600	35,100	7,800	32,000	---	148,700	21,200
Transportation Trust Fund I	---	---	---	---	---	29,000	50,600	79,600	11,400
NY/NJ Port Authority	---	30,700	100,800	16,100	22,300	4,600	50,000	224,500	32,100
Other state funds	2,900	---	500	5,900	5,700	8,300	600	23,900	3,400
Total	\$148,900	\$275,300	\$284,600	\$262,500	\$212,000	\$231,700	\$219,700	\$1,634,700	\$233,500

Notes: Data in thousands of 1986 constant dollars.

1/ Balance of funds required are projected to be provided from Trust Fund Renewal II.

Sources: NJ TRANSIT and Hammer, Siler, George Associates.

Projected Capital Expenditures. Future capital expenditures can be subdivided into two categories - capital expenditures associated with Improving and/or Increasing existing system capacity and new Initiatives which represent new projects. Table 8 presents future capital expenditures under both categories. NJ TRANSIT has assembled a six-year capital improvement program (1988-1993). Beyond this period, a plausible scenario would be capital expenditures increasing at a similar annual rate (4.8 percent) as that which occurred during the 1980-1986 period (see Appendix Table C-1).

No projected expenditures have been associated with new initiative projects at this time. New Initiative projects are currently identified only as needed and have not been considered for funding.

Projected Capital Need/Revenue. Projected capital expenditures derived in Table 7 are brought forth and utilized in Table 8. Total projected expenditures are subtracted from projected need to determine the revenue surplus/deficit situation.

Table 8. NJ TRANSIT CAPITAL REVENUE/NEED PROJECTIONS, NEW JERSEY, 1988-2010

Expenditure/Need	1988	1989	1990	1991	1992	1993	1988-1993		1994-2010	
							Total Revenue/Need	Avg Annual Revenue/Need	Total Revenue/Need	Avg Annual Revenue/Need
Need										
Capital requests 1/	\$329,000	\$329,000	\$329,000	\$329,000	\$329,000	\$329,000	\$1,974,000	\$329,000	\$5,593,000	\$329,000
New Initiatives 2/	100,000	100,000	100,000	100,000	57,900	57,900	515,800	85,967	984,200	57,890
57,890										
Subtotal	\$429,000	\$429,000	\$429,000	\$429,000	\$386,900	\$386,900	\$2,489,800	\$414,967	\$6,577,200	\$386,890
Less projected capital revenue 3/										
	\$210,690	\$160,960	\$126,310	\$101,020	\$161,090	\$330,870	\$1,090,940	\$181,823	\$4,358,600	\$256,390
Surplus/(deficit) gap	(\$218,310)	(\$268,040)	(\$302,690)	(\$327,980)	(\$225,810)	(\$56,030)	(\$1,398,860)	(\$233,144)	(\$2,218,600)	(\$130,500)

Notes: Data in thousands of 1986 constant dollars.

1/ Provided by NJ TRANSIT.

2/ See Appendix Table C-3 for tentative project list.

3/ Appendix Table C-1.

Sources: NJ TRANSIT and Hamner, Siler, George Associates

Total capital- expenditures are based upon annual funding requests submitted to various departments at NJ TRANSIT. Of the \$438 million of total requests in 1986, approximately 75 percent represent practical and/or fundable need. It is assumed that this annual need of \$329 million will continue out to the horizon year of 2010.

Transit officials also provided cost estimates of new Initiative projects to 2000. Officials could not release prices associated with individual projects, but could estimate the total cost of the program (see Appendix Table C-3 for a tentative list of projects). Officials estimated that if funding were available, \$400 million could be committed to new Initiative projects during 1988-1991. The remaining \$1.1 billion is projected to be spent in equal installments over the 1992-2000 period. No programming of funds is assumed after 2000.

A total revenue deficit is projected for 1988-1993 of \$1.4 billion or \$233 million per year. A total deficit of \$2.2 billion is projected for 1994-2010 or \$131 million per year.

Aviation

The Division of Aeronautics is planning and funding the coordinating agency for public and private airports throughout the State except Newark Airport which is under the control of the NY/NJ Port Authority.

The Division of Aeronautics is in the process of completing a new Airport System Plan which will not be available for some time. For the purposes of this report data assembled in connection with the 1975 New Jersey State Airport System Plan. When this report was assembled there was a total of 156 airports in New Jersey with only 75 conventional

airports available, for public use. Of these 75, two were military and twelve were restricted for public use. Therefore, only 61 general aviation airports were open to the public without restriction. Of these airfields, 48 were under private and 13 were under public ownership. The twelve public airports were Included In the State System Plan. Only 23 of the private airports could be included based upon the extent to which they were deemed capable of expansion and adaptable to the overall transportation needs of the state. The following is a listing of airports Included in the 1975 Plan:

Caldwell	Princeton	Trenton/Robbinsville
Kupper	Somerset	Bader
Lincoln Park	Teterboro	Cape May
Linden	Aero Haven	Hammonton
Monmouth	Albion	Lakewood
Morristown	Burlington	Manahawkin
Nairooi	Cross Keys	Miller
Newark	Mercer	NAFEC
Preston	Red Llon	Ocean City
Smithville	Woodbine	Blairstown
Sky Manor	Sol berg	Sussex
Alloway	LiCalzi	Millville

Projected Capital Expenditure Revenues. Public and private airports typically have three revenue sources, over and above self-generated revenues, to make capital Improvements. These sources Include the Federal Aviation Administration, the State Department of Transportation, and individual municipalities.

Table 9 summarizes projected revenue from these sources for 1988-2010. Projections for federal and state revenue are based on past trends and Division personnel's assessment of future funding. Projections of local revenue (typically the Individual airport undertaking capital Improvements) is based on the Division's 1988-1991 project and revenue list. During 1988-1993 a total of \$25.9 million is

projected to be available and during 1994-2010 a total 1s \$73.3 million of revenues 1s anticipated. Projections of municipality and Individual airport contributions were not made.

Table 9. STATE AVIATION REVENUE PROJECTIONS, NEW JERSEY, 1988-2010.

Revenue Source	1988	1989	1990	1991	1992	1993	1988-1993		1994-2010	
							Total Revenue	Avg Annual Revenue	Total Revenue	Avg Annual Revenue
Federal 1/	\$2,500,000	\$2,500,000	\$2,500,000	\$2,500,000	\$2,500,000	\$2,500,000	\$15,000,000	\$2,500,000	\$42,500,000	\$2,500,000
State 2/	800,000	800,000	800,000	800,000	800,000	800,000	4,800,000	800,000	13,600,000	800,000
Local 3/	1,501,413	592,630	1,152,775	790,170	1,009,200	1,009,200	6,055,388	1,009,231	17,156,000	1,009,200
Total	\$4,801,413	\$3,892,630	\$4,452,775	\$4,090,170	\$4,309,200	\$4,309,200	\$25,855,388	\$4,309,231	\$73,256,000	\$4,309,200

Notes: Data in 1986 constant dollars.

1/ Based upon past trends and Division personnel projections.

2/ Based on 1984-1986 trends and the stability of the revenue source (gas tax on plane fuel).

3/ 1988-1991 based on Division's Capital Five Year Program. Revenues after 1991 are projected to be the average of 1988-1991 projections.

Sources: New Jersey Department of Transportation -- Division of Aeronautics; and Hamner, Siler, George Associates.

Projected Capital Revenue vs. Need. Projected revenue derived in Table 9 is compared to projected need. Statewide need was assessed by the use of mall surveys and on-site inspections. This need assessment goes into formulating a five year capital budget program (1987-1991). A complete list of projects for these years can be found in Appendix Table 0-1. It is assumed that need beyond 1991 will continue at a similar pace to the annual average projected need during 1987-1991 (see Table 10). Total need during 1988-1993 is projected at \$58.7 million and \$166.2 million during 1994-2010.

When comparing projected revenue against need, a deficit situation results (see Table 11). During 1988-1993, need exceeds projected revenue by \$32.9 million and during 1994-2010 need exceeds revenue by \$93 million. It should be noted that the actual shortages will be slightly less when taking into account potential contributions from municipalities.

**Table 12. RAIL FREIGHT ASSISTANCE CAPITAL EXPENDITURE TRENDS,
NEW JERSEY, 1983-1986**

<u>Funding Source</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1983-1986 Avg Annual Expend</u>
State Rail Assistance ^{1/}	\$0	\$997,921	\$2,000,000	\$ 564,658	\$ 890,645
Local Funding Sources ^{2/}	153,451	670,947	4,644,925	564,658	1,508,495
Federal Rail Assistance	336,998	73,371	1,107,664	0	379,508
Total	\$490,449	\$1,742,239	\$7,752,589	\$1,129,316	\$2,778,648

Notes: Data in 1986 constant dollars.

^{1/} Prior to 1983 the program only consisted of federal grants.

^{2/} Includes municipalities and private industry.

^{3/} After 1981 Rail Subsidy Fund was exhausted, a 1985 audit revealed that a number of Conrail lines were profitable. This money was returned to the Federal Government and then returned to New Jersey.

Sources: NJ Department of Transportation, Office of Freight, and Hammer, Siler, George Associates.

Rail Freight Services

New Jersey's rail freight network consists of 1,133 route miles the majority of which is operated by the Consolidated Rail Corporation (Conrail). Conrail was created by federal legislation in 1976, in the wake of the bankruptcy of the Penn Central and six other northeastern rail carriers. Federal funds recapitalized the physical plant and offset deficits. The legislation also assigned Conrail the responsibility to develop a viable and profitable rail freight system that eventually could be returned to private hands. Conrail has continued to "rationalize" the rail system it inherited, and to modernize that which supported profitable rail freight operations. As a result, New Jersey's active rail freight network has been reduced from the 1,518 route miles conveyed in 1976 to the 1,133 miles which now exists.

The New Jersey Department of Transportation became involved in state rail delivery as Conrail abandoned lines. DOT may acquire abandoned lines which are needed by local industry, or may renovate key lines to improve or maintain a certain level of service.

Capital Expenditure Trends. Between 1983-1986 an average of \$2.8 million was spent annually on rail projects throughout the state (see Table 12). Three revenue sources were used during this period -- state, local, and federal. The largest contributor was local, which includes both municipalities and private industry.

Table 13. RAIL FREIGHT ASSISTANCE CAPITAL REVENUE/NEED PROJECTIONS, NEW JERSEY, 1988-2010

Funding Source	1988	1989	1990	1991	1992	1993	1988-1993		1994-2010	
							Total Expend	Avg Annual Expend	Total Expend	Avg Annual Expend
State Rail Assistance ^{1/}	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000	\$12,000,000	\$2,000,000	\$34,000,000	\$2,000,000
Local Funding Sources ^{2/}	1,428,571	600,000	428,571	1,111,377	1,111,377	1,111,377	7,219,844	1,203,307	18,893,000	1,111,353
Federal Rail Assistance	0	0	0	0	0	0	0	0	0	0
Total	\$3,428,571	\$2,600,000	\$2,428,571	\$3,111,377	\$3,111,377	\$3,111,377	\$19,219,844	\$3,203,307	\$52,893,000	\$3,111,353

Notes: Data in 1986 constant dollars.

^{1/} Projected funding for 1991-2010 based on department 1987-1990 annual average estimates.

^{2/} Includes municipalities and private industry.

Sources: NJ Department of Transportation, Office of Freight and Hammer, Siler, George Associates.

Projected Capital Expenditures/Need. The projected expenditures presented in Table 13 originate from the State Rail Plan drafted in 1985 in which expenditures were projected for the period of 1987-1990. Under this scenario federal rail assistance is phased out and is not anticipated to be reestablished. Local funding sources are projected to average \$1.1 million (the annual average funding projections under the 1987-1990 capital program) and State funding is projected to remain at \$2 million per year. Under this scenario \$19.2 million will be needed and spent during 1988-1993 and \$52.9 between 1994-2010.

Departmental personnel indicated that this continuous funding scenario would meet future need. It should be noted that this scenario assumes that significant rail acquisition will not be needed and that the existing rehabilitation program will not expand.

Table 14. DELAWARE RIVER PORT AUTHORITY, BRIDGE/PATCO USE TRENDS, NEW JERSEY, 1981-1986

Facility	1981	1982	1983	1984	1985	1986	1981-1986	
							Average Annual Change Actual	Percent
Bridges 1/								
Ben Franklin	23,882,849	24,433,182	25,056,859	27,130,042	29,608,215	28,159,966	855,400	3.8%
Walt Whitman	34,476,464	34,497,647	35,568,899	35,887,574	34,472,524	37,719,224	648,600	1.9%
Commodore Barry	5,667,404	5,871,879	6,163,895	6,809,502	7,618,988	7,660,532	398,600	7.0%
Betsy Ross	4,730,866	4,847,902	5,461,181	5,871,725	5,958,963	7,159,387	485,700	10.3%
Subtotal	68,757,583	69,650,610	72,250,834	75,698,843	77,658,690	80,699,129	2,388,300	3.5%
Patco Rail 2/	11,263,926	11,132,825	10,670,945	10,211,589	10,230,659	10,367,374	(179,300)	-1.8%
Total	80,021,509	80,783,435	82,921,779	85,910,432	87,889,349	91,066,503	2,209,000	2.8%

1/ Vehicular traffic.
2/ Passengers.

Sources: Delaware River Port Authority and Hamer, Siler, George Associates.

Delaware River Port Authority

The Authority began in 1919 as a bi-state commission of Pennsylvania and New Jersey. It owns and operates four bridges (Walt Whitman, Benjamin Franklin, Betsy Ross, and Commodore Barry) which link southwestern Pennsylvania and southern New Jersey. It also operates the Lindenwold-Philadelphia Rapid Transit Line (PATCO). The Authority is self-sustaining, operating without tax funds. It supports its activities with revenues from its existing facilities.

Facility Use Trends and Projections. Between 1981-1986 vehicular traffic on all four bridges increased by 2.4 million vehicles per year or 3.5 percent (see Table 14). The PATCO rail line, however, saw annual ridership decline over this period by 179,300 passengers or 1.6 percent.

Table 15. DELAWARE RIVER PORT AUTHORITY, BRIDGE/PATCO USE PROJECTIONS, NEW JERSEY, 1987-2010

Facility	1987	1988	1989	1990	1991	1992	1993	1987-1993		1994-2000	
								Average Annual Use	Total Use	Average Annual Use	Total Use
Bridges ^{1/}	82,838,000	85,903,000	88,119,000	90,745,000	93,449,000	96,234,000	99,102,000	92,259,000	553,552,000	99,102,000	1,684,734,000
PATCO Rail ^{2/}	10,518,000	11,015,800	11,181,000	11,349,000	11,519,000	11,692,000	11,867,000	11,437,000	68,623,800	13,524,000	229,915,000
Total	93,356,000	96,918,800	99,300,000	102,094,000	104,968,000	107,926,000	110,969,000	103,696,000	622,175,800	112,626,000	1,914,649,000

^{1/} Vehicles.
^{2/} Passengers.

Sources: Delaware River Port Authority and Hamer, Siler, George Associates.

In 1985 the Authority evaluated current bridge and rail usage and made projections. They projected annual vehicle usage amongst the four bridges to increase by 2.65 percent, 3.7 percent, and 2.58 percent for 1987, 1988, and 1989 respectively. Total vehicular traffic on all bridges during 1988-1993 is projected to be 553 million (see Table 15). Because the bridges have a finite capacity, the usage level for 1994-2010 is projected to continue at the 1993 annual level of 99.1 million vehicles.

Beyond 1988, PATCO ridership is projected to increase by 1.5 percent annually. This projected annual ridership increase rate is projected to continue out to the year 2010.

Table 16. DELAWARE RIVER PORT AUTHORITY, CAPITAL REVENUE/NEED PROJECTIONS, NEW JERSEY, 1988-2010

<u>Expenditure/Usage</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1988-1993</u>		<u>1994-2010</u>	
							<u>Total</u>	<u>Avg Annual</u>	<u>Total</u>	<u>Avg Annual</u>
Total bridge use	85,903,000	88,119,000	90,745,000	93,449,000	96,234,000	99,102,000	553,552,000	92,259,000	1,684,734,000	99,102,000
Total PATCO use	11,015,800	11,181,000	11,349,000	11,519,000	11,692,000	11,867,000	68,623,800	11,437,000	229,915,000	13,524,000
Subtotal	96,918,800	99,300,000	102,094,000	104,968,000	107,926,000	110,969,000	622,175,800	103,696,000	1,914,649,000	112,626,000
Total capital expenditures	\$33,575,000	\$14,800,000	\$15,250,000	\$9,500,000	\$17,900,000	\$18,500,000	\$109,525,000	\$18,254,000	\$260,251,000	\$15,309,000
Expenditure per vehicle/passenger	\$0.346	\$0.149	\$0.149	\$0.091	\$0.166	\$0.167	\$0.176	\$0.176	\$0.136	-

Notes: Data in constant 1986 dollars. Data provided by Authority for 1988-2000.

Sources: Delaware River Port Authority and Hamer, Siler, George Associates.

The Authority has projected capital expenditures between 1988-2000. These expenditures were ratioed to projected usage levels and the results are presented in Table 16. Capital expenditures per vehicle/passenger are projected to fluctuate during 1988-2000. On average, during 1988-1993, \$0.176 of capital expenditures are expected to be spent for every vehicle/passenger. During the 1994-2000 this figure is projected to decrease to \$0.136 and projected to continue at this amount to 2010. Total capital expenditures during 1988-1993 are projected to total \$109.5 million and during 1994-2010 they are projected to total \$260.3 million.

Table 17. DELAWARE RIVER AND BAY AUTHORITY, RATIO OF CAPITAL EXPENDITURE TO FACILITY USAGE, NEW JERSEY, 1981-1985

Expenditure/Usage	1981	1982	1983	1984	1985	1981-1985	1981-1985		
						Annual Avg Expend/Use	Annual Actual	Change Percent	
Delaware Memorial Bridge									
Capital expenditure 1/	\$1,562,934	\$1,755,100	\$1,838,142	\$1,872,066	\$2,391,544	\$1,883,957	\$165,700	10.6%	
Annual usage	18,348,024	18,806,960	19,633,074	20,919,461	21,963,896	19,934,283	723,200	3.9%	
Expenditure per user	\$0.085	\$0.093	\$0.094	\$0.089	\$0.109	\$0.095	****	****	
Cape May-Lewes Ferry									
Capital expenditure 1/ 2/	\$0	\$0	\$74,357	\$55,761	\$25,272	\$51,797	****	****	
Annual usage	775,399	824,485	860,300	878,089	921,026	851,860	29,100	3.8%	
Expenditure per user	\$0.000	\$0.000	\$0.086	\$0.064	\$0.027	\$0.061	****	****	
Total	\$1,562,934	\$1,755,100	\$1,912,499	\$1,927,827	\$2,416,816	\$1,935,754	\$170,800	-	

Notes: Data in 1986 constant dollars.

1/ Derived in Appendix Table E-1.

2/ Annual average calculated for 1983-1985 period. Actual and percent change from 1983-1985 not calculated because capital investments (unlike the bridge) are not made on an annual basis.

Sources: Delaware River and Bay Authority and Hamner, Siler, George Associates.

Delaware River and Bay Authority

The Authority was created when the States of Delaware and New Jersey entered into a pact in 1961 for the purpose of planning, financing, constructing and operating river crossings with appropriate connections between Delaware and Pennsylvania. The Authority currently operates the Delaware Memorial Bridge and the Cape May-Lewes Ferry.

Trends in Capital Expenditures and Facility Usage. Table 17 highlights the relationships of capital expenditure trends to facility usage for both the bridge and ferry. During 1981-1985 an average of \$1.9 Billion was spent annually on bridge capital expenditures. For that same period an average of 19.9 million vehicles crossed the bridge annually. On average, \$0.095 of capital expenditures were made for each vehicle crossing. During this same period an average of \$0.061 of capital expenditures was spent per ferry passenger.

Table 10. DELAWARE RIVER AND BAY AUTHORITY CAPITAL REVENUE/NEED PROJECTIONS NEW JERSEY, 1988-2010

Expenditure/Usage	1988	1989	1990	1991	1992	1993	1988-1993	1988-1993	1994-2010	1994-2010
							Avg Annual Revenue/Need	Total Revenue/Need	Avg Annual Revenue/Need	Total Revenue/Need
Delaware Memorial Bridge										
Capital expenditure 1/	\$4,800,000	\$3,350,000	\$6,000,000	\$3,300,000	\$2,781,000	\$2,786,000	\$23,017,000	\$3,836,167	\$56,100,000	\$3,300,000
Annual usage	25,208,600	26,393,400	27,317,200	28,136,700	28,840,100	28,897,800	164,793,800	27,465,633	581,804,500	34,223,800
Expenditure per user	\$0.190	\$0.127	\$0.220	\$0.117	\$0.096	\$0.096	****	****	\$0.096	****
Cape May-Lewes Ferry										
Capital expenditure 1/	\$4,870,000	\$4,100,000	\$2,600,000	\$3,800,000	\$30,000,000	\$96,000	\$45,466,000	\$7,577,667	\$1,782,000	\$104,800
Annual usage	934,900	939,600	944,300	949,000	1,041,000	1,133,000	5,941,800	990,300	20,965,300	1,233,300
Expenditure per user	\$5.209	\$4.364	\$2.753	\$4.004	\$28.818	\$0.085	****	****	\$0.085	****
Total Expenditures	\$9,670,000	\$7,450,000	\$8,600,000	\$7,100,000	\$32,781,000	\$2,882,000	\$68,483,000	\$11,413,834	\$57,882,000	\$3,407,800

Notes: Data in 1986 constant dollars.

1/ 1987-1991 projected expenditures as reported in Authority's Five Year Program (10/86).

Sources: Delaware River and Bay Authority and Hamner, Siler, George Associates.

Projected Capital Expenditures. Between 1981-1985 traffic on the bridge increased by 3.9 percent annually. The bridge can accommodate forecasted growth according to Authority personnel. This 3.9 percent growth rate is projected to gradually taper off to a one percent annual growth rate during 1994-2010 (see Table 18).

The Authority prepared a five-year capital program covering the 1987-1991. Beyond this period capital expenditures are forecasted to decrease per vehicle crossing to \$.096, a ratio similar to that witnessed during 1981-1985. The decrease reflects the Authority's ambitious 1988-1991 bridge renovation program and the fact that this type of renovation will not be needed again prior to the horizon year of 2010.

Capital expenditures associated with the ferry service are derived using a different set of assumptions. Based on discussions with Authority personnel, the existing five boat fleet in 1986 accommodated 921,026 passengers or 184,000 passengers per boat. A slight Increase in ridership (0.05 percent annually) is projected for 1988-1991 as Cape May continues to become a destination oriented tourist spot. A new ferry is scheduled to be added in 1992 and it is assumed that in two years this ferry will carry 184,000 passengers per year. Slight Increases (0.05 percent annually) are projected in ridership and during 1994-2010 the ferrys are projected to accommodate a total of 21 million passengers. The capital expenditures associated with the ferrys are projected to average \$0.085 per passenger during 1994-2010. Between 1981-1985 the average capital costs associated per passenger per ferry was \$0.0122. The addition of the new ferry will Increase this to \$0.074. This amount has been Increased by 15 percent to account for the new terminal facility and projected increased upkeep costs.

Between the bridge and ferry service, the Authority is forecasted to spend \$68.5 million during 1988-1993 and \$57.9 Billion between 1994-2010.

Sewerage

The State's wastewater collection and disposal systems are highly decentralized; Made up of several hundred local and regional facilities. The extent of the system was described by the State of New Jersey County »and municipal Government Commission <n their 1984 'infrastructure report:

There Is not a complete Inventory presently Available of the total miles of local wastewater collections systems in New Jersey. However, the size and the overall capital investment represented by these systems is considerable, based. on the fact that approximately 1.3 billion gallons of liquid waste are treated in New Jersey each day, and that these wastes oust be transported to treatment facilities by some sort of collector system.

While an Incomplete picture, It is possible to obtain some Idea of the size of the local collection systems ---- The Department of Environmental Protection estimates that 30 percent of the state's population is served by some type of wastewater treatment facility and that there are approximately 450 publicly owned treatment plants around the state.

Collection and disposal systems are generally eligible for Federal Government Wastewater Construction Grants Program providing a share of the capital costs. The state program is administered out of the Department of Environmental Protection's Water Resources Division. Their primary function is financing and regulatory as opposed to operational. In addition, the Passaic Valley Sewerage Authority is a key provider of sewerage capacity in the state and *ill be discussed in this section.

State Sewerage Program

Not only is the state • »major financial contributor in the construction of wastewater disposal facilities, but 3EP officials help to coordinate the planning, and permitting of facilities.

Projected Revenue. During the past 20 years funding for Wastewater disposal systems originated from three sources -- state, federal, and local. State funding originated from the general fund. However, as federal funding became more scarce the State expanded its program. Table 19 summarizes projected future revenue sources and amounts.

As shown, federal funding is projected to dry-up after 1994. The state is projected to continue its moderate level of funding out of the general fund. The local contribution is projected to run through 1991. Two new state programs are proposed - Wastewater Treatment Trust and Wastewater Treatment Trust Fund. The Trust will be operated by an Independent authority which will have bonding capabilities. Although these programs are not proposed to be refunded after 1990, it is assumed that with the absence of direct federal and local funds that refunding will need to occur every third year. These funding sources are projected to generate \$1.3 billion during 1988-1993 and \$703 million during 1994-2010.

Table 19. STATE SEWERAGE CAPITAL REVENUE PROJECTIONS, NEW JERSEY, 1988-2010

Funding Source	1988	1989	1990	1991	1992	1993	1988-1993		1994-2010	
							Total Revenue	Avg Annual Revenue	Total Revenue	Avg Annual Revenue
Sewage facility construction 1/										
General fund	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$90,000	\$15,000	\$15,000	\$882
Federal 2/	103,896	52,194	52,440	104,881	79,277	53,549	446,237	55,282	27,698	1,629
Local 3/	67,000	67,000	67,000	67,000	0	0	268,000	44,667	0	0
Subtotal	\$185,896	\$134,194	\$134,440	\$186,881	\$94,277	\$68,549	\$804,237	\$114,949	\$42,698	\$2,511
Wastewater Treatment Trust 4/										
Bond	\$150,000	\$25,000	\$25,000	\$50,000	\$0	\$0	\$250,000	\$41,667	\$300,000	\$17,647
Loan repayments	0	0	0	990	1,155	1,320	3,465	578	41,250	2,426
Subtotal	\$150,000	\$25,000	\$25,000	\$50,990	\$1,155	\$1,320	\$253,465	\$42,244	\$341,250	\$20,074
Wastewater Treatment Trust Fund 5/										
Bond	\$150,000	\$0	\$0	\$50,000	\$0	\$0	\$200,000	\$33,333	\$300,000	\$17,647
Loan repayments	0	0	0	543	543	543	1,629	272	19,548	1,150
Subtotal	\$150,000	\$0	\$0	\$50,543	\$543	\$543	\$201,629	\$33,605	\$319,548	\$18,797
Total	\$485,896	\$159,194	\$159,440	\$288,414	\$95,975	\$70,412	\$1,259,331	\$190,798	\$703,496	\$41,382

Notes: Data in thousands of constant 1986 dollars.

1/ Total expenditure reported in August 1986 Annual Capital Improvement Plans as assumed by the NJ Commission on Capital Budgeting and Financing. 2/ Derived in Appendix Table F-1. 3/ After the federal grant expires in 1990, local municipalities share contribution is assumed to reduce to zero since all new funding will be in the form of loans, as in 1985 Trust totals. This principal will be used by the authority to float \$3 million of bonds. HP personnel estimate that \$1 million of financing will be spent in 1988-1990; the remainder over the 1969-1990 period. Loan repayments calculated in Appendix Table F-2. 4/ Loan repayments calculated in Appendix Table F-3.

Sources: K) Commission on Capital Budgeting and Financing; Environmental Protection Agency and Manner, Slier, Geosje Associates.

Projected Capital Need. Every two years the EPA asks states to submit a list of public wastewater disposal project applications for federal funding consideration. Projects are submitted based upon three scenarios: 1) 1986 publicly-owned wastewater treatment needs eligible for federal financial assistance under the Clean Water Act, 2) maximum eligible publicly-owned wastewater treatment needs eligible for federal financial assistance under the Clean Water Act, and 3) design year (2005) needs for publicly-owned wastewater treatment works. The third scenario is used here because it represents needs to the longest horizon year of 2005.

Although this scenario does not represent total state need (Independent regional and private systems do not submit projects) it does represent most needs. In addition, some states like New Jersey, submit proposals which will not qualify for federal funding. This makes the EPA report, in New Jersey's case, more representative of total need.

Table 20 highlights this EPA application process for New Jersey. During 1986-2005 total state need is projected to be \$4.4 billion or \$221 million-per year. The largest cost items are secondary treatment facilities and combined sewers.

Table 20. STATE WASTEWATER DISPOSAL SYSTEM NEED PROJECTIONS, NEW JERSEY, 1986-2005

Facility Type	EPA Estimates 1/	State Estimates 2/	1986-2005	
			Avg Annual Need	Total Need
Treatment Plants				
Secondary treatment	\$1,531,000	\$200,000	\$1,731,000	\$87,000
Advanced treatment	188,000	****	188,000	9,000
Subtotal	\$1,719,000	\$200,000	\$1,919,000	\$96,000
Collector/interceptor sewers				
Infiltration inflow correction	\$225,000	****	\$225,000	\$11,000
Collector pipe	328,000	****	328,000	16,000
Interceptor pipe	504,000	****	504,000	25,000
Replacement/rehab of sewers	104,000	****	104,000	5,000
Subtotal	\$1,161,000	\$0	\$1,161,000	\$57,000
Combined sewers/storm drains	\$767,000	\$600,000	\$1,367,000	\$68,000
Total	\$3,647,000	\$800,000	\$4,447,000	\$221,000

Notes: Data In thousands of 1986 constant dollars.

1/ EPA's assessment of needs to satisfy the design year (2005) population for facilities which meet the established documentation criteria.

2/ State estimates over and above that qualifying for federal funding.

Sources: New Jersey Department of Environmental Protection -- Division of Water Resources (Construction Grants Administration); Environmental Protection Agency; and Hammer, Slier, George Associates.

Projected Revenue vs. Need. During 1988-1993 need is projected to exceed revenue by \$509 million. This deficit situation is projected to continue and amount to \$3 billion during 1994-2010. Project needs are estimated at over \$5.5 billion for the 22-year period.

Table 21. STATE WASTEWATER CAPITAL REVENUE/NEED
PROJECTIONS, NEW JERSEY, 1988-2010

<u>Need/Revenue</u>	<u>1988-1993</u>	<u>1994-2010</u>
Revenue 1/	\$1,259,331	\$731,080
Less need 2/	1,768,000	3,757,000
Surplus/(deficit) gap	(\$508,669)	(\$3,025,920)

Notes: Data in thousands of 1986 constant dollars.

1/ Derived in Table 19.

2/ Derived in Table 20. The EPA need assessment presented in Table 20 only covers the period 1986-2005. To obtain a need assessment for the remaining five years out to the horizon year of 2010, average annual need between 1986-2005 was trended for the period 2006-2010.

Sources: New Jersey Department of Environmental Protection, Division of Water Resources (Construction Grants Administration); and Hanfner, Siler, George Associates.

Passaic Valley Sewerage Commissioners

In 1902, the Passaic Valley Sewerage Commissioners (PVSC) was formed as an agency of the state to reduce pollution in the Passaic River and its tributaries. The organization is one of the oldest and largest in the United States. The PVSC operates one main facility which services a heavily industrialized 100-square-mile section of northern New Jersey. Within this service area in 1983, there were 380,000 residential units, 360 large apartment buildings, 2,205 large commercial institutions, and 350 major industries.

Capital Expenditure Trends. PVSC received funding from the state, federal, and local authorities to finance the construction of the secondary treatment facilities (See Table 22). The PVSC, however, funds all operating and capital maintenance expenditures out of operating revenue. During 1977-1987 PVSC spent a total of \$455 million or \$43.9 million annually. Only \$34 million was spent on capital maintenance, the remainder went to construction of the secondary treatment facilities.

Table 22. PASSAIC VALLEY SEWERAGE COMMISSIONERS REVENUE TRENDS, NEW JERSEY, 1977-1987

Funding Source/Project	1977	1978	1979	1980	1981	1982	1983
	Secondary facility Construction 1/						
Federal	\$12,814,023	\$15,661,584	\$47,459,346	\$47,459,346	\$47,459,348	\$34,170,728	\$28,475,607
State DEP	1,474,100	1,801,775	5,459,925	5,459,925	5,459,925	3,931,146	3,275,955
Municipalities	4,611,536	5,636,322	17,079,765	17,079,765	17,079,765	12,297,430	10,247,858
Subtotal	\$18,899,739	\$23,099,681	\$69,999,036	\$69,999,036	\$69,999,038	\$50,399,304	\$41,999,420
Capital maintenance 2/ 3/	\$952,314	\$692,089	\$3,377	\$222,346	\$3,623,434	\$4,794,482	\$3,794,715
Total	\$19,852,053	\$23,791,770	\$70,002,413	\$70,221,382	\$73,622,472	\$55,193,786	\$45,794,135
					1980-1987		
					Total	Avg Annual	
					Revenue	Revenue	
Secondary facility Construction 1/							
Federal	\$22,780,485	\$11,390,243	\$11,390,243	\$5,695,122	\$284,756,075	\$27,194,205	
State DEP	2,620,764	1,310,382	1,310,382	655,191	32,759,550	3,128,537	
Municipalities	8,198,287	4,099,143	4,099,143	2,049,572	102,478,586	9,786,705	
Subtotal	\$33,599,536	\$16,799,768	\$16,799,768	\$8,399,885	\$419,994,211	\$40,109,447	
Capital maintenance 2/ 3/	\$9,723,095	\$5,380,283	\$5,684,920	NA	\$34,871,055	\$3,768,749	
Total	\$43,322,631	\$22,180,051	\$22,484,688	\$8,399,885	\$454,865,266	\$43,878,196	

Notes: Data in 1985 constant dollars. Nft mtans data not available.

1/ See Appendix Table 6-1.

2/ Asswves Interceptor lines are financed out of operatlnr) revenues. 3/ Large Increase in 1961 due to new treatmnt plant. 4/ Wet age expenditures only for 1977-1986 period for capital maintenance.

Sources: Passaic Valley Sewerage Commissioners ark! Hamer, Slier, George Associates.

Capital Expenditure/Need Projections. PSVC personnel Indicated that future capital expenditures Would be used to repair and maintain the treatment facility, repair the Interceptor, and construct an •incinerator. It should be noted that the Incinerator Is not an approved capital expenditure and Us construction Is speculative at this time. Table 23 summarizes these expenditures for the period 1988-2010. During J988-1993, PVSC personnel project capital expenditures it \$42 million, or \$12 million annually. During 1994-2010 expenditures are projected to total \$301 million and average \$18 million annually.

Table 23. PASSAIC VALLEY SEWERAGE COMMISSIONERS CAPITAL REVENUE/NEED PROJECTIONS, NEW JERSEY, 1988-2010

Funding Source	1988	1989	1990	1991	1992	1993	1988-1993		1994-2010	
							Total Revenue/Need	Avg Annual Revenue/Need	Total Revenue/Need	Avg. Annual Revenue/Need
Repairs and Maintenance 1/	\$5,500,155	\$5,500,155	\$5,500,155	\$5,500,155	\$5,500,155	\$5,500,155	\$33,000,929	\$9,428,837	\$25,500,000	\$1,500,000
Interceptor	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	9,000,000	2,571,429	25,500,000	1,500,000
Incinerator	0	0	0	0	0	0	0	0	250,000,000	NA
Total	\$7,000,155	\$7,000,155	\$7,000,155	\$7,000,155	\$7,000,155	\$7,000,155	\$42,000,929	\$12,000,265	\$301,000,000	\$17,706,000

Notes: Data in 1986 constant dollars.

1/ Represents 1981-1986 average annual expenditures.

Sources: Passaic Valley Sewerage Commissioners and Hamer, Siler, George Associates

Water Supply and Distribution

New Jersey's water supply system is diverse and interrelated. More than 500 purveyors, both public and private, operate within the State. Approximately 75 percent of the water supplied by these systems is the responsibility of the 25 largest purveyors.

The major coordinating agency is the Division of Water Resources (OWR) operating out of the State's Department of Environmental Protection. The primary responsibilities of DWR were described in the 1983 New Jersey Water Supply Handbook authored by the State of New Jersey County and Municipal Government Study Commission:

The powers currently vested in the DWR have been derived from a number of sources. In addition to succeeding to the authority of the former Division's of Water Policy and Supply, the Division authority concerning various aspects of water resource management has been supplemented by the adoption of subsequent legislation and administrative reorganization within the DEP. The DWR has general responsibility for dams, drainage basins, flood control, flood plains, industrial pretreatment, landfills, NJPDES surface and groundwater discharge permits, portable water systems, septic tanks, sewerage systems, shellfish harvest areas, sludge management, soil conservation and water conservation, stream encroachment, storm water management, water supply planning and allocation and well permits. To perform its responsibilities at the present time, the Division is organized into the following component units: Construction Grants Administration, Enforcement Element, Monitoring and Planning Element, Water Quality Management Element, Water Supply and Watershed Management Administration and the New Jersey Geological Survey Element.

Both surface water and groundwater resources are used extensively in the provision of water throughout the state. Sources include reservoirs, river intakes, well systems, and/or a combination of these. The southern portion of the northern area is dependent upon surface waters. In the densely populated northeast, a complex but inadequate network of interconnections exists for transfer of supplies.

Capital Expenditure Needs

In 1982, the State of New Jersey County and Municipal Government Study Commission surveyed local engineers and private surveyors about the condition of their water supply and distribution system. The survey revealed annual needs (in 1986 constant dollars) among public surveyors to be \$70.5 million and \$22.4 million amongst private surveyors. The private surveyors require less investment because they were better capitalized. This annual projection has been carried out to the horizon year of 2010. During 1988-1993, total projected capital need for both types of systems is \$558 million and during 1994-2010 total need is projected to be \$1.6 billion (See Table 24). Because this survey took place at the local level, it is felt to be a fairly good representation of total need throughout the state.

Table 24. STATE WATER SUPPLY CAPITAL REVENUE/NEED PROJECTIONS, NEW JERSEY, 1988-2010

<u>Need/Revenue</u>	<u>1988-1993</u>	<u>1994-2010</u>	<u>1988-2010</u>	
			<u>Total Revenue/Need</u>	<u>Annual Average Revenue/Need</u>
Water distribution need				
Public purveyor	\$423,600,000	\$1,200,200,000	\$1,623,800,000	\$70,600,000
Private purveyor	134,400,000	380,800,000	515,200,000	22,400,000
Subtotal	\$558,000,000	\$1,581,000,000	\$2,139,000,000	\$93,000,000
Less scheduled water supply expenditures				
State/private 1/	\$95,592,000	\$35,000,000	\$130,592,000	\$5,678,000
NJ Water Supply Authority 2/	62,115,000	103,730,000	165,845,000	7,211,000
North Jersey Water Supply Comm. 3/	1,000,000	0	1,000,000	43,000
Subtotal	\$158,707,000	\$138,730,000	\$297,437,000	\$12,932,000
Less proposed NJDEP loan programs	\$168,000,000	\$476,000,000	\$644,000,000	\$28,000
Surplus/(deficit) gap	(\$231,293,000)	(\$966,270,000)	(\$1,197,563)	(\$24,040,000)

Notes: Data in 1986 constant dollars.

- 1/ Derived in Appendix Table H-1.
- 2/ Derived in Appendix Table H-2.
- 3/ Derived in Appendix Table H-3.

Sources: NJ Department of Environmental Protection; NJ Water Supply Authority; North Jersey Water Supply Commission; and Hammer, Siler, George Associates.

Projected Capital Revenue

The Division of Water Resources has prepared *n Action Program for 1985-1989. These are projects where funding »and Implementation 1s scheduled. In addition, the Division has listed potential actions or projects spanning the period 1985-2020. This long range action program only describes potential projects and does not provide costs or assess the projects cost/benefit. These two lists were combined with cost estimates acquired from Division personnel when available (see Appendix Table H-i. Should these projects be Implemented they would reduce the total projected need by \$130.6 million between 1983-2010.

The New Jersey Water Supply Authority 1s Implementing several large scale projects -- the D & R, Spruce Run, Round Valley Reservoirs and the Manasquan Reservoirs. Based on discussions with Authority personnel and their 1987-1991 capital program, these projects are assumed to be constructed over the 1988-2010 period (see Appendix Table H-2). In addition to these projects, Authority personnel were asked to speculate as to the need for future reservoirs. They Indicated that 1t is likely that the D i~R, Sprues Run, and Round Valley Reservoirs will run out of capacity sometime before the horizon year because they service^ three large growth corridors: U.S. Routes 1, 30 and Interstate routes 287/78. Proposals include construction of two new reservoirs (Six Mile Run and Confluence) and an increase of the dam wall height at Round Valley by 25 feet. Based upon recently completed reservoirs, the projected cost of the two new reservoirs, having a capacity to deliver 79 million gallons per day. Is \$69.7 million. Cost estimates associated with modification of dam walls at Round Valley cannot be Hade at this time. It 1s assumed that revenue for the two new reservoirs will be obtained.

The North Jersey District Water Supply Commission has plans to rehabilitate piping associated with the North Wanaque Reservoir prior to 1993. Officials indicate that five miles of pipe will be relined costing \$1 Billion (see Appendix Table H-3). Because the dam walls and surge tanks have recently been renovated, no additional capital expenditures are projected prior to the horizon year of 2010.

Given the implementation of these projects, water supply need will be decreased by 5158.7 million during 1988-1993 and \$138.7 million during 1994-2010. This, however, will still leave a deficit of \$231 million in 1988-1993 and \$966.3 million in 1994-2010, or \$1.2 billion during the period.

Flood Control and Storm Water Management

Apart from the flood plain mapping program, flood control and storm water management have not elicited large amounts of funding over the years. The state began to take a more active role in flood control in 1973 when it provided \$22 million of state flood control grants, and \$3 million for flood control planning under the Emergency Flood Control Bond Act. During the first four years of this program, 27 projects costing \$16 million were approved.

Flood control and storm water management is implemented by local governments via two different techniques -- flood control and flood plain management. Flood control addresses an existing or known flooding problem, and includes the design, construction, and maintenance of facilities to channel, divert, or store storm water runoff to allow drainage to occur in a planned and controlled rate. Flood plain management is the technique by which land uses in the flood plain are controlled and regulated to prevent or reduce damage to property and

threats to lives during times of major flooding. In addition, flood plain management plans are designed to encourage the natural control of flooding problems by controlling development on upstream slopes and limiting the amount of ground covered by impermeable materials.

The Division of Water Resources, operated out of the Department of Environmental Protection, oversees the flood control and storm water management program for the entire state. Responsibilities include providing financing, encouraging master planning, and regulating construction or program implementation.

Storm water management is now becoming a more important issue as states are attempting to control both flooding and non-point-source pollution by using retention basins and natural aquifers. In the coming years it is likely that new state programs will be created to help municipalities and counties utilize these techniques to their fullest benefits. Flood control/storm water management need will be compared against revenues to determine future surplus/deficit situations.

Projected Capital Revenue

A listing of New Jersey projects to be funded by the Federal Government can be found in Appendix Table 1-1. It should be noted that this legislation does not appropriate funding but does authorize the U.S. Army Corp Engineers to proceed with planning, feasibility studies, and cost estimating. Based upon discussions with Water Supply and Watershed Element personnel, it is likely that the projects will be constructed but the exact year is uncertain. Because of the distant

horizon year of 2010, It Is assumed that these projects Mill be constructed during- this planning period.

Federal appropriations for New Jersey projects derived In Appendix Table 1-1 are brought forth Into Table 25. The Hazard Dam Repair Program, Instituted by DEP, 1\$ projected to continue to 2010. Funding under the Emergency Flood Control Act is projected to dry-up during the 1988-1994 period. Mater Supply »and Watershed personnel Indicated that this program will likely be replaced with another program to deal with the storm water management Issue, but Its size and timing are not predictable.

Revenue from county and municipal agencies Is projected to total \$170 million during 1988-1993 and \$480 million during 1994-2010. Future expenditures are based upon 1982 expenditures as reported in the Mew Jersey County and Municipal Government Study report on Infrastructure. These expenditures are projected to be \$331 Billion during 1988-1993 \$1.0 and billion during 1994-2010.

Table 25. STATE FLOOD CONTROL/STORM WATER MANAGEMENT CAPITAL REVENUE PROJECTIONS, NEW JERSEY, 1988-2010

<u>Project Sponsor/Project Name</u>	<u>1988-1993</u>		<u>1994-2010</u>	
	<u>Total Expend</u>	<u>Avg Annual Expend</u>	<u>Total Expend</u>	<u>Avg Annual Expend</u>
Federal 1/ State	\$51,300,000	\$8,550,000	NA	NA
Contributions on federal projects 1/ Hazard dam repair program 2/ 1978 Flood Control Act 3/ Subtotal	70,800,000 30,000,000 9,000,000 \$109,800,000	11,800,000 5,000,000 1,500,000 \$18,300,000	NA NA 0 NA	NA NA 0 NA
County/Local	169,572,000	28,262,000	480,445,000	28,262,000
Total	\$330,372,000	\$55,112,000	\$1,009,800,000 4/	\$59,400,000

Notes: Data In 1986 constant dollars.

1/ Derived In Appendix Table 1-1.

In 1988-1990 Capital Improvement Program assembled by the NJDEP projected funding for this program at \$5 million annually. It is assumed that the program continues at this level to the year 2010.

3/ DEP Capital Improvement Program calls for \$3 million to be spent annually from 1988-1990. No funds have been allocated for flood control beyond this period and it is

assumed that no funds will be allocated for this purpose. 4/ Assume future revenue will equal future need.

Sources: NJ Department of Environmental Protection, Water Supply and Watershed Management Element "The NJ Statewide Flood Control Master Plan, 1985"; and Hammer, Slier, George Associates.

Capital Revenue vs. Need

Capital revenues derived in Table 25 are brought forth into Table 26 and compared against projected need to determine if a surplus or deficit situation will exist. According to the County and Municipal Study Commission, total flood control/storm water management need in 1982 was \$59.4 million (1986 constant dollars). Because this survey was taken at the smallest planning unit level, the municipality, it is felt to be a reasonable estimate of total state need. Deficits of \$25.7 million during 1988-1993. During 1994-2010, revenues are projected to match need. This assumes implementation of projects introduced in the federal authorization bill H.R.G.

Table 26. STATE FLOOD CONTROL/STORM WATER MANAGEMENT REVENUE/
NEED PROJECTIONS NEW JERSEY, 1988-2010

Funding Source	1988-1993		1994-2010	
	Total Expend	Avg Annual Expend	Total Expend	Avg Annual Expend
Expenditures				
Federal 1/	\$51,300,000	\$8,550,000	NA 4/	NA
State 1/	109,800,000	18,300,000	NA	NA
County/local 2/	169,572,000	28,262,000	480,454,000	28,262,000
Subtotal	\$330,672,000	\$55,112,000	\$1,009,800,000	\$59,400,000
Less projected need 3/	\$356,400,000	\$59,400,000	\$1,009,800,000	\$59,400,000
Revenue Surplus/ (deficit)	(\$25,728,000)	(\$4,288,000)	0	0

Notes: Data In 1986 constant dollars. Derived In Table 25.

1 From County and Municipal Study Commission.
2 NJ Municipal Government Study Commission.

3 It Is assumed that the total dollar amount of projects approved under H.R.G. will not exceed total need.

Sources: NJ Department of Environmental Protection -- Water Supply and Watershed Management Element; State of New Jersey County and Municipal Government Study Commission, "New Jersey local Infrastructure: An Assessment of Needs"; and Hammer, Slier, George Associates.

Solid Waste

The legislative framework for solid waste management and planning in New Jersey is provided in the Solid Waste Management Act. The division of roles and responsibilities provided by this Act shape the policies of the Department of Environmental Protection. The Act delineates solid waste management districts (all 21 counties and the Hackensack* Meadowlands District) and provides a framework to plan for the management of solid waste, which includes determining the present and future waste quantities, choices of technology, and new facility locations. The State reviews, approves, and/or modifies district plans. The Department has initiated several major policy initiatives, such as resource recovery and mandatory source separation of recyclable materials.

The state is currently working with the following counties and/or municipalities which have selected new landfill sites:

Hamm's Upland White Township	Ocean County, L.F.
Rockaway Township	Winslow Township South
Bridgewater Township	Harrison Township
Reclamation Center Expansion	Alloway Township
Mansfield and Florence Twps.	Deerfield Township Cape
	May County

In addition to these, the state is working with the following counties and/or municipalities which have selected resource recovery sites:

Hamm's Upland Project	Trenton Freightyards
City of Passaic	S.W. Facilities Complex
Ridgefield Borough	Lacy Township
Oxford Township	Pennsauken Township
Sockway Township City	South Camden West
of Newark Koppers	Deptford Township
Koke Site City of	Carney's Point Township
Rahway	

Projected Capital Revenues

Projected revenues available for solid waste facility construction are summarized in Table 27. Of the five sources, only the repayment proceeds from the 1985 Resource Recovery Bond program are projected to run to 2010 (see Appendix Table J-1 for the repayment schedule). Department personnel indicated that only two years worth of funding remain from the 1980 Natural Resources Bond, and four years from the 1985 Resource Recovery Bond. Reauthorization of these funding programs cannot be assumed nor can State Aid and NY/NJ Port Authority funding. With these assumptions in hand, solid waste capital revenues are projected at \$369 million during 1988-1993 and decrease substantially to \$6 million during 1994-2010. It should be noted that it is likely that new State programs will be instituted after the two existing bond programs run out. Thus, the projected revenue totals are likely understated.

Table 27. STATE SOLID WASTE REVENUE PROJECTIONS, NEW JERSEY, 1988-2010

Revenue Source	1988	1989	1990	1991	1992	1993	1988-1993		1994-2010	
							Total Revenue	Avg Annual Revenue	Total Revenue	Avg Annual Revenue
1980 Natural Resources Bond 1/	\$6,250,000	\$6,250,000	\$0	\$0	\$0	\$0	\$12,500,000	\$2,083,333	\$0	\$0
1985 Resource Recovery Bond 2/	38,300,000	28,300,000	28,300,000	28,400,000	0	0	123,300,000	20,550,000	0	0
State Aid 3/	33,000,000	0	0	0	0	0	33,000,000	5,500,000	0	0
NY/NJ Port Authority 4/	200,000,000	0	0	0	0	0	200,000,000	33,333,333	0	0
Loan repayment on 1985 bond 5/	0	0	0	0	117,917	235,834	353,751	58,959	6,020,839	354,167
Total	\$277,550,000	\$34,550,000	\$28,300,000	\$28,400,000	\$117,917	\$235,834	\$369,153,751	\$61,525,625	\$6,020,839	\$354,167

Notes: Data in 1986 constant dollars.

1/ \$1.5 billion of the total bill is \$50 million of which \$37.5 million has been authorized in 1987 for the Essex County project, the remaining \$12.5 billion is projected to be spent in 1988-1989. 2/ \$8.3 million has been appropriated in 1988. Based on discussions with Waste Management personnel at LIP, the balance of \$85 million is projected to be appropriated over the 1989-1991 period. 3/ This is an allocation out of discretionary general funds going to the Essex County project. Because this revenue is discretionary, it is not assumed to be a recurring revenue.

4/ This represents a one-time commitment to construct the Essex County project. This revenue is not assumed to be recurring. 5/ Repayments calculated in Appendix J-1.

Sources: New Jersey Division of Environmental Protection -- Division of Waste Management and Interim, George Associates.

Projected Capital Need

Total State need is based on the 1985-2000 Solid Waste Management Plan drafted by the Department of Environmental Protection's Division of Waste Management and on discussions with Management personnel. They are subdivided into three categories -- resource recovery facilities, land fills, and land fill closures (see Table 28). Management personnel indicated that' the State is in the midst of a 52.2 billion program to construct resource recovery facilities. A total of \$1.3 billion of need still exists under this program.

Table 28. STATE SOLID WASTE NEED PROJECTIONS, NEW JERSEY, 1988-2010

Type of Facility	1988	1989	1990	1991	1992	1993	1988-1993		1994-2010	
							Total Need	Avg Annual Need	Total Need	Avg Annual Need
Resource recovery										
Construction 1/	\$1,230,000	\$257,000	\$367,000	\$0	\$0	\$0	\$1,854,000	\$309,000	\$0	\$0
Land fill										
Construction 1/	\$126,500	\$126,500	\$126,500	\$126,500	\$126,500	\$126,500	\$759,000	\$126,500	\$2,151,000	\$127,000
Land fill closure										
Construction	\$107,700	\$107,700	\$107,700	\$107,700	\$107,700	\$107,700	\$646,200	\$107,700	\$754,000	\$44,000
Maintenance	20,000	20,000	20,000	20,000	20,000	20,000	120,000	20,000	340,000	20,000
Subtotal	\$127,700	\$127,700	\$127,700	\$127,700	\$127,700	\$127,700	\$766,200	\$127,700	\$1,094,000	\$64,000
Total	\$1,464,000	\$511,200	\$621,200	\$254,200	\$254,200	\$254,200	\$3,379,200	\$563,200	\$3,245,000	\$191,000

Notes: Data in thousands of 1986 constant dollars.

1/ Maintenance is assumed to be paid for out of tipping fees charged to local trash haulers.

Sources: New Jersey Department of Environmental Protection -- Division of Waste Management and Hazardous Waste, Siller, George Associates.

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Land fill need is projected to be \$759 Billion during 1988-1993 and \$2.2 billion during 1994-2010. This estimate is based upon a total state need of 47 million tons of capacity and an average land fill construction cost of \$35 per ton. Because land fills reach capacity and new fills are required, it is anticipated that this annual need will be recurring out to the year 2010.

Another need involves closure of fills and maintaining abandoned land fills. Management personnel indicated that there are 284 land fills in need of closure. Two cost estimates have been generated -- \$700.9 Billion and \$1.4 billion. The more expensive cost scenario involves lining the land fill to prevent seepage of pollutant condensation into the water table. It is assumed that the more expensive of the two alternatives will be implemented given the political sensitivity of these environmental issues in the state. In addition to closing land fills, the State will also be required to provide maintenance. The total cost of closing and maintaining these 284 land fills is projected to be \$756 million during 1988-1993 and \$1.1 billion during 1994-2000.

Projected need and revenue are brought forth into Table = 29 to determine if a revenue surplus or deficit will occur. As was the case with other infrastructure types, solid waste capital needs are projected to exceed revenue by \$3.0 billion during 1988-1993 and \$3.2 billion during 1994-2010.

Table 29. SOLID WASTE REVENUE VS. NEED FORECASTS, NEW JERSEY, 1988-2010

<u>Needs/Revenue</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1988-1993</u>		<u>1994-2010</u>	
							<u>Total Revenue</u>	<u>Avg Annual Revenue</u>	<u>Total Revenue</u>	<u>Avg Annual Revenue</u>
Revenue <u>1/</u>	\$277,550	\$34,550	\$28,300	\$28,400	\$117,917	\$235,834	\$369,154	\$61,523	\$6,020	\$354
Need <u>2/</u>	<u>1,484,200</u>	<u>511,200</u>	<u>621,200</u>	<u>254,200</u>	<u>254,200</u>	<u>254,200</u>	<u>3,379,200</u>	<u>563,200</u>	<u>3,245,000</u>	<u>191,000</u>
Revenue surplus/ deficit	(\$1,206,650)	(\$476,650)	(\$592,900)	(\$225,800)	(\$136,283)	(\$18,366)	(\$3,010,046)	(\$501,677)	(\$3,238,980)	(\$190,646)

Notes: Data in thousands of 1986 constant dollars.

1/ Derived in Table 27.

2/ Derived in Table 28.

Sources: New Jersey Department of Environmental Protection, Division of Waste Management and Hamner, Siler, George Associates.

Shore Protection

New Jersey, like all coastal states provides financial and technical assistance to help communities cope with shoreline erosion. In the early 1940's, legislation authorized the Department of Environmental Protection's predecessor (the Department of Conservation and Economic Development) to repair, reconstruct, or construct bulkheads, seawalls, breakwaters, groins, jetties, beaches, dunes and any or all appropriate structures for shore protection purposes. The annual appropriation for this work has averaged approximately \$1 million dollars. Some \$49 million in State, federal, municipal, and county funds were spent between 1959 and 1974.

In recent years, the need for shoreline protection planning has been heightened by the cumulative effect of minor and major storms (particularly the March 1962 storm) and the tremendous boom in oceanfront development. The New Jersey Commission on Capital Budgeting and Planning recognized that the annual one million dollar appropriation for State Aid to municipalities for shore protection purposes was inadequate and in 1977 the voters of the State approved a \$30 million Beaches and Harbors Bond Issue which provided \$20 million for State Aid for shore protection purposes and \$10 million for harbor cleanup.

Local governments have taken different approaches towards shore protection, with some allowing dunes to be overtaken by development, while others worked to acquire oceanfront lots and rebuild dunes. The Federal Government has also been actively involved in shorefront development through the National Flood Insurance Program. The net

result of these State, Federal and Local activities has been an amalgam reactive approach to shore protection."

Projected Capital Need and Revenue

Projected shore protection need and revenues to meet this need are summarized in Table 30. Need is subdivided into State and federally sponsored projects. State need is based upon a "listing of proposed projects assembled as part of the 1981 New Jersey Shore Protection Master Plan (see Appendix Table K-1). The master plan discusses each project in terms of construction and maintenance costs. The maintenance costs for State projects are projected out to the horizon year 2010 (see Appendix Table K-2).

I/ 1981 New Jersey Shore Protection Master Plan.

**Table 30. STATE SHORE PROTECTION REVENUE/NEED PROJECTIONS,
NEW JERSEY, 1988-2010**

<u>Need/Revenue</u>	<u>1988-1993 Need/Revenue</u>	<u>1994-2010 Need/Revenue</u>
State Projects		
Construction 1/	\$83,268,669	\$0
Maintenance 2/	176,660,100	539,114,600
Subtotal	\$259,928,769	\$539,114,600
Federal Projects		
Construction 1/	\$154,100,000	*****
Maintenance 3/	0	196,000,000
Subtotal	\$154,100,000	\$196,000,000
Total Need	\$414,028,769	\$735,114,600
Less Revenue		
State 4/	\$18,310,000	\$0
Federal 5/	107,500,000	196,000,000
Local	4,103,000	0
Subtotal	\$129,913,000	\$196,000,000
Surplus/(deficit) gap	(\$284,115,769)	(\$539,114,600)

- 1/
- 2/
- 3/
- 4/
- 5/

Notes: .Data in 1986 constant dollars. Derived in Appendix Table K-1. Derived in Appendix Table K-2. Derived in Appendix Table K-3. It is assumed that the federal government will assume all maintenance costs. Final appropriation from the 1983 Shore Protection Bond program. Coastal Resource personnel estimated federal commitments as they know them at this time. They indicated that federal funds would likely be used to maintain the three scheduled federal projects.

Sources: State of New Jersey Department of Environmental Protection, Division of Coastal Resources and Hammer, Slier, George Associates.

Division of Coastal Resource personnel also provided construction and maintenance information on the three proposed federal projects.

Barnegat Inlet, Sea Bright/Monmouth Beach, and Egg Harbor Inlet. These three projects are estimated to cost \$154 Billion to construct and \$196 million to maintain over the period 1994-2010. Total construction and maintenance need for State and Federal projects for 1988-1993 is projected to total \$414 million and \$735 million for 1994-2010.

Projected shore protection revenues originate *from one of three sources -- State, federal, or local. Coastal Resource personnel could not provide State forecasts. For this reason, no State appropriations are assumed after the 1983 Shore Protection Bond is depleted. However, it is likely that some State support will be forthcoming to replace this popular program.

To date, no solid commitments have been made regarding federal projects, however Coastal Resource personnel indicate that it is likely that the Federal Government will pay for the majority of construction and maintenance. It is assumed that this will be the case and that federal funding can be considered as revenue to offset total need.

Between 1988-1993 revenue from local sources is projected to be \$4.1 million. Because of the political complexity of local financial involvement it cannot be assumed to be a recurring funding source. More than likely however, some local funding commitments will be made in the 1994-2010 period.

Total revenues are subtracted from total need to yield revenue deficits of \$284 million during 1988-1993 and \$539 million during 1994-2010. Because of this unpredictability of need, due to storms and unforeseen erosion problems, these need projections are at best estimates*.

Education

The State of New Jersey has created and maintains an extensive elementary and secondary educational program. As of 1984 there were 1,900 public elementary schools; 425 public secondary schools; 185 private high schools and academies; 77 schools for the handicapped; and a total of 1.246 million students and 96,000 professional staff. Because Individual school districts have taxing authority, over the years local districts have been able to keep pace with capital needs. This trend is projected to continue into the future.

*

For the purposes of this report only public elementary and secondary facilities are evaluated. Institutions of higher education, in addition to private elementary and secondary (financed independently from the state) are not evaluated.

Capital Expenditure Trends

Total capital expenditures are made-up of two components - capital outlay and Improvement authorization. Capital outlays are . actual expenditures made to a project within a particular year. Improvement authorizations are usually associated with bonds, whereas payments are made over a period of time. This is not debt service but actual drawdowns on a given project. In 1985 capital outlays were \$58.3 million and improvement authorizations were \$62.7 million (see Appendix Table L-1). These two expenditure categories can be compared to total enrollment to derive capital expenditures per pupil. In 1985, \$107 worth of capital expenditures were made per pupil.

Enrollment Trends and Projections

Enrollment trends and projections are presented in Table 31. Between 1980 and 1987 total elementary and secondary enrollment declined by over 25,000 students per year or 2 percent (see Appendix Table L-2 for a listing of enrollment by county).

The New Jersey Department of Education has made statewide enrollment projections from 1988-1997. The Department uses a three year moving average to make these projections. During this period, enrollment is projected to increase slightly, by 1.45 percent annually, and state-wide enrollment in 1997 is projected to be 1.24 million. The overall decline in enrollment between 1980-1987 is projected to reverse itself as those in 25-35 year olds now began having children. Enrollment between 1998-2010 is projected to continue to increase at the moderate 1.45 percent level. Total enrollment in 2010 is projected to be 1.5 million (see Appendix Table 1-3 for state-wide enrollment projections distributed by county).

capital expenditure factor of \$107 per pupil derived in Table 31. During 1988-1993, total \$925 million or \$154 million annually is projected to be needed and expended on capital projects. During 1994-2010, the total is \$2.5 billion or \$145 million per year. Projected capital expenditures by school district are summarized in Appendix Table L-4.

Table 32. CAPITAL EXPENDITURE PROJECTIONS FOR ELEMENTARY AND SECONDARY SCHOOLS. NEW JERSEY, 1988-2010 (1986 Constant Dollars)

<u>Year</u>	<u>Expenditures</u> I/
1988	\$302,413,389
1989	158,739,691
1990	98,786,375
1991	119,552,225
1992	121,530,325
1993	123,755,069
1994	126,214,380
1995	129,018,708
1996	131,815,116
1997	134,305,635
1998	136,760,576
1999	138,743,434
2000	140,755,289
2001	142,796,172
2002	144,866,704
2003	146,967,378
2004	149,098,261
2005	151,260,253
2006	153,453,550
2007	155,578,463
2008	157,935,922
2009	160,226,030
2010	162,549,280
1968-1993	
-Average Annual Expenditures	\$154,146,212
Total Expenditures	\$924,877,274
1994-2010	
-Average Annual Expenditures	\$144,379,127
Total Expenditures	\$2,462,945,151

I/ See Appendix Table L-4 for expenditures by county.

Sources: New Jersey Department of Education and Hammer, Slier, George Associates.

Total Unmet Capital Needs

In the preceding pages capital need projections were made for two periods — 1988-1993 and 1994-2010. Along with need, revenue projections (for non-revenue generating agencies or authorities) were also made. In most cases need exceeded revenue leaving infrastructure groups with unmet capital needs. Unmet needs by Infrastructure group is summarized in Table 33.

Between 1988-2010 a total need of \$48.5 billion has been documented. When compared to the projected revenue for the same period, a deficit of \$19.3 billion exists.¹

1 OSP Editors Note (1/88) :

If the revaluation of county and local roads prepared in the TRD prepared by OSP on "Infrastructure Needs Assessment-Transportation" 1/88 is used, the need and the revenue gap figures increase by \$2.2 billion respectively

Table 33. STATEWIDE INFRASTRUCTURE NEEDS/REVENUE PROJECTIONS, NEW JERSEY. 1988-2010

Infrastructure Cap"	Need		Revenue		
	1988- liffi	1994-2010	total"	Potential	
Roads and Bridges	\$8,935,000 ⁶	\$3,987,000	\$12,922,000	19,237,000	3,685,000
I/ N.J. Turnpike Authority	2,004,318		\$313,038	2,317,356	2,317,356
0 II N.J. Highway Authority	715,284	2,171,638		2,886,922	2,886,922
0 If N.J. Transit	2,489,800	6,577,200	9,067,000	5,449,540	(3,617,460)
Aviation	58,707	166,209	224,916	999,111	(125,805)
Rail freight	19,220	52,893	72,113	72,113	0 3/
Delaware River Port Authority		109,525	260,251	369,776	369,776
Delaware River and Bay Authority		68,483	57,882	126,365	126,365
Sewerage (State)	1,768,000	3,757,000	5,525,000	199,041	(3,534,589)
Passaic Valley Sewerage Commission		42,001,301	343,001	343,001	0 y
Water Supply	558,000	1,581,000	2,139,000	941,437	(1,197,563)
Mood Control/SUM Water	356,400	1,009,800	1,366,200	1,304,472	(61,728) 4/
Solid Waste	3,379,200	3,245,000	6,624,200	375,174	(6,249,026) 5/
Shore Protection	414,029	735,115	1,149,144	325,913	(823,231)
Education			921,871	2,462,945	
		^3.387.822	23.387.822	0 2/	
Total	\$21,842,844	\$26,677,971	\$48,520,815		29,226,413
(19,294,402)					

Note: Data In thousands of constant 1986 dollars.

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I/ Assumes adoption and construction of Trust Fund II funding on an annual basis to 2010 sufficient to pay for needed roads.
 \J Agencies and/or authorities which have revenue generating capabilities (through tolls or taxes). Assumes that revenue collections will be adjusted to pay for Infrastructure needs.
 3/ A modest capital Improvement program Is projected based on Conrad's continued retention of rail lines. Revenues are projected to meet future needs based upon these assumptions.
 4/ Assumes federal appropriations for all projects authorized In authorization bill H.R.6.
 5/ Does not Include hazardous waste disposal or treatment.

Sources: New Jersey agencies and Hammer, Slier, George Associates.

⁶OSP Editor's Note: (I/88)

[A recalculation of county and local roads and bridge needs, as appears in TRD prepared by OSP on 1/88 on Infrastructure Needs Assessment on Transportation. yields a higher figure than appears here. This higher figure would increase total needs and the revenue gap by about \$2 billion

Unmet Need In Relation to the State Capital Budget

To provide a reference point from which to assess total unmet need, total need is compared against the 1986 State Capital Budget. According to the New Jersey Commission on Capital Budgeting and Planning, it was \$416.07 million. The projected annual deficit exceeds this budget by over 1.6 times.

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APPENDIX A

Appendix Table A-1. PROJECTED ANNUAL CAPITAL ROAD MAINTENANCE NEED NEW JERSEY, 1988-2010
(1986 Constant Dollars 000)

<u>Jurisdiction</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1988-1993</u>		<u>1994-2</u>
							<u>Total Expend</u>	<u>Avg Annual Expend</u>	<u>Total Expend</u>
State <u>1/</u>	\$2,338,000	\$2,338,000	\$2,338,000	\$2,338,000	\$2,338,000	\$2,338,000	\$14,028,000	\$2,338,000	\$39,746,000
Local/County <u>2/</u>	\$6,306,000	\$6,306,000	\$6,306,000	\$6,306,000	\$6,306,000	\$6,306,000	\$37,836,000	\$6,306,000	\$107,202,000
Total	\$8,644,000	\$8,644,000	\$8,644,000	\$8,644,000	\$8,644,000	\$8,644,000	\$51,864,000	\$8,644,000	\$146,948,000

- 1/ Derived from Governor's Management Improvement Program Inc. "Report to the State of New Jersey". The following table on page 10 was utilized; "NJ Bridge & Roadway Rehabilitation Accumulated Backlog 15 Year Horizon". Data presented in table is in 1983 dollars. These figures were brought up to 1986 dollars using factor of 1.0873. Assume continuation of need at projected pace to year 2010.
- 2/ Defined in the NJ County and Municipal Government Study Commission's report "NJ Local Infrastructure: An Assessment of Needs". This data comes from Table III-3 on page 21. The methodology of "Unmet capital needs" by "Municipal type" was utilized. Assume continuation of need at projected pace to year 2010.

Sources: State of New Jersey County and Municipal Government Study Commission; Governor's Management Improvement Program, Inc.; and Hammer, Siler, George Associates.

Appendix Table A-2. BRIDGE REHABILITATION NEEDS, NEW JERSEY. 1987
(1986 Constant Dollars)

	<u>1987 Dollars</u>
Atlantic County	
State bridges:	167,819,000
County bridges:	6,072,000
Agency bridges:	22,531,000
Bergen County	
State bridges:	265,956,000
County bridges:	48,524,000
Agency bridges:	19,346,000
Burlington County	
State bridges:	60,770,000
County bridges:	47,253,000
Agency bridges:	34,755,000
Camden County	
State bridges:	37,230,000
County bridges:	5,346,000
Agency bridges:	230,043,000
Cape May State	
bridges: County	272,060,000
bridges: Agency	10,018,000
bridges:	22,693,000
Cumberland County	
State bridges:	2,723,000
County bridges:	9,644,000
Agency bridges:	0
Essex County	
State bridges:	487,116,000
County bridges:	43,838,000
Agency bridges:	14,633,000
Goucester County	
State bridges:	52,203,000
County bridges:	49,651,000
Agency bridges:	8,401,000
Hudson County	
State bridges:	260,546,000
County bridges:	27,104,000
Agency bridges:	50,875,000

Appendix Table A-2. BRIDGE REHABILITATION NEEDS. NEW JERSEY. 1987

(Continued)

	1987 Dollars
Hunterdon County	
State bridges:	31,996,000
County bridges:	129,470,000
Agency bridges:	1,799,000
Mercer County	
State bridges:	20,675,000
County bridges:	57,965,000
Agency bridges:	2,940,000
Middlesex County	
State bridges:	340,491,000
County bridges:	74,679,000
Agency bridges:	48,780,000
Monmouth County	
State bridges:	84,502,000
County bridges:	64,356,000
Agency bridges:	25,388,000
Morris County	
State bridges:	147,131,000
County bridges:	63,817,000
Agency bridges:	2,271,000
Ocean County	
State bridges:	32,250,000
County bridges:	32,626,000
Agency bridges:	9,408,000
Passaic County	
State bridges:	127,644,000
County bridges:	76,953,000
Agency bridges:	12,389,000
Salem County	
State bridges:	13,387,000
County bridges:	17,419,000
Agency bridges:	0

Appendix Table A-2. BRIDGE REHABILITATION NEEDS. NEW JERSEY. 1987
(Continued)

	<u>1987 Dollars</u>
Somerset County	
State bridges:	72,270,000
County bridges:	49,173,000
Agency bridges:	2,109,000
Sussex County	
State bridges:	5,302,000
County bridges:	24,800,000
Agency bridges:	1,031,000
Union County	
State bridges:	136,557,000
County bridges:	73,029,000
Agency bridges:	7,997,000
Harran County	
State bridges:	21,087,000
County bridges:	41,858,000
Agency bridges:	5,610,000
Total	
State bridges:	2,639,717,000
County bridges:	953,595,000
Agency bridges:	542,527,000

Source: New Jersey Department of
Transportation - Division of
Bridges and Structures; and Hammer,
Slier, George Associates.

APPENDIX B

Appendix Table B-1. CAPITAL MAINTENANCE EXPENDITURES PROJECTION
METHODOLOGY, NEW JERSEY TURNPIKE AUTHORITY,
1988-2010

<u>Type of Expenditure</u>	<u>1980</u>	<u>1986</u>	<u>1980-1986</u>	
			<u>Actual</u>	<u>Annual Change</u> <u>Percent</u>
Actual capital expend	\$9,486,600	\$13,208,500	\$532,000	5.61%
1986 growth factor	1.309	1.000	--	--
Capital expend in 1986 constant dollars	\$12,418,000	\$13,208,500	\$113,000	0.91%

Notes:

Between 1980-1986 capital expenditures have Increase 6.5% annually. After taking Into account Inflation, the actual Increase was 0.91% annually. Because of the \$2 billion widening program, future maintenance is projected to continue to Increase to service Increase road width, In addition to the 1966 road widening program. Future expenditure trends are projected to Increase by .91% annually between 1988-1993. After 1993 facility will be larger and the annual expenditures are projected to Increase between .91-1.0% annually (over 1993 level of \$22.52 million) or 0.95%.

Period I Period II 1988-1993 1994-2010 1.0091 1.0095 Sources: NJ

NJ Turnpike projected annually expenditure Turnpike Authority and
 Increase Manner, Slier, George

Associates.

APPENDIX C

Appendix Table C-1. NEW JERSEY TRANSIT CAPITAL EXPENDITURE/REVENUE PROJECTIONS, NEW JERSEY, 1988-2010
(In 1986 Constant Dollars) 1/

Type of Expenditure	1988	1989	1990	1991	1992	1993	1988-1993		1994-2010	
							Avg Annual Expend	Total Expend	Avg Annual Expend	Total Expend
Capital expenditures 2/	\$210,690	\$160,960	\$126,310	\$101,020	\$161,090	\$330,870	\$181,823	\$1,090,940	\$256,390	\$4,100,000
New Initiatives 3/ 4/	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$210,690	\$160,960	\$126,310	\$101,020	\$161,090	\$330,870	\$181,823	\$1,090,940	\$256,390	\$4,100,000

- 1/ Projected expenditures are projected to equal revenue as was the case during the period 1980-1986 (See Tables 6&7).
- 2/ 1988-1993 expenditure projections provided by NJ TRANSIT in the "NJ TRANSIT Rail Capital Needs -- Basic Program" (8/26/86). See Appendix Table C-2 for methodology for 1994-2010 projections.
- 3/ New projects associated with the expansion of the existing system
- 4/ At this time only "need" has been identified by TRANSIT personnel. Future revenues covering the new initiative program cannot be estimated at this time.

Sources: NJ TRANSIT and Hammer, Siler, George Associates.

Appendix Table C-2. CAPITAL EXPENDITURE PROJECTION METHODOLOGY,
NJ TRANSIT, 1994-2010
 (1986 Constant Dollars 000)

<u>Type Of Expenditure</u>	<u>Annual Expenditures</u>		
	<u>1994</u> <u>Projected</u> <u>Expend</u>	<u>I</u> <u>1987-1994</u> <u>Avg Annual</u> <u>Expend</u>	<u>II</u> <u>1994-2010</u> <u>Total</u> <u>Expend</u>
Maintenance Expenditures	\$124,010	\$173,590	\$4,358,600
New Initiatives	\$0	\$0	\$0
Total	\$124,010	\$173,590	\$4,358,600
Projected Annual Expend increase:	Actual data provided by NJ TRANSIT		
Period I	1.048		
Period II			

Notes:

During 1980-1986 capital expenditures (without Inflation) Increased with 4.8% annually (see Table 1). Authority personnel Indicate that the new equipment and facilities projected to come on line in the future, capital expenditures will likely Increase as facilities require additional maintenance. Assume average annual expenditures (\$173.59 million) that are projected to occur between 1988-1994 to continue and Increase 4.8% annually.

Source: NJ TRANSIT and Hammer, Slier, George Associates.

Appendix Table C-3. PROJECTED NEW INITIATIVE PROJECT LIST.
NJ TRANSIT. 1988-2000 1?

Project Name

1. Waterfront Transit way
2. PSNY capacity upgrade
3. Secaucus transfer/connection
4. Kearny connection
5. Montclair/Boonton project
6. West Shore rail restoration
7. Monmouth ocean project
8. Reverse Kearny
9. Hew Meadowlands transit
10. One or more bus ways
11. Dual mode locomotive development
12. Substantial park/ride construction (possibly Including garages)

\J It should be noted that this list is not only a tentative but partial list. It is likely that projects will be added and existing projects reevaluated.

Sources: NJTRANSIT and Hammer, Siler, George Associates.

APPENDIX D

**APPENDIX
D**

Appendix Table D-1. AVIATION CAPITAL EXPENDITURE PROJECTIONS
BY PROJECT, NEW JERSEY, 1984-1986.
(1986 Constant Dollars) (Continued)

<u>Project</u>	<u>Revenue</u>			<u>Total Project Cost</u>
	<u>FAA</u>	<u>State</u>	<u>Local</u>	
1989				
Hammonton	\$45,000	\$2,500	\$2,500	\$50,000
Mercer County	\$945,000	\$52,500	\$52,500	\$1,050,000
R.J. Miller	\$630,000	\$35,000	\$35,000	\$700,000
Millville	\$383,940	\$21,330	\$21,330	\$426,600
Morristown	\$1,803,600	\$100,200	\$100,200	\$2,004,000
Ocean City	\$499,500	\$27,750	\$27,750	\$555,000
Teterboro	\$3,602,312	\$200,127	\$200,127	\$4,002,566
Woodbine	\$562,034	\$31,223	\$31,223	\$624,480
Aeroflex/Andover	\$0	\$4,000	\$0	\$4,000
Alexandria	\$0	\$20,000	\$0	\$20,000
Kupper	\$0	\$50,000	\$30,000	\$80,000
Oldmans	\$0	\$50,000	\$0	\$50,000
Princeton	\$0	\$50,000	\$0	\$50,000
Sky Manor	\$0	\$0	\$92,000	\$92,000
Subtotal	\$8,471,386	\$644,630	\$592,630	\$9,708,646
1990				
Hammonton	\$45,000	\$2,500	\$2,500	\$50,000
Mercer County	\$983,250	\$54,625	\$54,625	\$1,092,500
R.J. Miller	\$247,500	\$13,750	\$13,750	\$275,000
Millville	\$640,800	\$35,600	\$35,600	\$712,000
Morristown	\$1,633,500	\$90,750	\$90,750	\$1,815,000
Ocean City	\$54,000	\$3,000	\$3,000	\$60,000
Woodbine	\$2,511,900	\$139,550	\$139,550	\$2,791,000
Alexandria	\$0	\$50,000	\$350,000	\$400,000
Kupper	\$0	\$50,000	\$50,000	\$100,000
Oldmans	\$0	\$40,000	\$48,000	\$88,000
Princeton	\$0	\$50,000	\$0	\$50,000
Sky Manor	\$0	\$0	\$365,000	\$365,000
Subtotal	\$6,115,950	\$529,775	\$1,152,775	\$7,798,500

Appendix Table D-1. AVIATION CAPITAL EXPENDITURE PROJECTIONS
BY PROJECT, NEW JERSEY, 1984-1986.
(1986 Constant Dollars) (Continued)

<u>Project</u>	<u>Revenue</u>			<u>Total Project Cost</u>
	<u>FAA</u>	<u>State</u>	<u>Local</u>	
1991				
Hammonton	\$4,500	\$250	\$250	\$5,000
Mercer County	\$1,736,550	\$96,475	\$96,475	\$1,929,500
R.J. Miller	\$270,000	\$15,000	\$15,000	\$300,000
Millville	\$1,620,000	\$90,000	\$90,000	\$1,800,000
Morristown	\$2,034,000	\$113,000	\$113,000	\$2,260,000
Ocean City	\$135,000	\$7,500	\$7,500	\$150,000
Woodbine	\$1,583,010	\$87,945	\$87,945	\$1,758,900
Kupper	\$0	\$50,000	\$0	\$50,000
Oldmans	0	\$10,000	\$0	\$10,000
Princeton	\$0	\$50,000	\$380,000	\$430,000
Subtotal	\$7,383,060	\$520,170	\$790,170	\$8,693,400
Total Expenditures	\$56,061,291	\$4,154,533	\$28,212,533	\$88,428,357
Average Annual Expenditure	\$11,212,258	\$830,907	\$5,642,507	\$17,685,671

1/ Includes NY/NJ Port Authority and other non-state and non-federal agencies.

**APPENDIX
E**

Appendix Table E-1. TOTAL CAPITAL EXPENDITURES ON FERRY AND BRIDGE, DELAWARE RIVER AND BAY AUTHORITY, NEW JERSEY, 1981-1985

<u>Type of Asset</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
Delaware Memorial Bridge					
Equipment	\$1,351,304	\$1,533,362	\$1,598,820	\$1,660,416	\$1,825,614
Unusual maintenance <u>2/</u>	\$211,630	\$221,738	\$239,322	\$211,650	\$565,930
Subtotal	\$1,562,934	\$1,755,100	\$1,838,142	\$1,872,066	\$2,391,544
Cape May-Lewes Ferry					
Equipment	\$0	\$0	\$74,357	\$55,761	\$25,272
Subtotal	\$0	\$0	\$74,357	\$55,761	\$25,272
Total	\$1,562,934	\$1,755,100	\$1,912,499	\$1,927,827	\$2,416,816

1/ Not listed in 1981-1982 Annual Operating Statements.

2/ Predominantly bridge painting.

Sources: Delaware River and Bay Authority and Hammer, Siler, George Associates.

**APPENDIX
F**

Appendix Table F-1. PROJECTED FEDERAL SEWER REVENUE ALLOCATION, NEW JERSEY, 1987-2010
(1986 Constant Dollars 000)

Allocation/Program (000)	1987	1988	1989	1990	1991	1992	1993	1987-1993 Total	1994- 2010
National Allocation 1/ Construction grant program	\$2,400,000	\$2,400,000	\$600,000	\$600,000	\$0	\$0	\$0	\$6,000,000	
Capitalization grant program	***	***	\$600,000	\$600,000	\$2,400,000	\$1,800,000	\$1,200,000	\$6,600,000	\$600,000
Total	\$2,400,000	\$2,400,000	\$1,200,000	\$1,200,000	\$2,400,000	\$1,800,000	\$1,200,000	\$12,600,000	\$600,000
NJ allocation factor 2/	4.329%	4.329%	4.329%	4.329%	4.329%	4.329%	4.329%	****	4.329%
NJ Allocation									
Construction grant program	\$103,896	\$103,896	\$25,974	\$25,974	\$0	\$0	\$0	\$259,740	
Capitalization grant program	\$0	\$0	\$25,974	\$25,974	\$103,896	\$77,922	\$51,948	\$285,714	\$25,974
Loan repayment 3/	\$0	\$0	\$246	\$492	\$985	\$1,355	\$1,601	\$4,679	\$1,601
Total	\$103,896	\$103,896	\$52,194	\$52,440	\$104,881	\$79,277	\$53,549	\$550,133	\$27,175

- 1/ Construction program scheduled to run through 1990 and the Capitalization program is scheduled to run through 1994.
 2/ It is assumed that New Jersey's present allocation will continue at the same rate to the horizon year of 2010.
 3/ Assume that state continues to allocate 1987 and 1988 federal funding on 100% grant basis. Assume that loans are made for 25 years at 3% with payments beginning the following year (see payment schedule below):

Allocation Year	Principal	1989	1990	1991	1992	1993	1994	1989-1993 Total	1994- 2010
1989	\$51,948	\$246	\$246	\$246	\$246	\$246	\$246	\$1,230	
1990	\$51,948	\$0	\$246	\$246	\$246	\$246	\$246	\$984	
1991	\$103,896	\$0	\$0	\$493	\$493	\$493	\$493	\$1,479	
1992	\$77,922	\$0	\$0	\$0	\$370	\$370	\$370	\$740	
1993	\$51,948	\$0	\$0	\$0	\$0	\$246	\$246	\$246	
1994	\$25,974	\$0	\$0	\$0	\$0	\$0	\$123	\$0	
Total	\$363,636	\$246	\$492	\$985	\$1,355	\$1,601	\$1,724	\$4,679	\$1,601

Sources: Environmental Protection Agency; NJ Department of Environmental Protection -- Division of Water Resources (Construction Grants Administration); and Hammer, Siler, George Associates.

Appendix Table F-2. WASTEWATER TRUST LOAN PROGRAM REPAYMENT SCHEDULE, NEW JERSEY, 1988-2010
 (1986 Constant Dollars 000)
 (Continued)

Allocation Year	Principal	Annual Payment								
		1994	1995	1996	1997	1998	1999	2000	2001	2002
1988	\$150,000	\$990	\$990	\$990	\$990	\$990	\$990	\$990	\$990	\$990
1989	\$25,000	\$165	\$165	\$165	\$165	\$165	\$165	\$165	\$165	\$165
1990	\$25,000	\$165	\$165	\$165	\$165	\$165	\$165	\$165	\$165	\$165
1991	\$50,000	\$330	\$330	\$330	\$330	\$330	\$330	\$330	\$330	\$330
1992	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1993	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1994	\$50,000	\$0	\$0	\$0	\$330	\$330	\$330	\$330	\$330	\$330
1995	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1997	\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$330	\$330	\$330
1998	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1999	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2000	\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2001	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2002	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2003	\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2004	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2005	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2006	\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2007	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2008	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2009	\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2010	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$550,000	\$1,650	\$1,650	\$1,650	\$1,980	\$1,980	\$1,980	\$2,310	\$2,310	\$2,310

Appendix Table F-2. WASTEWATER TRUST LOAN PROGRAM REPAYMENT SCHEDULE, NEW JERSEY, 1988-2010
 (1986 Constant Dollars 000)
 (Continued)

Allocation Year	Principal	Annual Payment							1994-2010 Total
		2004	2005	2006	2007	2008	2009	2010	
1988	\$150,000	\$990	\$990	\$990	\$990	\$990	\$990	\$990	\$16,830
1989	\$25,000	\$165	\$165	\$165	\$165	\$165	\$165	\$165	\$2,805
1990	\$25,000	\$165	\$165	\$165	\$165	\$165	\$165	\$165	\$2,805
1991	\$50,000	\$330	\$330	\$330	\$330	\$330	\$330	\$330	\$5,610
1992	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1993	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1994	\$50,000	\$330	\$330	\$330	\$330	\$330	\$330	\$330	\$4,620
1995	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1997	\$50,000	\$330	\$330	\$330	\$330	\$330	\$330	\$330	\$3,630
1998	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1999	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2000	\$50,000	\$330	\$330	\$330	\$330	\$330	\$330	\$330	\$2,640
2001	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2002	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2003	\$50,000	\$0	\$0	\$330	\$330	\$330	\$330	\$330	\$1,650
2004	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2005	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2006	\$50,000	\$0	\$0	\$0	\$0	\$0	\$330	\$330	\$660
2007	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2008	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2009	\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$0	\$2,640	\$2,640	\$2,970	\$2,970	\$2,970	\$3,300	\$3,300	\$41,250

Notes: The following assumptions are made:
 Repayment terms (beginning third year after loan issued) 20
 Interest rate 5.0%

Source: Hammer, Siler, George Associates.

Appendix Table F-3. WASTEWATER TRUST FUND LOAN PROGRAM REPAYMENT SCHEDULE, NEW JERSEY, 1988-2010
 (1986 Constant Dollars 000)

Allocation Year	Principal	Annual Payments						1989-1993 Total
		1988	1989	1990	1991	1992	1993	
1988	\$150,000	\$0	\$0	\$0	\$543	\$543	\$543	\$1,629
1989	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1990	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1991	\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1992	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1993	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1994	\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1995	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1997	\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1998	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1999	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2000	\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2001	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2002	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2003	\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2004	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2005	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2006	\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2007	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2008	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2009	\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2010	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$500,000	\$0	\$0	\$0	\$543	\$543	\$543	\$1,629

Appendix Table F-3. WASTEWATER TRUST FUND LOAN PROGRAM REPAYMENT SCHEDULE, NEW JERSEY, 1988-2010
 (1986 Constant Dollars 000)
 (Continued)

Location Number	Principal	Annual Payments									
		1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
88	\$150,000	\$543	\$543	\$543	\$543	\$543	\$543	\$543	\$543	\$543	\$5
89	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
90	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1
91	\$50,000	\$181	\$181	\$181	\$181	\$181	\$181	\$181	\$181	\$181	\$0
92	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
93	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1
94	\$50,000	\$0	\$0	\$0	\$181	\$181	\$181	\$181	\$181	\$181	\$0
95	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
96	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$181	\$181	\$181	\$
97	\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
98	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$
99	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$
000	\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
001	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
002	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
003	\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
004	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
005	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
006	\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
007	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
008	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
009	\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
010	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$500,000	\$724	\$724	\$724	\$905	\$905	\$905	\$1,086	\$1,086	\$1,086	\$1

Appendix Table F-3. WASTEWATER TRUST FUND LOAN PROGRAM REPAYMENT SCHEDULE, NEW JERSEY, 1988-2010
 (1986 Constant Dollars 000)
 (Continued)

Allocation Year	Principal	Annual Payments							1994-2010
		2004	2005	2006	2007	2008	2009	2010	Total
1988	\$150,000	\$543	\$543	\$543	\$543	\$543	\$543	\$543	\$9,231
1989	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1990	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1991	\$50,000	\$181	\$181	\$181	\$181	\$181	\$181	\$181	\$3,077
1992	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1993	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1994	\$50,000	\$181	\$181	\$181	\$181	\$181	\$181	\$181	\$2,534
1995	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1997	\$50,000	\$181	\$181	\$181	\$181	\$181	\$181	\$181	\$1,991
1998	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1999	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2000	\$50,000	\$181	\$181	\$181	\$181	\$181	\$181	\$181	\$1,448
2001	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2002	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2003	\$50,000	\$0	\$0	\$181	\$181	\$181	\$181	\$181	\$905
2004	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2005	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2006	\$50,000	\$0	\$0	\$0	\$0	\$0	\$181	\$181	\$362
2007	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2008	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2009	\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$0	\$1,267	\$1,267	\$1,448	\$1,449	\$1,448	\$1,629	\$1,629	\$19,548

Notes:

The following assumptions are made:

Repayment terms (beginning third year after loan issued) 23
 Interest rate 0.0%

Source: Hamner, Siler, George Associates.

**APPENDIX
G**

Appendix Table G-1. SECONDARY TREATMENT FACILITY CONSTRUCTION REVENUE SOURCES, PASSAIC VALLEY SEWERAGE COMMISSIONERS, 1977-1987.

Funding Source	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	Total / Average /	
Total Construction	\$10,889,739	\$23,099,081	\$69,999,036	\$69,999,036	\$69,999,036	\$50,399,304	\$41,999,420	\$33,999,536	\$16,799,768	\$16,799,768	\$8,399,085	\$419,994,211	\$40,109
Revenue Sources													
Federal	\$12,814,023	\$15,051,984	\$47,459,346	\$47,459,346	\$47,459,346	\$34,170,728	\$28,475,007	\$22,780,485	\$11,390,243	\$11,390,243	\$5,695,122	\$284,756,075	\$27,194
State	\$1,474,180	\$1,001,775	\$5,459,925	\$5,459,925	\$5,459,925	\$3,931,146	\$3,275,955	\$2,620,764	\$1,310,382	\$1,310,382	\$655,191	\$32,759,550	\$3,128
Local	\$4,611,536	\$5,636,322	\$17,079,765	\$17,079,765	\$17,079,765	\$12,297,430	\$10,247,858	\$8,198,287	\$4,099,143	\$4,099,143	\$2,049,572	\$102,478,586	\$9,786
Drainage													

(1) Authority personnel could not provide the revenue distribution annually, but instead for the total project cost. To subdivide the three revenue sources amongst project years, the revenue percentage distributions (as seen below) are applied to the projected construction drainages presented in Table 1.

REVENUE SOURCE	REVENUE	DISTRIBUTION
Federal	\$284,756,075	67.0%
State	\$32,759,550	7.8%
Municipalities	\$102,382,624	24.8%
Total	\$419,994,211	100.0%

Sources: Passaic Valley Sewerage Commissioners and Hamer, Sitter, George Associates

**APPENDIX
H**

Appendix Table H-1. PROPOSED WATER SUPPLY PROJECTS BY REGION, NEW JERSEY, 1988-2010

<u>Region/Project</u>	<u>1988-1993</u>		<u>1994-2010</u>	
	<u>Total Expend</u>	<u>Avg Annual Expend</u>	<u>Total Expend</u>	<u>Avg Annual Expend</u>
Region 1				
Manaque South 1/	***	***	***	***
Round Valley Reservoir 2/	***	***	***	***
Six Mile Run Reservoir 2/	***	***	***	***
Confluence Reservoir	***	***	***	***
Dunkers Pond	\$33,600,000	***	\$0	\$0
Longwood Valley Reservoirs	\$26,992,000	***	\$0	\$0
Monksville Reservoir 4/	***	***	***	***
Hackensack River optimization	***	***	***	***
Raritan-Passaic Diversion 5/	***	***	***	***
Raritan-North Branch Pipeline 5/	***	***	***	***
Raritan-Northeast Branch Pipeline 5	***	***	***	***
Raritan-Passaic Pipeline 5/	***	***	***	***
Washington Valley Reservoir	***	***	***	***
Subtotal	\$60,592,000	\$0	\$0	\$0
Region 2				
Manasquan Reservoir 2/	***	***	***	***
Region 3				
Local groundwater projects as req. 6/	NA	NA	***	NA
Region 4				
Local groundwater projects as req. 6/	***	***	***	***
Region 5				
Camden metro water supply 7/	NA	NA	NA	NA
Wharton Tract SW groundwater 8/	\$0	\$0	\$0	\$0
Delaware River flow augmentation 9/	\$35,000,000	\$5,833,300	\$35,000,000	\$2,058,800
Subtotal	\$35,000,000	\$5,833,300	\$35,000,000	\$2,058,800

Appendix Table H-1. PROPOSED WATER SUPPLY PROJECTS BY REGION, NEW JERSEY, 1988-2010
(Continued)

<u>Region/Project</u>	<u>1988-1993</u>		<u>1994-2010</u>	
	<u>Total Expend</u>	<u>Avg Annual Expend</u>	<u>Total Expend</u>	<u>Avg Annual Expend</u>
Region 6 10/				
Beaver Run Reservoir	NA	NA	NA	NA
Franklin Reservoir	NA	NA	NA	NA
Groundwater supplies	NA	NA	NA	NA
Hackettstown Reservoir	NA	NA	NA	NA
Honey Run	NA	NA	NA	NA
Petersburg Reservoir	NA	NA	NA	NA
Ross' Corner Reservoir	NA	NA	NA	NA
Shades Reservoir	NA	NA	NA	NA
Sussex North Reservoir	NA	NA	NA	NA
Subtotal	NA	NA	NA	NA
Total	\$95,592,000	\$5,833,300	\$35,000,000	\$2,058,800

- 1/ Described under North Jersey Water Supply Commission program description (see Appendix Table H-3)
- 2/ Described under NJ Water Supply Authority program description (see Appendix Table H-2)
- 3/ At this time expenditures cannot be assessed by period.
- 4/ Part of Wanaque South project.
- 5/ Water Resource personnel indicated that these projects are not economically feasible at this time.
- 6/ Water Resource personnel indicated that this area is dependent upon groundwater. At this time and there are no significant surface water projects proposed.
- 7/ Includes Delanco Intake and Philadelphia-Camden pipeline.
- 8/ Water Resource personnel indicated that there is no foreseeable progress in the future of this project at this time.
- 9/ Cost estimate made in 1982 Master Plan document of \$159 million. Water Resource personnel indicated that most recent costs (1986 dollars) is \$140 million, of which 50% or \$70 million would be paid by NJ.
- 10/ Projections cannot be made for this particular region at this time regarding total water retained on this project.

Sources: The NJ Statewide Water Supply Master Plan (4/82) as prepared by the NJ Department of Environment and Natural Resources, Siler, George Associates.

Appendix Table H-2. NJ WATER SUPPLY AUTHORITY CAPITAL EXPENDITURE PROJECTIONS, NEW JERSEY, 1988-2010

Source	1988	1989	1990	1991	1992	1993	1988-1993		1994-2010	
							Total Expend	Avg Annual Expend	Total Expend	Avg Annual Expend
Canal 1/	\$2,600,000	\$2,600,000	\$2,600,000	\$2,600,000	\$1,500,000	\$1,500,000	\$13,400,000	\$2,233,300	\$25,500,000	\$1,125,000
Reservoir 2/	\$19,085,000	\$19,085,000	\$9,545,000	\$0	\$500,000	\$500,000	\$48,715,000	\$8,119,200	\$8,500,000	\$1,700,000
facilities	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$69,730,000	\$4,100,000
	\$21,685,000	\$21,685,000	\$12,145,000	\$2,600,000	\$2,000,000	\$2,000,000	\$62,115,000	\$10,352,500	\$103,730,000	\$6,925,000

1/ Authority personnel indicated that the five year capital program (1987-1991) for the D & R Canal, Spruce Run, and Round Valley Reservoirs is \$13 million.

2/ The construction contract is projected to be let in June 1986 and the project scheduled for completion in mid-1990. The total construction cost (anticipating engineering) is projected at \$66.8 million.

Sources: New Jersey Water Supply Commission and Hammer, Siler, George Associates.

Index Table H-3. NORTH JERSEY DISTRICT WATER SUPPLY COMMISSION CAPITAL EXPENDITURE PROJECTIONS, NEW JERSEY, 1988

Project	1988	1989	1990	1991	1992	1993	1988-1993		1994-2010	
							Total Expend	Avg Annual Expend	Total Expend	Avg Annual Expend
Wanaque lining of pipe	\$0	\$0	\$0	\$0	\$1,000,000	\$0	\$1,000,000	\$166,667	\$0	\$0
Wanaque 1/	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$0	\$0	\$0	\$0	\$1,000,000	\$0	\$1,000,000	\$166,667	\$0	\$0

1/ This facility is new and the projected life of equipment goes beyond the horizon year of 2010. Thus no capital expenditures (for maintenance) are projected.

Sources: North Jersey District Water Supply Commission and Hammer, Siler, George Associates.

**APPENDIX
1**

Table I-1. PROJECTED FEDERAL CAPITAL EXPENDITURES FOR FLOOD CONTROL/STORM WATER MANAGEMENT, NEW JERSEY, 1988-2010
(1986 Constant Dollars)

Sponsor/Project Name ^{1/}	Federal Appropriations				State Appropriations			
	1988-1993		1994-2010		1988-1993		1994-2010	
	Total Expend	Avg Annual Expend	Total Expend	Avg Annual Expend	Total Expend	Avg Annual Expend	Total Expend	Avg Annual Expend
Authorized for construction								
Brook sub-basin ^{2/}	\$0	\$0	\$151,000,000	\$8,882,000	\$0	\$0	\$203,000	\$203,000
Brook's Branch ^{2/}	\$0	\$0	\$20,000,000	\$1,176,000	\$0	\$0	\$26,600,000	\$26,600,000
Brook and Van Winkles Brook ^{2/}	\$0	\$0	\$12,500,000	\$735,000	\$0	\$0	\$17,500,000	\$17,500,000
Brook and Middle River Basin ^{3/}	\$25,700,000	\$4,283,000	\$0	\$0	\$36,500,000	\$6,083,000	\$0	\$0
Brook and Min's Brook ^{3/}	\$16,200,000	\$2,700,000	\$0	\$0	\$21,600,000	\$3,600,000	\$0	\$0
Brook River at Oakland ^{3/}	\$4,800,000	\$800,000	\$0	\$0	\$6,400,000	\$1,067,000	\$0	\$0
Brook and Mahwah Rivers ^{3/}	\$4,600,000	\$767,000	\$0	\$0	\$6,300,000	\$1,050,000	\$0	\$0
Total	\$51,300,000	\$8,550,000	\$183,500,000	\$10,793,000	\$70,800,000	\$11,800,000	\$44,303,000	\$44,303,000
Authorized for constr. in generic provision ^{2/}								
Brook River East bank	\$0	\$0	\$5,000,000	\$294,000	\$0	\$0	\$6,700,000	\$6,700,000
Authorized for constr. subject to secretary review ^{2/}								
Brook at Deal	\$0	\$0	\$1,700,000	\$100,000	\$0	\$0	\$2,300,000	\$2,300,000
Brook Dam at Little Falls	\$0	\$0	\$15,000,000	\$882,000	\$0	\$0	\$20,000,000	\$20,000,000
Brook River basin flood area	\$0	\$0	\$50,000,000	\$2,941,000	\$0	\$0	\$66,700,000	\$66,700,000
Total	\$0	\$0	\$66,700,000	\$3,923,000	\$0	\$0	\$89,000,000	\$89,000,000
Authorized for construction ^{4/}								
Brook River Valley project	\$0	\$0	\$700,000,000	\$41,176,000	\$0	\$0	\$300,000,000	\$300,000,000
Total	\$51,300,000	\$8,550,000	\$955,200,000	\$56,186,000	\$70,800,000	\$11,800,000	\$440,003,000	\$440,003,000

Appendix Table I-1. PROJECTED FEDERAL CAPITAL EXPENDITURES FOR FLOOD CONTROL/STORM WATER MANAGEMENT, NEW JERSEY, 1988-2010

Notes:

- ✓ From NJ project Authorizations as defined in Authorization Bill H.R.6. It should be noted that this legislation only authorized these projects and that no funding was made available. It has been assumed that all projects will be funded by the horizon year of 2010.
- ✓ Assume that these projects will all be financed and constructed in by 2010.
- ✓ Assume that these projects, which the state has already set aside funds for, will receive federal appropriations in the 1988-1993 period.
- ✓ This very large project was not included in the Authorization bill H.R. 6. It is assumed, however that it will be financed and constructed by 2010. This is based on the strong support it has received from both state and federal authorities and the overall need for the project. The state is assumed to support 30% of the total project cost, as presented in the DEP's Capital Improvement Program.

Sources: NJ Department of Environmental Protection -- Water Supply and Watershed Management Element, "The NJ Statewide Flood Control Master Plan -- 1985"; and Hamer, Siler, George Associates.

**APPENDIX
0**

Appendix Table J-1. 1985 RESOURCE RECOVERY LOAN PROGRAM REPAYMENT SCHEDULE, NEW JERSEY, 1988-2010
(1985 Constant Dollars)

Allocation Year	Principal	Annual Payment										1989-1993		1994-2010		
		1988	1989	1990	1991	1992	1993	Total	1994	2001	2002	Total	Total			
1988	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1989	\$28,300,000	\$0	\$0	\$0	\$0	\$0	\$0	\$117,917	\$0	\$117,917	\$0	\$235,834	\$0	\$117,917	\$0	\$117,917
1990	\$28,300,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$117,917	\$117,917	\$0	\$117,917	\$0	\$117,917
1991	\$28,400,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$85,000,000	\$0	\$0	\$0	\$0	\$0	\$0	\$117,917	\$0	\$117,917	\$235,834	\$353,751	\$0	\$0	\$0	\$0
Allocation Year	Principal	Annual Payment										1989-1993		1994-2010		
1988	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1989	\$28,300,000	\$117,917	\$117,917	\$117,917	\$117,917	\$117,917	\$117,917	\$117,917	\$117,917	\$117,917	\$117,917	\$117,917	\$117,917	\$117,917	\$117,917	\$117,917
1990	\$28,300,000	\$117,917	\$117,917	\$117,917	\$117,917	\$117,917	\$117,917	\$117,917	\$117,917	\$117,917	\$117,917	\$117,917	\$117,917	\$117,917	\$117,917	\$117,917
1991	\$28,400,000	\$118,333	\$118,333	\$118,333	\$118,333	\$118,333	\$118,333	\$118,333	\$118,333	\$118,333	\$118,333	\$118,333	\$118,333	\$118,333	\$118,333	\$118,333
Total	\$85,000,000	\$354,167	\$354,167	\$354,167	\$354,167	\$354,167	\$354,167	\$354,167	\$354,167	\$354,167	\$354,167	\$354,167	\$354,167	\$354,167	\$354,167	\$6,020,839

Y The following assumptions were made:

- Repayment terms 20
- Interest rate 0.0%
- First payment begins three years from issuance of loan

Sources: New Jersey Department of Environmental Protection -- Division of Waste Management and Hammer, Siler, George Associates.

**APPENDIX
K**

Appendix Table K-1. PROPOSED STATE AND FEDERAL SHORE PROTECTION PROJECTS, NEW JERSEY, 1982
(1986 Constant Dollars)

Reach	Project Name	Description 2/	Construct. Cost	Projected Maintenance 3/		Total Construct/ Maint Cost
				1988-1993	1994-2010	
1	Multiple Projects	---	\$23,757,041	\$0	\$0	\$0
2	Sandy Hook to Long Branch	M	\$4,406,292	\$505,800	\$1,433,100	\$1,938,900
3	Long Branch to Shark River	LR	\$23,630,508	\$10,750,400	\$32,128,600	\$42,879,000
4	Shark River to Manasquan	RD	\$4,245,912	\$11,434,100	\$34,261,000	\$45,695,100
5	Manasquan to Mantoloking	RD	\$627,264	\$114,400	\$9,016,800	\$9,131,200
6	Mantoloking to Barnegat	RD	\$841,104	\$484,600	\$25,914,800	\$26,399,400
7	Long Beach Island	RD	\$4,321,944	\$2,687,400	\$21,535,100	\$24,222,500
8	Brigantine Island	RD	\$833,976	\$539,200	\$9,839,300	\$10,378,500
9	Absecon Island	RD	Complete	\$40,950,200	\$102,409,500	\$143,359,700
10	Peck Beach	RD	Complete	\$13,478,400	\$46,857,200	\$60,335,600
11	Ludlam Island	RD	Complete	\$47,962,000	\$120,042,000	\$168,004,000
12	Seven Mile Beach	RD	\$831,600	\$341,400	\$17,082,100	\$17,423,500
13	Five Mile Beach	RD	\$883,376	\$377,600	\$956,600	\$1,334,200
14	Cape May to Cape May Point	RD	\$12,838,672	\$47,034,600	\$117,638,500	\$164,673,100
15&1	Multiple Projects	***	\$6,040,980	\$0	\$0	\$0
	Subtotal		\$83,268,669	\$176,660,100	\$539,114,600	\$715,774,700
Federal Projects:						
NA	Barnegat Inlet	***	\$39,100,000	\$0	\$17,000,000	\$17,000,000
NA	Sea Bright/Monmouth Beachs	***	\$40,000,000	\$0	\$112,000,000	\$112,000,000
NA	Egg Harbor Inlet	***	\$75,000,000	\$0	\$67,000,000	\$67,000,000
	Subtotal		\$154,100,000	\$0	\$196,000,000	\$196,000,000

1/ From "New Jersey Shore Protection Master Plan -- 10/81", assembled by the State of New Jersey Department of Environmental Protection -- Division of Coastal Resources.

2/ Description: LR = Limited Restoration; M = Maintenance; RD = Recreational Development.

3/ Derived in Appendix Table K-2 and K-3.

Source: Hammer, Siler, George Associates.

**Appendix Table K-2. PROJECTED PERIODIC MAINTENANCE OF STATE SHORE PROTECTION PROJECTS,
NEW JERSEY, 1968-2010
(1986 Constant Dollars)**

- 1/ The "reach concept" or approach is the method whereby consistent shore protection engineering plans are developed within areas affected by similar coastal process. Each reach corresponds to a specific coastal areas.
- 2/ No available.
- 3/ Maintenance funding distribution methodology:
In the Master Plan under each reach, total project cost and subsequent maintenance costs are listed. Usually the required interval between improvements is defined, however, under the category "Maintenance of Existing Functional Structures", interval expenditures for individual cost items are often not defined. In these cases, it is assumed that this projected expenditure item will require attention at a rate equal to the total cost divided by the projected intervals for "Beach Nourishment" or "Beach Fill" projects.

Sources: State of New Jersey Department of Environmental Protection -- Division of Coastal Resources and Hammer, Siler, George Associates.

Appendix Table K-3. PROJECTED PERIODIC MAINTENANCE OF FEDERAL SHORE PROTECTION PROJECTS, NEW JERSEY, 1988-2010 1/
(1986 Constant Dollars)

Year	Projects		
	<u>Barnegat Inlet</u>	<u>Sea Bright</u>	<u>Egg Harbor</u>
1988	****	****	****
1989	****	****	****
1990	****	****	****
1991	****	****	****
1992	****	****	****
1993	****	****	****
1994	\$1,000,000	****	****
1995	\$1,000,000	\$7,000,000	\$2,000,000
1996	\$1,000,000	\$7,000,000	\$2,000,000
1997	\$1,000,000	\$7,000,000	\$9,000,000
1998	\$1,000,000	\$7,000,000	\$2,000,000
1999	\$1,000,000	\$7,000,000	\$2,000,000
2000	\$1,000,000	\$7,000,000	\$9,000,000
2001	\$1,000,000	\$7,000,000	\$2,000,000
2002	\$1,000,000	\$7,000,000	\$2,000,000
2003	\$1,000,000	\$7,000,000	\$9,000,000
2004	\$1,000,000	\$7,000,000	\$2,000,000
2005	\$1,000,000	\$7,000,000	\$9,000,000
2006	\$1,000,000	\$7,000,000	\$2,000,000
2007	\$1,000,000	\$7,000,000	\$2,000,000
2008	\$1,000,000	\$7,000,000	\$9,000,000
2009	\$1,000,000	\$7,000,000	\$2,000,000
2010	\$1,000,000	\$7,000,000	\$2,000,000
Total	\$17,000,000	\$112,000,000	\$67,000,000

1/ Coastal Resource personnel at the Department of Environmental Protection provided very rough estimates regarding future maintenance associated with these projects. No formal studies have been done assessing these future costs. It is assumed that the federal government will pay for all maintenance associated with these three projects.

Sources: State of New Jersey Department of Environmental Protection
-- Division of Coastal Resources and Hammer, Siler, George Associates.

APPENDIX L

Appendix Table L-1. CAPITAL EXPENDITURES FOR ELEMENTARY AND SECONDARY SCHOOLS, NEW JERSEY, FY 1985
(1986 Constant Dollars)

<u>County</u>	<u>Capital Outlay 1/</u>	<u>Improvement Authorization 2/</u>	<u>Total Capital Expenditures</u>	<u>Enrollment 3/</u>	<u>Capital Expenditures Per Pupil 4/</u>
Atlantic	\$684,279	\$1,598,901	\$2,283,180	30,991	\$75
Bergen	\$7,187,819	\$2,583,224	\$9,771,043	106,597	\$93
Burlington	\$2,494,415	\$1,613,841	\$4,108,256	62,017	\$67
Camden	\$3,961,657	\$1,850,486	\$5,812,143	79,529	\$74
Cape May	\$644,751	\$237,923	\$882,674	11,666	\$77
Cumberland	\$550,753	\$80,326	\$631,079	25,425	\$25
Essex	\$4,304,732	\$8,755,116	\$13,059,848	128,645	\$103
Gloucester	\$1,462,185	\$4,777,917	\$6,240,102	36,300	\$174
Hudson	\$3,979,998	\$13,645,169	\$17,625,167	70,983	\$252
Hunterdon	\$1,099,055	\$2,184,400	\$3,283,455	16,867	\$198
Mercer	\$2,190,689	\$6,915,098	\$9,105,787	44,164	\$209
Middlesex	\$5,394,093	\$1,680,503	\$7,074,596	86,555	\$83
Monmouth	\$5,566,847	\$1,140,063	\$6,706,910	84,019	\$81
Morris	\$5,650,968	\$2,045,160	\$7,696,128	67,533	\$116
Ocean	\$3,591,365	\$449,023	\$4,040,388	59,131	\$69
Passaic	\$1,762,766	\$8,918,351	\$10,681,117	68,598	\$158
Salem	\$612,234	\$112,829	\$725,063	12,055	\$61
Somerset	\$1,807,098	\$753,495	\$2,560,593	30,716	\$85
Sussex	\$1,157,504	\$2,024,655	\$3,182,159	23,982	\$135
Union	\$3,162,659	\$1,316,983	\$4,479,642	68,226	\$67
Warren	\$1,002,235	\$0	\$1,002,235	15,224	\$67
Total	\$58,268,102	\$62,683,463	\$120,951,565	1,129,223	\$107

Appendix Table L-1. CAPITAL EXPENDITURES, FOR ELEMENTARY AND
SECONDARY SCHOOLS, NEW JERSEY, FY 1985
(1986 Constant Dollars)
(Continued)

- 1/ Expenditures on fixed assets such as sites, buildings and equipment which are made from the current year's budget.
- 2/ Expenditures made from the proceeds of bond sales during or prior to the current year's budget.
- 3/ Enrollment as of September 30, 1985.
- 4/ 1986 constant dollars.

Sources: NJ Department of Education -- Division of Finance and Hammer, Siler, George Associates.

Appendix Table L-2. ENROLLMENT TRENDS FOR ELEMENTARY AND SECONDARY SCHOOLS BY COUNTY, NEW JERSEY, FY 1980-1987

County	1980	1981	1982	1983	1984	1985	1986	1987	1980-1987	
									Average Change Actual	Percent
Atlantic	35,070	33,482	32,583	31,767	31,320	30,991	30,882	31,025	(578)	-1.6%
Bergen	130,627	124,813	119,002	113,889	110,120	106,597	103,860	102,094	(4,076)	-3.1%
Burlington	71,323	68,692	66,462	64,203	62,967	62,017	61,279	61,537	(1,398)	-2.0%
Camden	87,755	85,104	82,876	81,279	80,259	79,529	79,772	79,833	(1,132)	-1.3%
Cape May	11,913	12,045	11,675	11,429	11,420	11,666	12,002	12,296	55	0.5%
Cumberland	28,522	27,651	26,744	26,072	25,601	25,425	25,200	25,007	(502)	-1.8%
Essex	145,698	141,113	136,929	134,232	131,878	128,645	126,314	123,851	(3,121)	-2.1%
Gloucester	39,122	38,119	37,520	36,901	36,290	36,300	36,060	36,367	(394)	-1.0%
Hudson	79,400	77,629	75,062	73,767	72,792	70,983	69,744	68,449	(1,564)	-2.0%
Hunterdon	18,853	18,235	17,640	17,194	16,901	16,867	16,785	16,819	(291)	-1.5%
Mercer	49,440	47,712	46,490	45,795	44,633	44,164	44,165	44,052	(770)	-1.6%
Middlesex	102,705	98,527	94,226	91,291	88,367	86,555	84,996	84,463	(2,606)	-2.5%
Monmouth	95,891	92,500	89,067	86,495	84,584	84,019	83,356	83,199	(1,813)	-1.9%
Morris	80,568	77,324	74,630	72,063	69,666	67,533	65,599	64,197	(2,339)	-2.9%
Ocean	62,325	61,340	60,225	59,039	58,826	59,131	60,004	60,714	(230)	-0.4%
Passaic	76,209	74,588	72,150	70,290	69,147	68,598	67,224	66,139	(1,439)	-1.9%
Salem	13,110	12,872	12,414	12,274	12,306	12,055	12,052	11,978	(162)	-1.2%
Somerset	38,244	36,037	34,274	32,755	31,554	30,716	30,532	30,432	(1,116)	-2.9%
Sussex	25,010	24,798	24,447	24,131	23,981	23,982	23,886	23,973	(148)	-0.6%
Union	79,861	77,031	74,236	71,922	69,738	68,226	67,131	66,131	(1,961)	-2.5%
Warren	16,613	16,396	16,066	15,732	15,491	15,224	14,846	14,911	(243)	-1.5%
Total	1,288,259	1,246,000	1,204,718	1,172,520	1,147,841	1,129,223	1,115,689	1,107,467	(25,828)	-2.0%

Sources: NJ Department of Education and Hamer, Siler, George Associates.

Appendix Table L-3. RATIO OF COUNTY TO STATE ENROLLMENT TRENDS FOR ELEMENTARY AND SECONDARY SCHOOLS, NEW JERSEY, FY 1983-1987

County	1983 Enrollment		1984 Enrollment		1985 Enrollment		1986 Enrollment		1987 Enrollment		1983-1987 Avg Ratio
	County	Ratio 1/	County	Ratio	County	Ratio	County	Ratio	County	Ratio	
Atlantic	31,767	2.7%	31,320	2.7%	30,991	2.7%	30,882	2.8%	31,025	2.8%	2.8%
Bergen	113,889	9.7%	110,120	9.6%	106,597	9.4%	103,860	9.3%	102,094	9.2%	9.5%
Burlington	64,203	5.5%	62,967	5.5%	62,017	5.5%	61,279	5.5%	61,537	5.6%	5.5%
Camden	81,279	6.9%	80,259	7.0%	79,529	7.0%	79,772	7.2%	79,833	7.2%	7.1%
Cape May	11,429	1.0%	11,420	1.0%	11,666	1.0%	12,002	1.1%	12,296	1.1%	1.0%
Cumberland	26,072	2.2%	25,601	2.2%	25,425	2.3%	25,200	2.3%	25,007	2.3%	2.2%
Essex	134,232	11.5%	131,878	11.5%	128,645	11.4%	126,314	11.3%	123,851	11.2%	11.4%
Gloucester	36,901	3.2%	36,290	3.2%	36,300	3.2%	36,060	3.2%	36,367	3.3%	3.2%
Hudson	73,767	6.3%	72,792	6.3%	70,983	6.3%	69,744	6.3%	68,449	6.2%	6.3%
Hunterdon	17,194	1.5%	16,901	1.5%	16,867	1.5%	16,785	1.5%	16,819	1.5%	1.5%
Mercer	45,795	3.9%	44,633	3.9%	44,164	3.9%	44,165	4.0%	44,052	4.0%	3.9%
Middlesex	91,291	7.8%	88,367	7.7%	86,555	7.7%	84,996	7.6%	84,463	7.6%	7.7%
Monmouth	86,495	7.4%	84,584	7.4%	84,019	7.4%	83,356	7.5%	83,199	7.5%	7.4%
Morris	72,063	6.2%	69,666	6.1%	67,533	6.0%	65,599	5.9%	64,197	5.8%	6.0%
Ocean	59,039	5.0%	58,826	5.1%	59,131	5.2%	60,004	5.4%	60,714	5.5%	5.3%
Passaic	70,290	6.0%	69,147	6.0%	68,598	6.1%	67,224	6.0%	66,139	6.0%	6.0%
Salem	12,274	1.1%	12,306	1.1%	12,055	1.1%	12,052	1.1%	11,978	1.1%	1.1%
Somerset	32,755	2.8%	31,554	2.8%	30,716	2.7%	30,532	2.7%	30,432	2.8%	2.8%
Sussex	24,131	2.1%	23,981	2.1%	23,982	2.1%	23,886	2.1%	23,973	2.2%	2.1%
Union	71,922	6.1%	69,738	6.1%	68,226	6.0%	67,131	6.0%	66,131	6.0%	6.1%
Warren	15,732	1.3%	15,491	1.4%	15,224	1.4%	14,846	1.3%	14,911	1.4%	1.3%
Total	1,172,520	100.0%	1,147,841	100.0%	1,129,223	100.0%	1,115,689	100.0%	1,107,467	100.0%	100.0%

Sources: NJ Department of Education and Hammer, Siler, George Associates.

ndix Table L-4. ENROLLMENT PROJECTIONS FOR ELEMENTARY AND SECONDARY SCHOOLS BY COUNTY, NEW JERSEY, FY 1988-2010 1/

1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
1,243	30,035	30,021	30,291	30,767	31,330	31,952	32,662	33,370	34,127	34,622	35,124	35,633
1,913	103,199	103,150	104,078	105,712	107,647	109,786	112,225	114,658	117,259	118,959	120,684	122,434
1,480	60,065	60,037	60,577	61,528	62,654	63,899	65,319	66,734	68,249	69,238	70,242	71,261
7,633	77,101	77,064	77,757	78,978	80,423	82,021	83,844	85,661	87,605	88,875	90,164	91,471
1,441	11,362	11,357	11,459	11,639	11,852	12,087	12,356	12,624	12,910	13,097	13,287	13,480
4,635	24,466	24,454	24,674	25,062	25,521	26,028	26,606	27,183	27,799	28,202	28,611	29,026
5,025	124,168	124,107	125,222	127,189	129,514	132,092	135,027	137,957	141,084	143,128	145,202	147,310
5,301	35,058	35,042	35,357	35,912	36,569	37,296	38,125	38,951	39,835	40,412	40,998	41,593
8,947	68,474	68,441	69,057	70,141	71,425	72,844	74,462	76,076	77,802	78,931	80,075	81,236
16,388	16,276	16,268	16,415	16,672	16,978	17,315	17,699	18,083	18,493	18,762	19,034	19,310
13,218	42,921	42,901	43,286	43,966	44,771	45,660	46,675	47,686	48,768	49,476	50,193	50,921
34,451	83,871	83,831	84,585	85,913	87,485	89,224	91,206	93,183	95,297	96,679	98,081	99,503
81,702	81,141	81,102	81,832	83,117	84,638	86,320	88,238	90,150	92,195	93,532	94,889	96,264
65,758	65,307	65,276	65,863	66,897	68,121	69,475	71,019	72,558	74,204	75,280	76,372	77,479
57,732	57,335	57,308	57,823	58,731	59,806	60,995	62,350	63,701	65,147	66,091	67,050	68,022
66,198	65,744	65,713	66,303	67,344	68,577	69,940	71,494	73,043	74,701	75,784	76,883	77,997
11,770	11,690	11,684	11,789	11,974	12,193	12,436	12,712	12,987	13,282	13,475	13,670	13,868
30,243	30,035	30,021	30,291	30,767	31,330	31,952	32,662	33,370	34,127	34,622	35,124	35,633
23,206	23,046	23,036	23,243	23,608	24,040	24,517	25,062	25,605	26,186	26,566	26,951	27,342
66,528	66,071	66,040	66,634	67,680	68,919	70,288	71,850	73,407	75,073	76,161	77,266	78,386
14,739	14,638	14,631	14,763	14,994	15,269	15,572	15,918	16,263	16,632	16,874	17,118	17,366
99,551	1,092,003	1,091,484	1,101,299	1,118,591	1,139,062	1,161,699	1,187,511	1,213,250	1,240,775	1,258,766	1,277,018	1,295,535

Appendix Table L-4. ENROLLMENT PROJECTIONS FOR ELEMENTARY AND SECONDARY SCHOOLS BY COUNTY, NEW JERSEY, FY 1988-2010
 (1986 Constant Dollars)
 (Continued)

County	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Atlantic	36,150	36,674	37,206	37,745	38,293	38,848	39,411	39,983	40,562	41,151
Bergen	24,209	126,011	127,838	129,691	131,572	133,480	135,415	137,379	139,370	141,391
Burlington	72,294	73,342	74,406	75,484	76,579	77,689	78,816	79,959	81,118	82,294
Canden	92,797	94,143	95,508	96,893	98,298	99,723	101,169	102,636	104,124	105,634
Cape May	13,675	13,874	14,075	14,279	14,486	14,696	14,909	15,125	15,344	15,567
Cumberland	29,447	29,874	30,307	30,747	31,193	31,645	32,104	32,569	33,041	33,520
Essex	149,446	151,609	153,805	156,041	158,301	160,596	162,925	165,287	167,689	170,118
Gloucester	42,196	42,808	43,429	44,058	44,697	45,345	46,003	46,670	47,346	48,033
Hudson	82,414	83,609	84,822	86,051	87,299	88,565	89,849	91,152	92,474	93,815
Hunterdon	19,590	19,874	20,162	20,454	20,751	21,052	21,357	21,667	21,981	22,299
Mercer	51,659	52,408	53,168	53,939	54,721	55,515	56,319	57,136	57,964	58,805
Middlesex	100,946	102,410	103,895	105,401	106,930	108,480	110,053	111,649	113,267	114,910
Monmouth	97,660	99,076	100,513	101,970	103,449	104,949	106,471	108,015	109,581	111,170
Morris	78,603	79,742	80,899	82,072	83,262	84,469	85,694	86,936	88,197	89,476
Ocean	69,008	70,009	71,024	72,054	73,098	74,158	75,234	76,325	77,431	78,554
Passaic	79,128	80,276	81,440	82,621	83,819	85,034	86,267	87,518	88,787	90,074
Salem	14,069	14,274	14,481	14,690	14,903	15,120	15,339	15,561	15,787	16,016
Somerset	36,150	36,674	37,206	37,745	38,293	38,848	39,411	39,983	40,562	41,151
Sussex	27,738	28,141	28,549	28,963	29,383	29,809	30,241	30,679	31,124	31,575
Union	79,523	80,676	81,846	83,032	84,236	85,458	86,697	87,954	89,229	90,523
Warren	17,618	17,874	18,133	18,396	18,662	18,933	19,208	19,486	19,769	20,055
Total	1,314,320	1,333,378	1,352,712	1,372,326	1,392,225	1,412,412	1,432,892	1,453,669	1,474,747	1,496,131

1/ State-wide enrollment projections are subdivided by County by multiplying the 1983-1987 average enrollment distribution factor (calculated in Appendix Table L-3) by the total state-wide enrollment projections (calculated in Table 29).

Sources: NJ Department of Education and Hamer, Siler, George Associates.

Appendix Table L-5. CAPITAL EXPENDITURE PROJECTIONS FOR ELEMENTARY AND SECONDARY SCHOOLS BY COUNTY, NEW JERSEY, FY 1988-2010
(1986 Constant Dollars)

County	1988 1/	1989 1/	1990 1/	1991	1992	1993	1988-1993 Avg Annual Expend	1988-1993 Total Expend
Atlantic	\$35,815,792	\$38,809,175	\$1,737,200	\$2,271,825	\$2,307,525	\$2,349,750	\$13,881,878	\$83,291,267
Bergen	\$25,958,294	\$12,868,184	\$18,463,170	\$9,679,254	\$9,831,216	\$10,011,171	\$14,468,548	\$86,811,289
Burlington	\$16,692,700	\$7,648,000	\$2,387,750	\$4,058,659	\$4,122,376	\$4,197,818	\$6,517,884	\$39,107,303
Camden	\$6,168,090	\$3,620,650	\$3,843,650	\$5,754,018	\$5,844,372	\$5,951,302	\$5,197,014	\$31,182,082
Cape May	\$6,912,567	\$2,991,183	\$2,489,384	\$882,343	\$896,203	\$912,604	\$2,514,047	\$15,084,284
Cumberland	\$1,495,600	\$740,000	\$1,085,750	\$616,850	\$626,550	\$638,025	\$867,129	\$5,202,775
Essex	\$58,584,988	\$11,970,184	\$7,568,700	\$12,897,866	\$13,100,467	\$13,339,942	\$19,577,025	\$117,462,147
Gloucester	\$12,699,440	\$4,573,100	\$4,423,496	\$6,152,118	\$6,248,688	\$6,363,006	\$6,743,308	\$40,459,848
Hudson	\$1,816,700	\$4,841,000	\$1,832,200	\$17,402,364	\$17,675,532	\$17,999,100	\$10,261,149	\$61,566,896
Hunterdon	\$6,025,701	\$983,410	\$2,856,640	\$3,250,170	\$3,301,056	\$3,361,644	\$3,296,437	\$19,778,621
Mercer	\$18,402,300	\$5,260,660	\$2,202,310	\$9,046,774	\$9,188,894	\$9,357,139	\$8,909,680	\$53,458,077
Middlesex	\$10,741,448	\$6,646,687	\$5,309,811	\$7,020,555	\$7,130,779	\$7,261,255	\$7,351,756	\$44,110,535
Morrmouth	\$11,366,050	\$10,797,570	\$14,202,272	\$6,628,392	\$6,732,477	\$6,855,678	\$9,430,407	\$56,582,439
Morris	\$7,681,314	\$7,699,568	\$5,916,733	\$7,640,108	\$7,760,052	\$7,902,036	\$7,433,302	\$44,599,811
Ocean	\$11,941,350	\$15,408,650	\$1,543,110	\$3,989,787	\$4,052,439	\$4,126,614	\$6,843,658	\$41,061,950
Passaic	\$12,162,198	\$6,544,230	\$4,333,032	\$10,475,874	\$10,640,352	\$10,835,166	\$9,165,142	\$54,990,852
Salem	\$1,568,175	\$616,125	\$1,060,775	\$719,129	\$730,414	\$743,773	\$906,399	\$5,438,391
Somerset	\$33,383,325	\$7,357,700	\$5,317,700	\$2,574,735	\$2,615,195	\$2,663,050	\$8,985,284	\$53,911,705
Sussex	\$3,134,925	\$1,936,025	\$786,175	\$3,137,805	\$3,187,080	\$3,245,400	\$2,571,235	\$15,427,410
Union	\$18,108,129	\$5,812,405	\$9,136,552	\$4,464,478	\$4,534,560	\$4,617,573	\$7,778,950	\$46,673,697
Warren	\$1,754,303	\$1,615,185	\$2,289,665	\$989,121	\$1,004,598	\$1,023,023	\$1,445,983	\$8,675,895
Total	\$302,413,389	\$158,739,691	\$98,786,075	\$119,652,225	\$121,530,825	\$123,755,069	\$154,146,212	\$924,877,274

Appendix Table L-5. CAPITAL EXPENDITURE PROJECTIONS FOR ELEMENTARY AND SECONDARY SCHOOLS BY COUNTY, NEW JERSEY, FY 1988-2010
 (1986 Constant Dollars)
 (Continued)

County	1994	1995	1996	1997	1998	1999	2000	1994-2000 Total Expend
Atlantic	\$2,396,400	\$2,449,650	\$2,502,750	\$2,559,525	\$2,596,650	\$2,634,300	\$2,672,475	\$17,811,750
Bergen	\$10,210,098	\$10,436,925	\$10,663,194	\$10,905,087	\$11,063,187	\$11,223,612	\$11,386,362	\$75,888,465
Burlington	\$4,281,233	\$4,376,373	\$4,471,178	\$4,572,683	\$4,638,946	\$4,706,214	\$4,774,487	\$31,821,114
Camden	\$6,069,554	\$6,204,456	\$6,338,914	\$6,482,770	\$6,576,750	\$6,672,136	\$6,768,854	\$45,113,434
Cape May	\$930,699	\$951,412	\$972,048	\$994,070	\$1,008,469	\$1,023,099	\$1,037,960	\$6,917,757
Cumberland	\$650,700	\$665,150	\$679,575	\$694,975	\$705,050	\$715,275	\$725,650	\$4,836,375
Essex	\$13,605,476	\$13,907,781	\$14,209,571	\$14,531,652	\$14,742,184	\$14,955,806	\$15,172,930	\$101,125,400
Gloucester	\$6,489,504	\$6,633,750	\$6,777,474	\$6,931,290	\$7,031,688	\$7,133,652	\$7,237,182	\$48,234,540
Hudson	\$18,356,688	\$18,764,424	\$19,171,152	\$19,606,104	\$19,890,612	\$20,178,900	\$20,471,472	\$136,439,352
Hunterdon	\$3,428,370	\$3,504,402	\$3,580,434	\$3,661,614	\$3,714,876	\$3,768,732	\$3,823,380	\$25,481,808
Mercer	\$9,542,940	\$9,755,075	\$9,966,374	\$10,192,512	\$10,340,484	\$10,490,337	\$10,642,489	\$70,930,211
Middlesex	\$7,405,592	\$7,570,098	\$7,734,189	\$7,909,651	\$8,024,357	\$8,140,723	\$8,258,749	\$55,043,359
Morrmouth	\$6,991,920	\$7,147,278	\$7,302,150	\$7,467,795	\$7,576,092	\$7,686,009	\$7,797,384	\$51,968,628
Morris	\$8,059,100	\$8,238,204	\$8,416,728	\$8,607,664	\$8,732,480	\$8,859,152	\$8,987,564	\$59,900,892
Ocean	\$4,208,655	\$4,302,150	\$4,395,369	\$4,495,143	\$4,560,279	\$4,626,450	\$4,693,518	\$31,281,564
Passaic	\$11,050,520	\$11,296,052	\$11,540,794	\$11,802,758	\$11,973,872	\$12,147,514	\$12,323,526	\$82,135,036
Salem	\$758,596	\$775,432	\$792,207	\$810,202	\$821,975	\$833,870	\$845,948	\$5,638,230
Somerset	\$2,715,920	\$2,776,270	\$2,836,450	\$2,900,795	\$2,942,870	\$2,985,540	\$3,028,805	\$20,186,650
Sussex	\$3,309,795	\$3,383,370	\$3,456,675	\$3,535,110	\$3,586,410	\$3,638,385	\$3,691,170	\$24,600,915
Union	\$4,709,296	\$4,813,950	\$4,918,269	\$5,029,891	\$5,102,787	\$5,176,822	\$5,251,862	\$35,002,877
Warren	\$1,043,324	\$1,066,506	\$1,089,621	\$1,114,344	\$1,130,558	\$1,146,906	\$1,163,522	\$7,754,781
Total	\$126,214,380	\$129,018,708	\$131,815,116	\$134,805,635	\$136,760,576	\$138,743,434	\$140,755,289	\$938,113,138

CAPITAL EXPENDITURE PROJECTIONS FOR ELEMENTARY AND SECONDARY SCHOOLS BY COUNTY, NEW JERSEY, FY 1988-2010
 (1986 Constant Dollars)
 (Continued)

	2002	2003	2004	2005	2006	2007	2008	2009
01								
11,250	\$2,750,550	\$2,790,450	\$2,830,875	\$2,871,975	\$2,913,600	\$2,955,825	\$2,998,725	\$3,042,150
51,437	\$11,719,023	\$11,888,934	\$12,061,263	\$12,236,196	\$12,413,640	\$12,593,595	\$12,776,247	\$12,961,410
63,698	\$4,913,914	\$4,985,202	\$5,057,428	\$5,130,793	\$5,205,163	\$5,280,672	\$5,357,253	\$5,434,906
66,978	\$6,966,582	\$7,067,592	\$7,170,082	\$7,274,052	\$7,379,502	\$7,486,506	\$7,595,064	\$7,705,176
52,975	\$1,068,298	\$1,083,775	\$1,099,483	\$1,115,422	\$1,131,592	\$1,147,993	\$1,164,625	\$1,181,488
36,175	\$746,850	\$757,675	\$768,675	\$779,825	\$791,125	\$802,600	\$814,225	\$826,025
92,938	\$15,615,727	\$15,841,915	\$16,072,223	\$16,305,003	\$16,541,388	\$16,781,275	\$17,024,561	\$17,271,967
42,104	\$7,448,592	\$7,556,646	\$7,666,092	\$7,777,278	\$7,890,030	\$8,004,522	\$8,120,580	\$8,238,204
68,328	\$21,069,468	\$21,375,144	\$21,684,852	\$21,999,348	\$22,318,380	\$22,641,948	\$22,970,304	\$23,303,448
178,820	\$3,935,052	\$3,992,076	\$4,049,892	\$4,108,698	\$4,168,296	\$4,228,686	\$4,290,066	\$4,352,238
196,731	\$10,953,272	\$11,112,112	\$11,273,251	\$11,436,689	\$11,602,635	\$11,770,671	\$11,941,424	\$12,114,476
178,518	\$8,500,030	\$8,623,285	\$8,748,283	\$8,875,190	\$9,003,840	\$9,134,399	\$9,266,867	\$9,401,161
910,460	\$8,025,156	\$8,141,553	\$8,259,570	\$8,379,369	\$8,500,869	\$8,624,151	\$8,749,215	\$8,876,061
117,948	\$9,250,072	\$9,384,284	\$9,520,352	\$9,658,392	\$9,798,404	\$9,940,504	\$10,084,576	\$10,230,852
761,552	\$4,830,621	\$4,900,656	\$4,971,726	\$5,043,762	\$5,116,902	\$5,191,146	\$5,266,425	\$5,342,739
502,224	\$12,683,608	\$12,867,520	\$13,054,118	\$13,243,402	\$13,435,372	\$13,630,186	\$13,827,844	\$14,028,346
868,209	\$870,714	\$883,341	\$896,090	\$909,083	\$922,320	\$935,679	\$949,221	\$963,007
072,750	\$3,117,290	\$3,162,510	\$3,208,325	\$3,254,905	\$3,302,080	\$3,349,935	\$3,398,555	\$3,447,770
744,630	\$3,799,035	\$3,854,115	\$3,910,005	\$3,966,705	\$4,024,215	\$4,082,535	\$4,141,665	\$4,201,740
328,041	\$5,405,292	\$5,483,682	\$5,563,144	\$5,643,812	\$5,725,686	\$5,808,699	\$5,892,918	\$5,978,343
180,406	\$1,197,558	\$1,214,911	\$1,232,532	\$1,250,354	\$1,268,511	\$1,286,936	\$1,305,562	\$1,324,523
796,172	\$144,866,704	\$146,967,378	\$149,098,261	\$151,260,253	\$153,453,550	\$155,678,463	\$157,935,922	\$160,226,030

resented in Department of Education (Facility Planning
 "Capital Improvement Program For Fiscal Years 1986-1990"

s: NJ Department of Education -- Facility Planning; and Hamer,
 Siler, George Associates.