

# NEW JERSEY'S LOCAL INFRASTRUCTURE: An Assessment Of Needs

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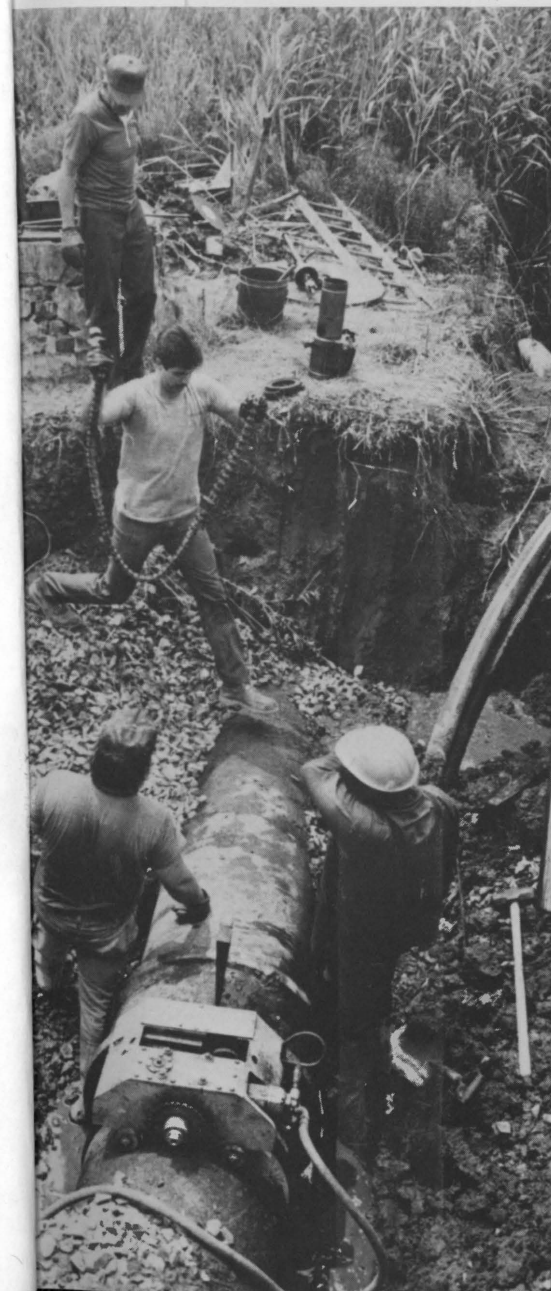


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COUNTY AND MUNICIPAL GOVERNMENT  
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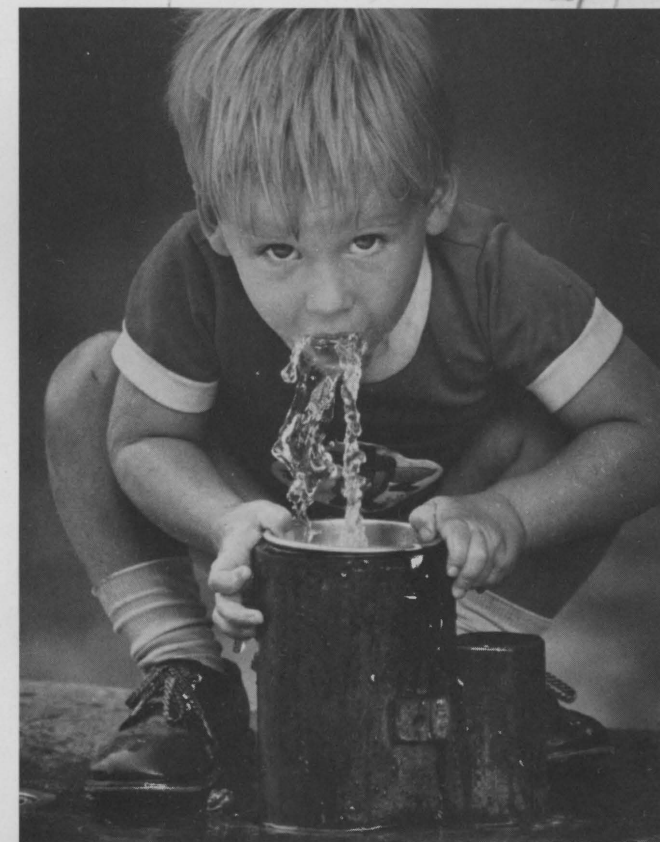
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\*The New Jersey Water Supply Handbook, December 1983  
\*New Jersey's Local Infrastructure: An Assessment of Needs, September 1984  
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### Front Cover:

Child drinking water. (Tom Herde/Trenton Times) Jersey City water main break at Seaview  
Avenue in Secaucus. (New Jersey Newsphotos)



State of New Jersey

## COUNTY AND MUNICIPAL GOVERNMENT STUDY COMMISSION

# NEW JERSEY'S LOCAL INFRASTRUCTURE:

# AN ASSESSMENT OF NEEDS

SEPTEMBER 1984

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**TO HIS EXCELLENCY, GOVERNOR THOMAS H. KEAN, AND HONORABLE  
MEMBERS OF SENATE AND GENERAL ASSEMBLY:**

The County and Municipal Government Study Commission is pleased to submit its twenty-eighth report, *New Jersey's Local Infrastructure: An Assessment of Needs*. This report is intended to provide State and local government officials, as well as the general public, with comprehensive information on the condition and capital investment needs of New Jersey's local infrastructure systems. These systems include roads and bridges, wastewater treatment and collection systems, water distribution systems, and flood control facilities.

New Jersey's county and municipal governments have the responsibility to construct and maintain the vast majority of the state's infrastructure. Cumulatively, these systems play a critical role in New Jersey's overall infrastructure network, helping to maintain the state's economic vitality and protecting the health and safety of its residents.

While most local infrastructure systems are maintained in sound working order, increasing fiscal pressures have forced county and municipal governments in New Jersey to reduce or defer needed maintenance and repair for many of these facilities. As a result, a significant portion of New Jersey's local infrastructure systems are in poor or very poor condition and in need of immediate repair or replacement. Together, these deteriorated infrastructure systems represent an unmet capital investment need of approximately 264 million dollars each year.

Because of the importance of these local infrastructure systems, the Commission urges that efforts begin at the State level to assist counties and municipalities to meet this essential need. Already the Legislature and the Governor have addressed the long-term needs of local transportation systems through the recent enactment of the Transportation Trust Fund legislation. The Commission is pleased to have played a positive role in this process by providing both the Legislature and the Administration with information on the condition and capital investment needs of New Jersey's local roads and bridges. However, critical investment needs still exist for local wastewater and flood control facilities. These systems play such a vital role in protecting New Jersey's environment and the health and well-being of its residents that the Commission recommends the passage of two new State aid initiatives for these systems.

In addition to new sources of funding, Commission recommendations include revisions in the enabling legislation relating to local infrastructure systems, changes in the permit and review process for local roads and bridges, a more comprehensive State and county role in flood control, and an analysis of the status of the large urban and small private water companies in the state. The Commission and its staff will work with the Legislature, the Executive, and other State and local leaders to formulate the appropriate legislative responses to these and other recommendations contained in this report.

Finally, the Commission hopes that this report will form the foundation of increased efforts to assess and meet the infrastructure needs of New Jersey's local governments. With a consistent and continuing commitment to the repair and rehabilitation of these facilities, we can ensure that New Jersey will continue to grow and prosper.

Respectfully submitted by the members of the County and Municipal Government Study Commission:

<u>/s/ Carmen A. Orechio, <i>Chairman</i></u>	<u>/s/ Peter Shapiro</u>
<u>/s/ Garrett W. Hagedorn</u>	<u>/s/ Catherine B. Frank</u>
<u>/s/ John A. Lynch, Jr.</u>	<u>/s/ Fred G. Stickel, III</u>
<u>/s/ John O. Bennett</u>	<u>/s/ John E. Trafford</u>
<u>/s/ Robert P. Hollenbeck</u>	<u>/s/ Robert F. Casey</u>
<u>/s/ Stephen Capestro</u>	<u>/s/ Benajmin R. Fitzgerald</u>
<u>/s/ Guy E. Millard</u>	<u>/s/ Amy Piro</u>

## ACKNOWLEDGEMENTS

The scope and comprehensive nature of a report on the condition and needs of the local infrastructure systems in New Jersey required the advice, counsel and assistance of many groups and individuals. The Commission is particularly indebted to those county and municipal engineers who took the time to complete and return the Commission's survey questionnaires. Without their thoughtful and thorough responses, this report would not be possible. In this regard, the Commission would like to thank the New Jersey Society of Municipal Engineers and the County Engineers Association for encouraging their members to participate in our study.

In addition, the Commission would like to acknowledge the Commissioners and staff of the New Jersey Departments of Transportation, Environmental Protection, and Community Affairs for providing the Commission's research staff with invaluable information, advice, and counsel in the development of this report. In particular, the Commission would like to express its appreciation to the members of the former Division of State and Regional Planning in the Department of Community Affairs, including Richard Ginman, former director of the division, Richard Binetsky, Dennis Jones, John Parke, Ken Butko, and Juhan Simonson for their participation in the design, application, and compilation of the Commission's survey questionnaires.

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Charles Van Benschotten, Chairman of the Save Our State Committee of the New Jersey Alliance for Action, and Ellis Veiser, Managing Director of the New Jersey Alliance for Action, as well as the other members of the Save Our State Committee for their cooperation and assistance in bringing together individuals concerned about local infrastructure and encouraging a constructive exchange of information and ideas on potential financing alternatives.

The Commission would also like to acknowledge the important contributions made by previous members of the Commission's staff in the development of this



report. Specifically, Thomas Hall, who assisted in the development of the Commission's survey and provided the initial direction for the project; David Loretti, who assisted in the compilation and analysis of research data; and Barbara Pallotti, who typed the initial drafts of this report.

Finally, the Commission would especially like to acknowledge the contributions made by Eugene J. Schneider, former Executive Director of the Commission. The Commission commends his leadership and foresight in identifying the rehabilitation of New Jersey's infrastructure systems as one of the critical issues of the 1980's.

While the individuals who participated in the development of this project share a commitment to the repair and renewal of New Jersey's local infrastructure, the responsibility for this report, its conclusions, recommendations, and implications rests solely with the Commission and its staff. However, without the assistance of the above named individuals, agencies, and groups, this report could not have been written.

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## EXECUTIVE SUMMARY

An adequately designed and well-maintained network of local infrastructure, including roads, bridges, water distribution systems, wastewater collection and treatment systems, and flood control facilities, is necessary both to maintain New Jersey's economic vitality and to protect the health and safety of its residents. While representing such a critical public investment need, many of these facilities have been allowed to deteriorate to the point where inefficient operation, service disruptions, and (in cases of prolonged neglect) major structural failures and collapse have either occurred or are inevitable.

Already a significant portion of New Jersey's local infrastructure has deteriorated sufficiently to warrant a major investment in its repair and rehabilitation. According to a recent survey of county and municipal engineers conducted by the Commission:

- 19 percent, or 4600 miles, of New Jersey's municipal streets and 10 percent, or 600 miles, of New Jersey's county roads are in poor or very poor condition and in need of immediate resurfacing or reconstruction.
- One fourth of the county bridges in the state are rated as being in poor or very poor condition and in need of "major reconstruction and replacement", with 6.5 percent being in such poor condition that they represent a serious safety threat and "are closed or should be closed."
- One fourth of the engineers responding to the Commission's survey indicate that the wastewater collection system in their jurisdiction has "capacity problems", experiences "excessive infiltration", and is in need of "major rehabilitation or replacement."
- Sixty-five percent of the municipalities which have their wastewater treated indicate that the capacity of their treatment plant was not adequate, with 45 percent of these municipalities anticipating that they would have to invest in additional sewage treatment facilities within the next ten years.
- Thirteen percent of the municipalities responding to the Commission's survey indicate that their water distribution system is in poor condition, with many jurisdictions indicating that lack of knowledge over the true condition of the pipes buried underground has resulted in a "crises management" approach to the maintenance of the system.
- One third of municipal engineers rate their present flood control facilities as being in poor condition and "not performing their designed function for reasons of structural or material deterioration."

### **Investment Trends (See Chapter II):**

The deteriorated condition of New Jersey's local infrastructure systems is the result of declines in the level of capital investment and maintenance for these facilities. In the past decade, there has been a significant decline in capital investment at the state and local level, both nationwide and in New Jersey. This decline has been measured in real dollar levels, per capita, and as a percent of GNP and GRP. In New Jersey, total capital outlays by municipal governments remained relatively stable

(in real dollar levels) until the middle of the 1970's. After a moderate jump in 1978, total capital outlays declined by one-third, falling from 223.3 million dollars in 1978 (1972 dollars) to 149.3 million in 1981. After a decline in the early 1970's, real capital spending by New Jersey's counties have just about remained even with inflation, averaging between 50 to 60 million dollars annually over the past decade.

This decline in aggregate capital investment is primarily the result of lowered investment levels for highways and educational facilities, reflecting a shift in government priorities and reduced needs. In addition, increased competition from other government services, inflation, high interest rates, CAPS on local government spending and taxing, and lower federal aid levels have worked to reduce real levels of capital investment for infrastructure systems as local governments have been forced to prioritize the allocation of scarce public dollars. The result has been delayed, reduced, or eliminated capital investment and maintenance, lengthened replacement cycles for major infrastructure systems, and—for many jurisdictions—gaps between actual local government capital investment and measured needs.

#### Local Capital Investment Needs:

Based on estimates from county and municipal engineers, New Jersey's local governments require 494.0 million dollars each year to maintain an adequate repair and replacement cycle for their major infrastructure systems. (See Figure S-1) Com-

**FIGURE S-1**  
**NEW JERSEY'S COUNTY AND MUNICIPAL INFRASTRUCTURE SYSTEMS**  
**ANNUAL CAPITAL INVESTMENT NEEDS SUMMARY**  
(000,000's)

	Average Capital Expenditures (1977-1981)	Unmet Capital Investment Needs	Total Annual Capital Investment Needs
Municipal Systems:			
Streets & Roads	52.4	55.9	108.3
Wastewater Collection	90.0	66.7	156.7
Storm Drainage	23.9	53.1	77.0
Water Distribution <sup>1</sup>	28.0	35.0	63.0
Subtotal	194.3	210.7	405.0
County Systems:			
Roads	25.3	14.7	40.0
Bridges	10.1	38.9	49.0
Subtotal	35.4	53.6	89.0
Totals	229.7	264.3	494.0
Other Investment Needs:			
Wastewater Treatment	—	—	178.5
		Grand Total	672.5

Data prepared by The County and Municipal Government Study Commission based on the returns from a survey of county and municipal engineers in New Jersey, 1982.

bined with the 178.5 million dollars of annual needs for wastewater treatment facilities, capital investment needs for local infrastructure systems total approximately 672 million dollars a year.

However, between 1977 and 1981, New Jersey's local governments invested only 229.7 million dollars each year in their local infrastructure systems, or less than one-half of the total estimated needs. Excluding the needs for wastewater treatment facilities, this spending "gap" represents an *unmet* capital investment need of 264.3 million dollars each year.

While any unmet capital investment needs should be addressed, critical areas of need include county bridges, where individual project costs are high and total needs are approximately 5 times that of present levels of investment; flood control facilities, where estimated needs are over three times that of present efforts; and wastewater treatment and collection where total needs are approximately 335 million dollars a year.

#### Distribution of Needs:

For wastewater collection, flood control, and water distribution systems, unmet capital investment needs tend to be concentrated primarily in high-distress urban and older suburban communities in the state (See Figure S-2). This distribution represents the need to upgrade and rehabilitate the existing infrastructure systems in these jurisdictions.

The distribution of the annual capital shortfall for municipal streets and roads indicates that unmet capital investment needs for local infrastructure systems are not just limited to older urban areas, but are significantly distributed in suburban communities as well. Over one-half of municipal road needs are (according to engineer estimates) in communities classified as suburban in character.

#### SYSTEM BY SYSTEM FINDINGS AND RECOMMENDATIONS

While analyzing infrastructure needs in the aggregate is useful to help formulate a comprehensive investment strategy based on comparative levels of need, *the Commission has determined that in the case of local infrastructure what is needed is a more selective and system specific approach.* Financing alternatives appropriate for one infrastructure system may not be appropriate for others. In addition, present levels of state and federal aid, as well as future aid strategies, will vary depending on the type of infrastructure system. Based on this strategy of disaggregating local infrastructure needs, the Commission evaluated, for each of the local infrastructure systems, the condition, capital investment needs, sources of available funding, and the intergovernmental planning and administrative processes for that system.

#### County and Municipal Roads and Bridges (See Chapter III):

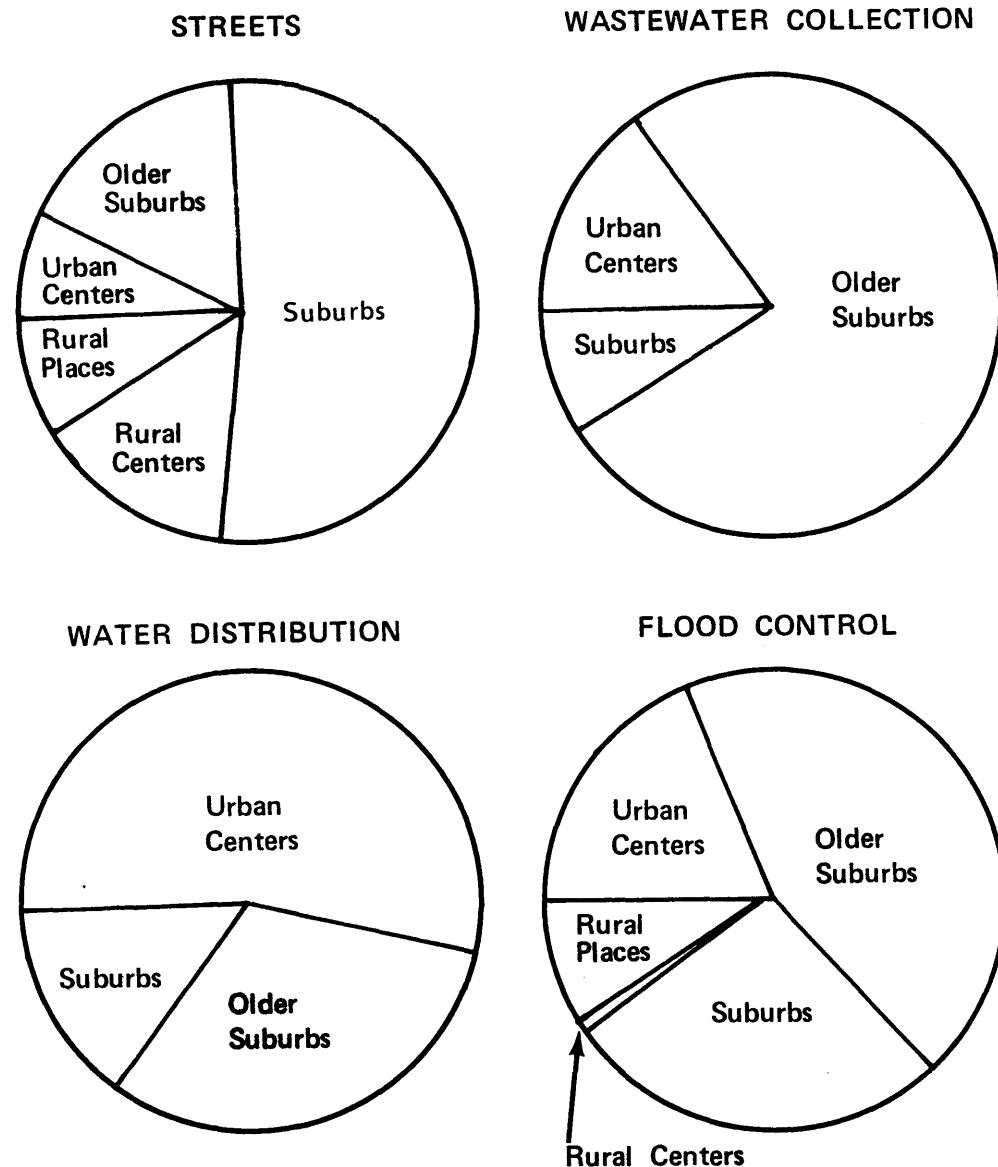
##### Condition and Needs

While in generally good to fair condition overall, a significant portion of New Jersey's local road system is rated as being in poor or very poor condition by local engineers. Municipal engineers categorize 19 percent of the streets and roads under their jurisdiction as being in poor or very poor condition, representing 4600 miles of



Figure S-2

**DISTRIBUTION OF UNMET CAPITAL INVESTMENT NEEDS FOR MUNICIPAL INFRASTRUCTURE SYSTEMS**



New Jersey's 23,800 miles of municipal roads. While county roads fair slightly better than municipal streets and roads, approximately 9 percent of the county roads on the federal aid system and 12 percent of the roads off the system are rated as being in poor or very poor condition by county engineers. Based on these estimates, over 600 miles of the roads in these counties need immediated resurfacing or reconstruction.

*There is presently a 56 million dollar a year "gap" between estimated capital needs for municipal streets and roads and present levels of capital investment for these systems. Added to an unmet annual capital investment need of 14 million dollars for county roads, the annual unmet capital investment needs for local streets and roads total 70 million dollars each year.*

Unmet capital needs for municipal streets and roads tend to be distributed in municipalities which are suburban in character, relatively younger and more prosperous than other municipalities. However, there are significant problems of unmet capital needs in both urban municipalities, which tend to have the most miles of roads per jurisdiction, a high intensity of use, and low or declining fiscal capacity; and rural communities, in which selective deterioration can have a significant impact on the local economy.

**Bridges**

Of the some 8,100 bridges and culverts under the jurisdiction of the nineteen (19) county governments responding to the Commission's survey, approximately 2,000, or 25 percent, are rated as being in poor or very poor condition and in need of "major reconstruction and replacement," with 6.5 percent being in such poor condition that they represent a serious safety threat and "are closed or should be closed".

Out of the 19 counties responding to the Commission survey, 17 claimed that their jurisdiction was on an inadequate repair and replacement cycle for bridges. *Together, these 17 counties require an additional capital investment of 38.9 million dollars each year to maintain an adequate repair and replacement cycle for bridges, or a shortfall nearly 4 times as much as is presently being spent on bridges each year.*

The overhead railroad bridge issue offers a unique subset of the overall problem of county bridge investment needs. According to a 1983 report on the overhead railroad bridge issue by the North Jersey Transportation Coordinating Council:

Eight percent of the overhead railroad bridges in the 11 counties in the NJTCC region are "structurally obsolete" and another 42 percent are "structurally deficient," requiring an estimated 191.4 million dollars in rehabilitation and reconstruction.

**Available Aid**

Since the mid-1970's, State aid strategy has been to raise monies primarily through bond issues and to allocate these funds primarily as the local match for available federal aid. Using this strategy, the State has provided local governments with approximately 370.4 million dollars in State and federal aid for roads and bridges between fiscal years 1979 and 1983, or approximately 74.1 million dollars each year. The Bridge and Rehabilitation Fund Bond Act of 1983 will provide local governments with 37.5 million dollars of State aid over the next several years and is expected to

match approximately 70 million dollars of available federal aid. However, all available funds from the 1979 Transportation Act have been appropriated, and without additional bond issues, increases in the amount of State aid appropriations in the general operating fund, or some other form of funding, local governments will essentially be on their own in providing for their street and road needs.

While providing local governments with millions in additional funds, matching available federal monies is limited as a broad-based aid strategy by the fact that one-third of county roads and over 90 percent of municipal streets and roads are not on the federal aid system.

#### **Intergovernmental Process**

According to county and municipal engineers, delays and elapsed time for DEP and DOT reviews and permitting add significant costs and administrative oversight for street, road, and bridge projects. To alleviate these problems, county and municipal engineers suggest greater local flexibility in designing and constructing major capital projects and recommend a much larger role for county engineering departments in certifying local projects.

#### **Commission Recommendations**

*The Commission recommends enactment of the State highway and FAUS swap component of the Governor's transportation trust fund proposal, as well as an additional separate funding component for local streets, roads, and bridges. While no specific funding level or allocation mechanism is recommended, the Commission notes that the non-FAUS component of the Transportation Bond Act of 1979 provided local governments with approximately 15 million dollars each year.*

*The Commission also recommends that county engineers be authorized to review and approve all local projects (pursuant to overall standards established by the State Department of Transportation) for municipal and county roads. Finally, the Commission recommends that legislation be passed authorizing counties to develop and to present to the State Department of Transportation an inventory and assessment of the costs of repairing and reconstructing the overhead railroad bridges within their boundaries.*

#### **Wastewater Collection and Treatment (See Chapter IV):**

##### **Condition and Needs**

The condition of local wastewater collector systems is generally good; however, one fourth of municipalities responding to the Commission's survey rate the collection system in their jurisdiction as being in poor or very poor condition, and in need of major repair or replacement. In addition, municipal engineers indicate that the underground and "invisible" characteristic of the collection system, makes an accurate assessment of condition and needs difficult and has resulted in a "crises management" approach to the repair and replacement of these facilities.

*Based on returns from the Commission's survey, unmet capital investment needs for collection systems in New Jersey total 66.7 million dollars each year, with unmet needs concentrated primarily in "distressed", urban communities throughout the state. Together with the 90 million dollars that are projected to be*

currently spent on these facilities, total collection system needs are approximately 156.7 million dollars each year.

A significant component of local collection system needs is the capital investment required to separate the various combined sewer systems into separate sanitary and storm drainage systems. This accounts for fully 70 percent of all unmet collection system needs at the local level.

According to the 1982 Department of Environmental Protection Estimates, capital investment needs for treatment and collection facilities in New Jersey total approximately 6.2 billion dollars, or approximately 327 million dollars each year between 1982 and the year 2000.

Responses from the Commission's survey indicates that there is still a necessary commitment to expand treatment capacity and upgrade the level of treated wastes throughout the state. Of the municipalities responding to the Commission's survey, 65 percent indicated that the capacity of their treatment plant is not adequate and 45 percent anticipated that they would have to invest in additional sewerage treatment capacity within the next ten years.

#### **Available Aid**

Federal monies available from the Section 201 Construction Grant Program have declined in recent years to the point where the Department of Environmental Protection estimates that *"less than one fifth of (New Jersey's) needed projects can be constructed with the monies that have been authorized for the State's Construction Grants Program."* With recent amendments to the program, the federal share of the funding has dropped from 75 percent to only 55 percent of total project costs.

Available funds for wastewater projects in recent state bond issues have been essentially depleted, with only 16 million dollars remaining from the Natural Resources Fund of 1980.

#### **Commission Recommendations**

*The Commission recommends that 15 million dollars in State aid be provided each year for local wastewater treatment and collection facilities. The Commission further recommends that these State funds be utilized to stimulate the construction of sewerage projects which would not be constructed without this aid.*

*In addition, the Commission recommends that private sector financing alternatives for wastewater systems be utilized wherever possible. To encourage local governments to utilize their borrowing capacity, the State should adopt a program of bond guarantees to enable local governments to obtain the lowest possible interest rates.*

#### **Water Distribution Systems (See Chapter V):**

##### **Condition and Needs**

Thirteen percent of the respondents to the Commission's survey indicated that their water distribution system is in poor condition. As with wastewater collection facilities, municipal engineers and local government officials indicate that lack of knowledge of the true condition of this underground and "invisible" system has

resulted in a "crises management" approach to the planning, maintenance, and operation of these systems.

**Total unmet needs for the water distribution system under the jurisdiction of public purveyors are approximately 35 million dollars each year**, with approximately one half of the public water purveyors reporting that their jurisdiction is on an inadequate repair and replacement cycle for their water distribution system.

Unmet capital investment needs are predominantly concentrated in high-distress, urban municipalities in the state, with the capital investment needs of the larger municipal systems accounting for this distribution. These large municipal systems are older and have deteriorated to the point where an almost complete reconstruction of the system is necessary. Combined with low capital investment levels in recent years, and the fact that water revenues from these urban systems are often diverted into the general operating fund of the municipality, urban water distribution systems represent an important public capital investment need that is presently not being met.

The State Water Supply Master Plan indicates that major capital expenditures should be made in the immediate future to secure additional water supply sources for the people of northeastern and central New Jersey. The DEP Action Program through 1986 indicates a total of 325 million dollars of water supply projects throughout the state.

In addition to water distribution and supply needs, increasing federal and State standards for potable water will increase the need for additional treatment facilities, making water treatment an important component of overall capital investment strategies for water purveyors in the state.

#### **Available Aid**

The State's 1981 Water Supply Bond Act authorized 350 million dollars for a variety of State and local water projects, including 65 million dollars in loan monies for the rehabilitation and reconstruction of water distribution systems in the state, another 25 million dollars for loans for the purchase of small private water purveyors and other remedial work, and an additional 15 million dollars in loans for various water system interconnection projects, or a total of 105 million dollars for local projects between 1983 and 1986. The federal government has never had a major aid program for water supply systems.

#### **Other Issues**

DEP officials laud the larger investor owned systems as being "sufficiently financed, well managed, and adequately equipped" and cite them as an example of how they feel public purveyors should operate.

Conversely, the state's numerous small private water purveyors which, in many cases, serve only a single development or complex, often do not have the necessary resources and operating capital for maintenance and investment of their systems, resulting in declining service reliability over time.

#### **Commission Recommendations**

**Due to recent initiatives by the State, water systems represent the one area of local infrastructure where sufficient aid monies are available for local governments. While urban systems do represent a significant unmet investment need**

**that should be addressed, adequate funds remain in the 1981 Water Supply Bond Act to finance the immediate needs of most municipally operated water systems. Based on the condition and needs of the major urban systems, the Commission recommends that the DEP and the Board of Public Utilities conduct a pilot infrastructure study of the Newark or Jersey City water systems to determine the appropriate means to upgrade and maintain those systems. In addition, the Commission recommends that the DEP and BPU analyze the long range future of each of the small failing water companies in the state.**

#### **Flood Control and Storm Drainage (See Chapter VI):**

##### **Condition and Needs**

Of the 108 municipalities which responded to the Commission's survey, 80 percent indicated that they had some type of flooding problem. Of these municipalities, approximately 42 percent indicated that they experience "frequent" flooding (occurring at least once every year), while 53 percent indicated that flooding occurs occasionally (at 2 to 20 year intervals). Most major or regional flooding occurs in the river basins in the northeastern and central parts of the state, while localized flooding occurs predominantly in urban municipalities and is associated with inadequate storm drainage facilities. **One third of the engineers responding to the Commission's survey rate their present flood control system as being in poor condition and "not performing its designed function for reasons of structural or material deterioration."**

A particular problem is the deteriorating condition of the storm water drainage facilities in some of the older urban communities of the state. These facilities were designed and constructed decades ago, and in many cases backups due to structural collapse, clogging, or low design capacity can cause significant localized flooding during times of heavy rains.

About half of the municipalities currently have or are developing some type of flood control program to address their current flooding problems. In terms of needed capital investment, the programs contemplated will cost significantly more than local governments are now spending on existing flood control facilities. **The projected unmet capital investment needs for municipal flood control and storm drainage facilities in New Jersey totals approximately 53 million dollars each year, or approximately twice as much as is presently being spent on these systems each year.**

Unmet capital investment needs for flood control and storm drainage are predominantly concentrated in the older suburban communities of the state, with significant amounts of need distributed in both the urban and growing suburban areas as well. This distribution of unmet capital investment needs reflects the need to rehabilitate inadequate storm drainage facilities in the older and highly developed urban and inner suburban ring communities of the state, as well as the need to upgrade and expand existing flood control and storm drainage facilities as more people and property become exposed to flooding risks.

##### **Available Aid**

The United States Army Corps of Engineers is the primary implementing agency for federal flood control programs authorized under the *Federal Flood Control Acts*

of 1936. Related to its flood control activities, the Corps provides state and local governments with assistance in data collection and analysis, project planning and design, and project construction. Corp activities are usually associated with large scale flood control and water projects which are regional in scope and beyond the ability of single local units of government to address.

In addition to the Corps, the U.S. Soil Conservation Service works as a regional coordinating agency for a variety of flood control and soil conservation projects in the rural areas of the state.

State aid to municipalities and counties for flood control facilities has come primarily in the form of matching grants from state bond issues. The *Emergency Flood Control Bond Act of 1978* and the *Safe Dam* component of the *Natural Resources Bond Act of 1980* authorized a total of 40 million dollars of grant monies for a variety of local flood control projects, as well as the construction and rehabilitation of dams in New Jersey. At the present time, 29 million dollars remain unobligated from these bond issues.

#### ***Commission Recommendations***

***Due to the availability of current bond funds, no new state bond issue will be required this year. However, continuing local flood control needs will require the State to develop a new source of financing for local flood control facilities within the next two years. The Commission recommends that the State take the lead role in formulating and implementing a comprehensive flood control strategy for the Passaic River Basin, including assistance and participation in the financing and construction of the major flood control projects in the region. The Commission also recommends that county governments play a stronger role in formulating and implementing regional flood control programs.***

#### ***Enabling Legislation (See Chapter VII):***

The Commission studied the adequacy of the statutory powers required for local governments to finance, acquire, contract and plan for local infrastructure systems. The Commission has determined that the statutes relating both to the financing of local infrastructure systems and the power to contract are incomplete and, as presently formulated, confusing and difficult to follow. A particular problem is the enabling legislation for municipal flood control facilities, where there is no statute now in existence authorizing municipalities to construct and finance flood control facilities.

#### ***Commission Recommendations***

***The Commission recommends the enactment of three new Municipal and County Infrastructure Statutes to be incorporated in the ongoing revision of Title 40. These revisions would be a Municipal and County Sewer Act, a Municipal and County Water Supply Act, and a Municipal and County Street and Road Act. In addition, a new Municipal and County Flood Control Act should be enacted in the immediate future to provide complete powers to county and municipal governments to construct flood control facilities and storm drainage systems. The new laws will replace the existing inadequate laws which are both incomplete and hard to follow because of the gradual accumulation of unnecessary and redundant provisions over the last century. To accomplish these revisions the Commission recommends that municipal and county engineers and attorneys be consulted in the preparation and amendment of the successor statutes.***

## **Chapter I INTRODUCTION**

One of the basic functions of county and municipal government is the construction and maintenance of public capital facilities. These facilities include water delivery systems, roads and bridges, wastewater treatment and collection systems, flood control and storm drainage facilities, as well as solid waste facilities, public buildings, and parks.<sup>1</sup> Collectively, these systems have become popularly known as a community's "infrastructure," and are considered by many economists and planners to constitute the vital physical connecting network of our society.

Any deterioration of these facilities and systems can have a significant impact on the economic vitality of a community, region, or state, and can ultimately represent a significant health and safety risk to the users of these facilities. Because of their importance, significant and measured deterioration of these facilities would suggest either the existence of structural inadequacies in the administrative, planning, or fiscal mechanisms established to maintain and replace them; or the existence of significant fiscal, political, or economic constraints which prevent or hinder local governments from meeting such an essential need.

Early research studies by urban policy analysts and news reports by the popular press have documented the deterioration of public capital facilities in New Jersey and throughout the nation, as well as a measured decline in the financial commitment of all levels of government to the repair and maintenance of these facilities. Illustrated with graphic footage and photographs of pot-holed and flooded streets, crumbling and rusted bridges, and deteriorated highways, these reports have dramatically increased public awareness of the problem and have helped to create a constituency for repair and rehabilitation of these systems.

However, even the more sophisticated research studies have focused on the problem in the aggregate, and at the state and federal level. Local infrastructure systems, which comprise the vast majority of public capital facilities, have, conversely, received less attention. What has been needed is an assessment of the present condition of local infrastructure systems, a measurement of the magnitude and distribution of any unmet capital needs, and an analysis of the capacity of local governments to meet these needs. Because of the extent of local infrastructure systems and the significant public capital investment that these systems represent, an assessment of this type would provide public officials and planners with vital information and data on which to develop appropriate capital planning and financing strategies.

What has complicated such an assessment, has been the lack of any real quantitative measures of the dimensions of the needs at the local level. Early research by the Commission has shown that the existing methods of compiling information about the condition of local infrastructure systems are both incomplete and uneven in quality, resulting from uncoordinated efforts at the state level and uneven resources and expertise at the local level. As noted in the Commission's 1982 interim report, *County and Municipal Capital Deterioration in New Jersey*:



The elements of local capital investment policy are fragmented throughout a system of budget formulation and approval, aid administration and regulatory control that meanders ad hoc on an intergovernmental level with virtually no coordinated direction, let alone any agreed upon common set of objectives with respect to local capital investment policy.

In addition,

Too many of our communities have no readily available inventory of their capital facilities or their condition, particularly where underground or out-of-sight facilities are concerned. Records are rarely kept for any length of time or in any systematic, uniform, and retrievable manner. Much reliance is put on the special study, usually done for the purpose of grant application or bonding, at which time detailed information is developed for the particular project.

### **Purpose and Goals of This Report:**

It is in response to these deficiencies that the Commission began its analysis of the process of infrastructure construction, maintenance, and renewal at the local government level. This research report, which is the result of that analysis, is intended to provide State and local government policy makers with **organized and coherent information on the condition and needs of the major infrastructure systems under the jurisdiction of county and municipal governments**. The Commission feels that this task is critical, in light of the major decisions that State and local leaders will be making in the immediate future in regards to the planning and financing of a comprehensive strategy to meet New Jersey's infrastructure needs. It is the Commission's belief, that without a comprehensive evaluation of the condition and needs of local infrastructure systems, which make up such an important component of New Jersey's overall infrastructure network, the formulation and implementation of State policy in this area will likely be flawed or misdirected.

Specifically, the Commission has attempted to answer the following questions for each major component of the local infrastructure network:

1. What is the size and extent of the infrastructure system throughout the state, and what types of governments or public agencies have responsibility for the construction, operation, and maintenance of that system?
2. What is the present condition of the infrastructure system?
3. What is the magnitude and distribution of the **unmet** capital investment needs of the system?
4. What are the funding sources for the system? What is the current local fiscal effort and what is the present and projected future State and federal aid levels for the system?
5. Are there any administrative, economic, or statutory constraints which prevent local governments from meeting their needs for this system?
6. Do local governments have all the necessary statutory powers to plan, finance, construct, and operate these facilities? Does the lack of any of these limit the ability of local governments in meeting their needs?

Finally, the Commission is especially interested in the implications that the answers to these questions have in regards to the formulation of appropriate financing strategies for local infrastructure. While not making specific recommendations in terms

of financing structures, the Commission hopes that in the process of answering these essential questions a methodology can be created for establishing priorities in the allocation of the state's scarce capital investment resources. Comparing, for each infrastructure system discussed in this report:

1. The level of unmet capital investment needs;
2. The amount of fiscal resources presently available; and
3. The projected future resources that are expected to be available,

the Commission has recommended in the Executive Summary of this report a strategy for allocating and timing additional State efforts to assist local governments in meeting their essential infrastructure needs.

### **Research Strategies:**

To accomplish these goals, the Commission adopted a research strategy which included the following:

1. **Survey of Local Engineers.** To identify conditions and quantify needs, the Commission, in conjunction with the Division of State and Regional Planning of the Department of Community Affairs, developed a series of questionnaires which were mailed to county and municipal engineers throughout the state. These surveys asked the engineers to use their professional judgment to assess the conditions and identify the needs of the infrastructure systems under their jurisdiction. In addition, the engineers were asked to evaluate the intergovernmental aid and regulatory process and the impact that this process has on the capacity of local governments to maintain and rehabilitate their infrastructure.

2. **Local Case Studies.** To analyze the ability and capacity of local governments to address their existing and projected infrastructure needs, the Commission conducted several in-depth case studies. The principal goals of the case studies were to assess the effectiveness of the local administrative and planning processes in meeting local capital needs, and to identify any constraints or obstacles which may decrease or limit this effectiveness.

3. **Other Research Activities.** To place local infrastructure condition and needs into a broader national and regional context, the Commission staff reviewed relevant literature, conducted interviews, and had meetings with academicians and professionals active in the area of infrastructure assessment and financing. In addition, the Commission staff took part in various conferences and seminars on the infrastructure issue and worked closely with several agencies and organizations interested in infrastructure revitalization, including the Port Authority of New York and New Jersey, the Division of State and Regional Planning of the New Jersey Department of Community Affairs, and the Save Our State Committee of the New Jersey Alliance for Action.

### **Approach to the Analysis: System and Jurisdiction Diversity**

While the term "infrastructure" has been useful in directing attention and concern toward the need to reinvest in our public capital facilities, it has tended to obscure the diverse characteristics of the different infrastructure systems and the jurisdictions

which construct and maintain these facilities. This, in turn, may lead to an oversimplification of the problems and issues inherent in the disinvestment in local infrastructure and, ultimately, to the adoption of financing techniques and policies which are overly broad in concept and approach.

The evidence from the surveys and Commission research suggest that what is needed is a more ***selective and system specific approach*** to the analysis of the infrastructure issue—particularly at the local level. Local and intergovernmental planning, administrative, and financing structures appropriate for one infrastructure system may not be appropriate for the others. In addition, differences in size, structure, and organization of local governments, as well as difference in the physical, social, and economic environments in which they operate (from older urban-core areas to rural and exurban regions), can significantly affect the capacity of local governments to dedicate the resources and the expertise necessary (on a consistent and continuing basis) to construct, maintain and repair their infrastructure systems. There can exist, depending on the jurisdiction and the infrastructure system, any number of fiscal economic and political constraints which can limit the potential options that a community may have in addressing their infrastructure needs.

Realizing these differences in both systems and jurisdictions, the approach of this study has been to disaggregate the analysis of local infrastructure. After a description of capital financing trends in Chapter 2, what follows is an evaluation of the condition, unmet needs, and available sources of funding for the construction and maintenance of New Jersey's local infrastructure.

## NOTES

1. While infrastructure can be defined broadly to include solid waste facilities, public buildings, and parks—all of which represent significant capital investment costs for local government—the Commission decided to limit its analysis to those systems which are most directly associated with the service or life support needs of the community; including roads and bridges, which provide for the movement of people and goods in and out of the community; as well as water distribution, wastewater, and flood control facilities, which protect and maintain the environment. While solid waste facilities could fall in the latter category, the issues and problems that are associated with these facilities are so comprehensive and complex that they are better treated in a separate analysis.

## Chapter II FINANCING TRENDS

Without periodic maintenance and repair, capital facilities will deteriorate as steel rusts, concrete disintegrates, and pipes weaken and burst through. This process is inevitable, and is inherent in the physical characteristics of the materials used to construct these systems, accelerating if levels of use exceed original design standards. If allowed to continue unabated, incremental deterioration in these systems will ultimately lead to major structural failure and collapse. At the very least, this will result in a disruption of service and an inconvenience. More likely, it will result in a serious threat to the health and safety of the persons who use or depend on these facilities.

Not only is consistent and periodic maintenance and repair necessary to keep these facilities in working order, but it also represents a prudent investment strategy for counties and municipalities which have spent millions of dollars on their design and construction. Beyond fiscal prudence, this investment in the repair and reconstruction of public capital facilities, which have a direct impact on the health, safety, and economic viability of a community, represents one of the basic responsibilities of government. Meeting this responsibility requires not only a continuing allocation in the annual budget for maintenance and repair costs, but also a systematic and planned program of capital investment to upgrade, expand, and institute major repairs to these systems. Unfortunately, evidence indicates that there has been a continual and measured decline in the commitment of all levels of government in the capital investment required to meet these needs.

### **State and Local Government Investment Trends:**

#### ***National Trends***

Nationwide, state and local capital investment has declined steadily since the late 1960's and early 1970's. In the past decade and a half, real levels of capital investment (measured in 1972 dollars) by state and local governments have declined 29.1 percent, falling from a high of 32.9 billion dollars in 1970 to 23.6 billion in 1981. (See Table II-1) During the same period, per capita state and local government capital investment fell from \$135.10 annually to \$72.20, for a decline of 46.6 percent. Overall, state and local government capital investment has become a smaller component of the national economy, declining from approximately 3 percent of Gross National Product in the mid-1960's to slightly more than 1 percent in the beginning of the 1980's.<sup>1</sup>

#### ***New Jersey Region***

Similar trends in expenditures for capital investment and public works have been evident in New Jersey, with a recent study by the Regional Plan Association documenting this decline in public capital investment in the Northern New Jersey and New York

TABLE II-1  
GOVERNMENT EXPENDITURES FOR FIXED CAPITAL  
INVESTMENT IN CURRENT AND CONSTANT DOLLARS  
(\$ in billions)

	Current Dollar Expenditures			Constant 1972 Dollar <sup>2</sup> Expenditures		
	Total <sup>1</sup>	Federal	State & Local	Total	Federal	State & Local
1960	\$26.6	\$13.1	\$13.5	\$40.3	\$18.5	\$21.8
1965	34.2	14.1	20.1	48.4	18.8	29.6
1970	42.8	14.0	28.8	48.2	15.3	32.9
1971	45.6	15.4	30.2	48.1	16.1	32.0
1972	48.9	18.0	30.9	49.3	18.1	31.2
1973	51.5	17.9	33.6	48.8	17.3	31.5
1974	58.4	17.7	40.7	48.0	15.9	32.1
1975	63.0	21.2	41.8	48.3	17.1	31.2
1976	63.3	23.4	39.9	45.8	17.6	28.2
1977	64.2	25.2	39.0	43.6	17.5	26.1
1978	75.7	29.0	46.7	46.2	18.0	28.2
1979	83.7	32.9	50.8	46.4	18.9	27.5
1980	—	—	54.9	—	—	26.6
1981	—	—	54.3	—	—	23.6

<sup>1</sup>Includes federal military expenditures.

<sup>2</sup>Based on the consumer price index.

SOURCE: BUREAU OF ECONOMIC ANALYSIS, U.S. DEPARTMENT OF COMMERCE

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City region.<sup>2</sup> In the area studied by the RPA, public capital investment peaked in 1972, as a result of public investment programs in highways, sewage treatment, and mass transit. At that time, public capital outlays in the region were approximately 4.3 billion dollars and accounted for 3 percent of Gross Regional Product. By the end of the decade, as public spending priorities shifted, public capital formation in the region declined to approximately 1.4 billion dollars, or about 1 percent of Gross Regional Product.<sup>3</sup>

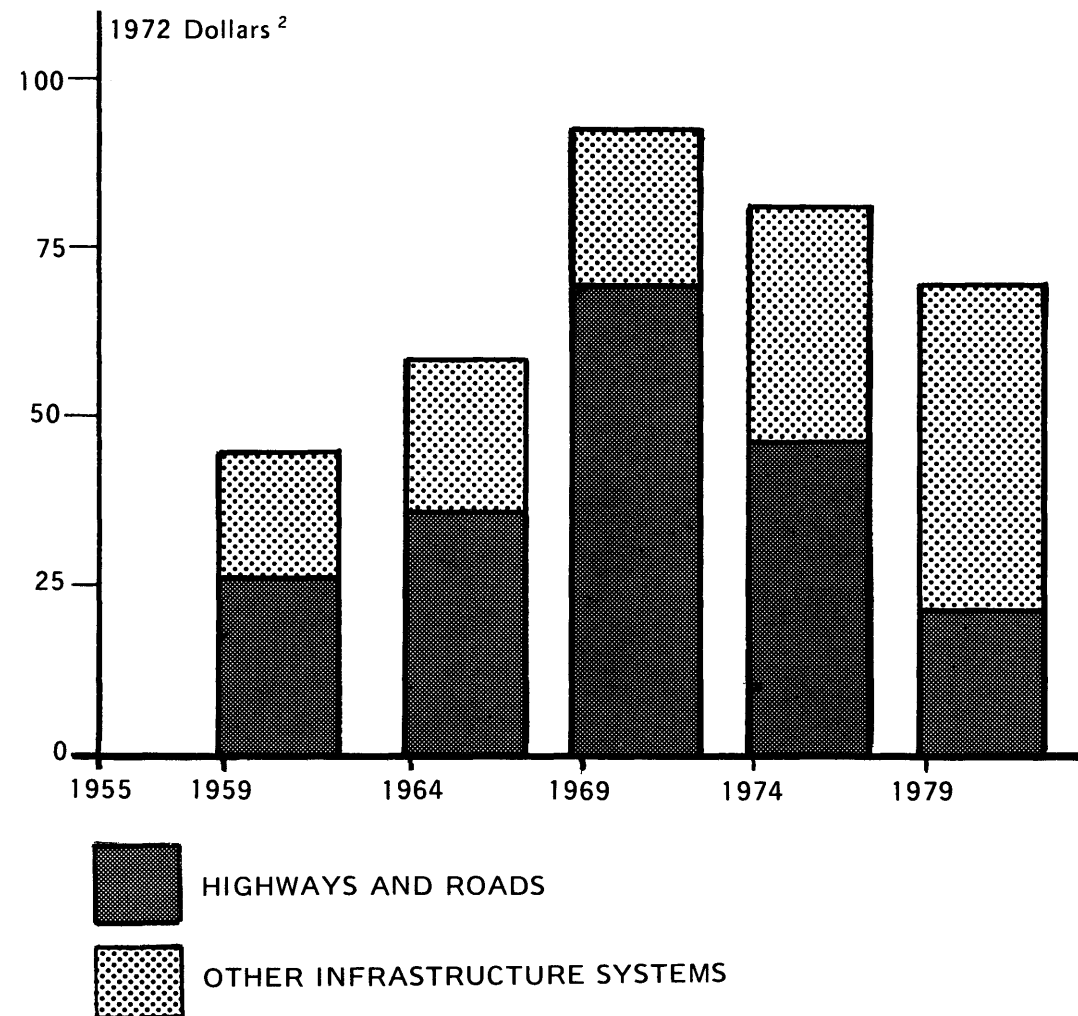
Figure II-1 illustrates the decline in per capita public capital spending in the New Jersey Subregion as measured by the RPA. As can be seen from the chart, public expenditures on capital facilities, which never reached \$100 per capita in the New Jersey Subregion, have slowly decreased since the late 1960's, primarily due to a precipitous decline in public capital investment for highways, which had made up the major portion of these expenditures.

#### County and Municipal Government Trends

Available data on capital outlays for county and municipal governments in New Jersey indicates a similar, if somewhat less clear, picture of capital investment at the

Figure II-1

REAL PER CAPITA PUBLIC EXPENDITURES  
IN THE NEW JERSEY SUBREGION<sup>1</sup> BY FUNCTION, 1959-1979



(Source Regional Plan Association, 1982)

<sup>1</sup> New Jersey Subregion of the RPA Includes...Bergen, Essex, Hudson, Hunterdon, Mercer, Middlesex, Monmouth, Morris, Ocean, Passaic, Somerset, Sussex, Union and Warren counties.

<sup>2</sup> Based on changes in the consumer price index

TABLE II-2  
CAPITAL OUTLAYS: NEW JERSEY  
LOCAL GOVERNMENTS 1970-1981<sup>1</sup>  
(000,000's)

	MUNICIPALITIES			COUNTIES		
	Total Capital Outlays	Public Works	Other	Total Capital Outlays	Public Works	Other
	Current Dollars	Constant 1972 Dollars	Current Dollars	Constant 1972 Dollars	Current Dollars	Constant 1972 Dollars
1970	173.02	183.3	—	82.1	—	—
1975	251.2	179.7	86.7	107.1	39.1	68.0
1976	269.7	188.9	76.1	88.4	35.0	53.4
1977	250.8	165.0	90.2	83.3	36.0	47.3
1978	383.8	223.3	154.6	95.8	43.5	52.3
1979	365.3	185.9	175.3	114.9	54.6	60.3
1980	415.3	189.2	191.05	119.5	52.2	67.3
1981	342.7	149.3	185.4	144.6	61.2	83.4

<sup>1</sup>SOURCE: Annual Reports Division of Local Government Services

<sup>2</sup>Based on changes in the consumer price index

local government level. Total outlays for municipalities remained relatively stable in real terms (1972 dollars) until the middle of the 1970's. (See Table II-2) After a moderate jump in 1978, total capital outlays declined sharply, falling from 223.3 million dollars in 1978 to 149.3 million in 1981—or by nearly one-third (33.1 percent) in three years.

Capital outlays for public works<sup>4</sup> have exhibited a more moderate decline, falling only 11 percent, from 90.8 million dollars in 1978 (a high for the decade) to 80.8 million in 1981. As capital outlays for items such as libraries and educational facilities have declined significantly, capital outlays for public works have made up an increasingly larger share of total capital spending at the municipal level, increasing from 28.2 percent of total capital expenditures in 1976, to 54.1 percent in 1981—in essence, becoming a larger piece of a shrinking pie.

Using consistency of investment over time as a standard, county governments in New Jersey have shown a slightly higher commitment to long term capital investment than have municipalities. Real capital spending by New Jersey's 21 counties have just about remained even with inflation, averaging about 50 to 60 million dollars annually since the beginning of the 1970's. Unlike municipalities, county capital outlays for public works have remained a fairly consistent portion of overall capital spending, constituting slightly less than one half of total annual capital outlays by county governments throughout the decade.<sup>5</sup>

#### Reasons Behind the Decline:

The principle reasons behind the nationwide decline in aggregate State and local capital investment in the past decade have been lowered levels of highway spending, reflecting a reduced commitment at the federal level to the national highway system, and lowered expenditures for educational facilities, reflecting reduced need at the county and municipal level for school construction as the school age population has declined.<sup>6</sup>

In New Jersey, capital outlays for libraries and educational facilities by municipal governments have declined both in real terms and as a percentage of total capital outlays.<sup>7</sup> In 1972, capital outlays for libraries and educational facilities totaled 42.1 million dollars (1972 dollars) and constituted 26.8 percent of total municipal capital outlays. By 1981, these figures had declined to 9.5 million dollars and 6.4 percent of total capital outlays. At the county level, capital investment for libraries and educational facilities have declined from 42.7 percent of total capital outlays in 1972 to only 14.2 percent in 1981.

Another major reason for the decline in total capital outlays by local governments has been the increasing competition from other public services for a share of the public dollar. As state and local governments have expanded their commitment to the provision of human and social services in the 1960's and early 1970's, and have incurred increasing costs in continuing their commitment to essential public services such as fire and police protection, capital investment has made up a consistently smaller share of state and local government spending. In 1960, gross capital invest-



ment by state and local governments was 13.5 billion dollars (current dollars) and constituted approximately 27 percent of total state and local government expenditures.<sup>8</sup> By 1980, gross capital investment had increased to 54.9 billion dollars, but only accounted for 15.4 percent of state and local spending.

### Impact of The Cap Law:

In New Jersey, the CAP law, since its institution in 1977, has worked to decrease local capital investment in infrastructure systems. A survey of capped municipalities, conducted by the County and Municipal Government Study Commission in late 1981 and early 1982, found that a predominant portion of the allowed increases under the CAP were consumed by increases in outlays for such "non-controllable" budget items as pensions and benefits, increased wages (resulting from mandatory arbitration), and increases in insurance payments. Compounded by high inflation rates in the late 1970's and early 1980's, municipal governments found their budgets increasingly constrained. As a result, local governments faced increasing pressure to place items not usually associated with capital expenditures into the capital budget. As noted in the Commission's 1982 issue paper, *Coping with Constraints: An Analysis of the Municipal CAP Experience*:

With service demands still increasing, many municipalities had only one alternative—to shift from pay-as-you-go to capital financing for many recurring items previously included in their annual operating budget. Almost three-fourths of the municipalities (surveyed) acknowledged such a modification of their procedures in 1980.<sup>9</sup>

Because of constitutional, and practical, limitations on the level of debt that municipalities can incur, the practice of placing items normally considered non-capital in the capital budget worked to effectively squeeze out needed capital investment for traditional infrastructure systems. This was especially true for those fiscally constrained municipalities which were nearest their statutory debt limitation, experienced the highest per capita costs for municipal services, and had the highest local public service needs. (Note: recent admendments to the CAP law have now made it more difficult for municipalities to shift operating expenses into the capital budget).

Because maintenance costs, which are financed through the general operating budget, and the debt service (annual interest plus principal payments) have to be factored into the CAP calculation, the CAPS, in conjunction with inflation and higher than normal interest rates, have further heightened the competition for limited public dollars, with many jurisdictions being put into the position of literally choosing between infrastructure repair and rehabilitation and other essential public services. ***More often than not, municipalities choose the highly "visible" expenditures over the more easily postponed maintenance and renewal of infrastructure systems, particularly where such systems are underground and out of sight.***

Increasingly, jurisdictions have sought to ease the pressure on the municipal and county budget by placing responsibility for infrastructure systems in such "quasi-public" entities such as county and municipal authorities. Over the past two decades, the number of local utility authorities has increased from only 5 in 1962 to 79 in 1981, and the number of sewerage authorities from 40 in 1962 to 70 in 1981—by far the largest increases of any special unit of governments other than fire districts.<sup>10</sup>

As the number of local authorities has increased, so has the size of the outstanding debt associated with these units. Over the past decade, total outstanding indebtedness of local authorities has increased over 280 percent, from 594 million dollars in 1971 to over 2.2 billion dollars in 1982.

While the transfer of jurisdictional control over infrastructure systems from local governments to authorities has been beneficial in certain respects, particularly in linking construction and maintenance costs to the direct users of these facilities, it has also resulted in a fragmented network of responsibility for these systems. This has raised several important policy questions in regards to the direction and control of infrastructure investment policies. First, questions have arisen concerning the limited public accountability over these bodies, particularly in those cases where the borrowing of the authority is backed by the pledge of the local tax base. In addition, this fragmentation of responsibility has created problems in coordinating local investment strategies between the various types of jurisdictions responsible for infrastructure construction and maintenance. Finally, as evidence from this research effort has indicated, the fragmentation of jurisdictional control has made the collection and compilation of important data on the condition and needs of these systems difficult.

### Increased Federal Involvement and Influence:

As local government commitment to capital investment has declined in the last decade, the federal government, through its various capital grant programs, has provided for an increasingly larger share of state and local government capital outlays.

TABLE II-3  
FEDERAL CAPITAL AID COMPARED TO TOTAL  
STATE-LOCAL CAPITAL SPENDING  
(in billions)

Year	Federal Capital Grants	Total State-Local Capital Spending	Federal Capital Aid as Percent of Total Spending
1970	\$ 5.9	\$28.8	20.5%
1975	9.0	41.8	21.4
1976	11.4	39.9	28.5
1977	16.4	39.0	42.1
1978	18.0	46.7	38.5
1979	19.8	50.8	39.0
1980	22.3	55.9	40.0

SOURCE: Office of Management and Budget, Executive Office of the President, "Special Analyses, Budget of the United States Government," various years, Table D-3, 1973-1978, Table D-4, 1979-1982, Table H-7, 1982.

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In 1970, federal capital aid to state and local governments totaled 5.9 billion dollars nationwide (in current dollars), and accounted for approximately 20 percent of all state and local capital investment. (See Table II-3) By 1980, federal capital grants had increased to 22.3 billion dollars and accounted for 40.0 percent of total state and local capital spending.

As federal aid made up a greater portion of local capital spending, it had a greater impact on "influencing", or directing, state and local investment priorities in this area. In the 1960's to early 1970's, when the federal highway program reached its peak, state and local capital investment was directed primarily to highway and road construction. By the mid-1970's federal capital grants were targeted primarily to wastewater systems and community development programs, leading state and local governments to direct their investment strategies in these areas. The recent reductions in federal sewerage construction grant funding has contributed further to the roller coaster impact of capital construction programs.

Some researchers and policy analysts have suggested that this "imposition" of federal priorities on state and local governments has led to an over-investment in certain capital areas, and has directed investment away from other critical infrastructure systems.<sup>11</sup> *An additional problem has been that, until recently, federal capital aid programs have emphasized new construction over rehabilitation of existing systems, and have generally neglected to provide long-term aid for continuing maintenance, repair, and operating costs.* This has resulted in significant and continued costs for the local jurisdictions which have the responsibility to maintain and operate these facilities. However, as indicated in subsequent sections of this report, federal aid will continue to be an important component in local governments' financing strategies.

### Impact of Federal Budget Reductions:

Because of the increased importance of federal capital grants as a component of local capital expenditures, the federal aid recisions and reductions in federal fiscal years 1981 and 1982 have had a significant impact on local capital investment and maintenance in New Jersey. A recent analysis conducted by the Eagleton Institute of Politics on the impacts of the federal budget reductions in New Jersey determined that New Jersey lost 250 million dollars in federal capital grants between 1981 and 1982. As a result, many municipalities have reduced their public works budgets or have scrapped capital projects entirely rather than reduce or cut back on essential core services such as police and fire protection.<sup>12</sup> According to the Eagleton study, 37 percent of surveyed jurisdictions indicated that they had reduced service levels for streets and bridges in response to the federal budget cuts, while 49 percent noted service reductions in their public works budgets. According to Eagleton Project Directors Carl Van Horn and Henry Raimondo:

Municipalities of all sizes and fiscal health reported declines in scheduled maintenance for roads, bridges, and other public facilities and predicted a continued deterioration of the local capital stock. Local officials feared that they would be unable to deal with emergencies in the future. As one manager said, "My public works department will be all right, if it doesn't snow this year." Public officials also expressed concern that

TABLE II-4  
REQUIRED VS. RECENT ACTUAL REPLACEMENT RATES  
FOR WATER, SEWERS AND STREETS  
NEW YORK CITY, NEWARK, JERSEY CITY, ELIZABETH

Required Replacement Rates	Recent Actual Replacement Rates			
	New York	Newark	Jersey City	Elizabeth
Water Lines (Every 75 Years)	250-300 Yrs.	300-400 Yrs.	400-500 Yrs.	300-400 Yrs.
Sewer Lines (Every 100 Years)	250-300 Yrs.	300-400 Yrs.	500-600 Yrs.	600-800 Yrs.
Streets (Every 40 Years)	150-200 Yrs.	300-400 Yrs.	300-400 Yrs.	400-500 Yrs.

SOURCE: Port Authority of New York and New Jersey, 1979

deferred or cancelled maintenance would hinder efforts at economic revitalization, particularly in the state's older urban communities.<sup>13</sup>

Overall, the reductions in federal capital grants, in conjunction with inflation, increased government costs, and higher than normal inflation rates in the 1970's and early 1980's have increased the necessity for local governments to prioritize between local capital needs and other essential government services.

### Impact of Reduced Capital Investment By Local Governments:

Reduced and deferred local government investment in public capital facilities and infrastructure systems has resulted in longer maintenance and replacement cycles for these facilities. Table II-4 illustrates the required (as determined by engineering standards) and actual replacement cycles for major infrastructure systems in New York City and three major cities in New Jersey. *Assuming that replacement rates continue at a similar level over the next several decades, major structural failures of the infrastructure systems in these cities appear inevitable, along with significant service disruptions, threats to the health and safety of the residents of these cities, and substantial repair and reconstruction costs.*

In total, reduced investment at the local government level has created a measured "gap" between the actual level of capital investment by local governments and the measured capital needs of these jurisdictions. This gap, or *capital investment shortfall*, indicates that local governments in New Jersey are—considering the importance of these systems to the health, safety, and economy of these communities—facing significant constraints in their ability to meet their essential capital investment needs. The following chapters summarize the magnitude of this unmet capital need and analyze how the statutory and regulatory framework for planning, financing, constructing, and operating these systems can either constrain or facilitate the ability of counties and municipalities to meet these needs.

## NOTES

1. Urban Land Institute, *Financing Local Infrastructure in a Time of Fiscal Constraint*. August 1983, p. 17.
2. Counties in New Jersey which comprise the New Jersey subregion of the RPA study area which include Bergen, Essex, Hudson, Hunterdon, Mercer, Middlesex, Monmouth, Morris, Ocean, Passaic, Somerset, Sussex, Union, and Warren counties.
3. Regional Plan Association, *Economic Development and Public Infrastructure Investment for the New York Urban Region*. May 1982, p. 45.
4. Capital Outlays for Public Works include capital expenditures by local governments for streets and roads, storm drainage facilities, street lighting (including traffic signals), sanitation-waste collection and disposal (solid waste), sanitary sewers, sewerage treatment plans, equipment and all other public works.
5. George Peterson and Mary John Miller, *Financing Public Infrastructure: Policy Options*, Urban Consortium, Washington, D.C., 1982, p. 9.
6. Several studies note the impact of reduced capital spending for these components, in particular, see U.S. General Accounting Office, *Report to the Committee on Environment and Public Works of the United States*. GAO/PAD-83-2, November 18, 1982, p. 11.
7. Data from *Annual Reports of the Division of Local Government Services*, Department of Community Affairs.
8. *Financing Public Infrastructure: Policy Options*, p. 6.
9. County and Municipal Government Study Commission, January 1982.
10. Data from *Annual Reports of The Division of Local Government Services*, Department of Community Affairs.
11. See Chapter 3 in George Peterson's and Mary John Miller's *Financing Public Infrastructure: Policy Options*, Urban Consortium, Washington, D.C., 1982. For a discussion of the implications of shifting federal aid strategies.
12. Raimondo, Henry and Carl Van Horn, "Living with Less: New Jersey Copes with Federal Aid Cutbacks". *Public Budgeting and Financing*. Spring 1983, p. 49.
13. Ibid.



Approximately 20 percent of municipal road miles and 10 percent of county road miles are rated in poor or very poor condition by county and municipal engineers. (Photo courtesy Trenton Times)

### Chapter III ROADS AND BRIDGES

Municipal streets and roads, county roads, and county bridges comprise one of the most important components of New Jersey's local infrastructure network. Daily, millions of New Jerseyans ride on these structures as they go to and from work, school, shopping, and the state's recreational and entertainment centers. In assessing the importance of New Jersey's local road and bridge systems to the State's economy, it would simply be stating the obvious in declaring that New Jersey's local road and bridge system represents one of the critical components of New Jersey's transportation network and an extremely important investment of local public capital.

In addition, local road and bridge systems represent the most visible of all the infrastructure systems. Because of this visibility, collapsing support structures, potholed streets, and closed bridges have become the visual representation of the overall problem of infrastructural decay and deterioration. Government leaders, economists, and planners have been concerned about the consequences of this decay and deterioration for a long period of time. In 1978, the County and Municipal Government Study Commission issued a report on the status of local road systems and the intergovernmental financing and planning processes associated with them. As noted by the Commission at that time:

Simply stated . . . New Jersey's roads and bridges committed to the jurisdiction of county and municipal governments are rapidly deteriorating, a significant amount of these roads are already in serious condition, the existing funding patterns and available aid to local governments necessary to ameliorate this condition has not changed and—if the current situation continues unabated—it will imperil a capital investment estimated at a present value of some \$10 billion.

Little has changed since that statement was made. If anything, the situation has become even more critical. The following is a description of the current condition, capital investment, needs, and financing options associated with the local road and bridge systems in New Jersey.

#### **Size and Extent of the Local Road and Bridge System:**

##### **Roads**

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 lane miles<sup>1</sup> and nearly 53 percent of all vehicle miles traveled in New Jersey each year. (See Table III-1) 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 quarter in municipalities characterized as rural. (See Appendix) Over half of municipal road miles are in the nine urban and suburban counties in the northeastern and central parts of the state and nearly two-thirds in communities with populations between 2,500 and 25,000.



TABLE III-1  
NEW JERSEY ROAD SYSTEM: MILEAGE AND USAGE

Owner	1982 Center <sup>1</sup> Lane Miles	% of State and Local Roads	1980 Estimate Vehicle Miles traveled (billions)	% of State Vehicle Miles
Turnpike, G.S.				
Parkway, Atlantic				
City Expressway	332	1.0	5.39	10.7
State	2,236	6.6	18.30	36.4
County	6,818 <sup>2</sup>	20.3	17.60	35.0
Municipal	23,805	70.7	8.97 <sup>3</sup>	17.9 <sup>3</sup>
Parks, Other	462	1.4	—	—
TOTAL	33,653	100.0%	50.26	100.0%

SOURCE: New Jersey Department of Transportation Inventories

<sup>1</sup>Number of Linear Road Miles (Independent of total Number of Lanes)

<sup>2</sup>Combined NJDOT Inventory and Miles Reported—1982 Survey of County Engineers, County and Municipal Government Study Commission

<sup>3</sup>Combined "Municipal, Parks, and Other"

From the distribution of local road miles around the state, it appears that the responsibility for maintaining and repairing New Jersey's municipal road system rests primarily with suburban municipalities. However, the levels of use and the overall age of existing local road systems tend to be higher in urban municipalities. Combined with a higher number of road miles per jurisdiction (approximately 89 miles in urban municipalities and 163 miles in communities with populations over 50,000), the maintenance and repair of existing road miles in urban areas of the State requires a commitment of local resources from individual municipalities substantially higher than what might be first indicated from the aggregate mileage data.

According to responses from the Commission's 1982 survey of county engineers and recent Department of Transportation inventories, there are approximately 6800 miles of county roads in the state. (See Table III-1) There appears to be no particular pattern to the distribution around the state, although the more "rural" counties in the southern part of the state, such as Gloucester and Cumberland, tend to have a slightly higher ratio of county to municipal road miles than other counties. Ocean, Cumberland, and Burlington rank one, two, and three respectively, in terms of total number of county road miles per county, each with total road miles of 500 or more.

#### Bridges

Determining the actual number of county bridges in the state is dependent on the way they are defined. For the purposes of this report, a "bridge" was defined as a span whose overall length is 20 feet or greater, with a span less than 20 feet long being defined as a "culvert". There are approximately 2300 bridges and an additional 6500 culverts in the 19 counties responding to the Commission's survey,

with about one-half of the bridges and 35 percent of the culverts on the federal aid system.

#### Present Condition of Local Roads and Bridges:

##### Roads

Evidence from the Commission's survey of county and municipal engineers indicates that while the road system is in generally good to fair condition overall, there is still a substantial proportion of local road mileage which is in poor or very poor condition. As noted in Table III-2, approximately 20 percent of the road miles in responding municipalities are rated as being in poor to very poor condition by municipal engineers. (See appendix for definition of rating categories.) Assuming that the same patterns of deterioration occur in all municipalities throughout the state, **approximately 4600 miles of New Jersey's 23,800 miles of municipal streets and roads are presently in poor or very poor condition and in need of immediate replacement or repair.**

County roads appear to be in slightly better overall condition than do municipal streets and roads, with county road miles on the Federal Aid System doing even better. In the 19 counties responding to the survey, approximately 67 percent of the roads on the Federal Aid System and 58.5 percent of the roads off the system were rated as being in good or very good condition by the county engineers, compared to only 49 percent of municipal roads. Conversely, only 9 percent of the county road miles on the Federal Aid System and 12.9 percent off the Federal Aid System were rated as being in poor or very poor condition, compared to 19 percent of all municipal streets and roads. Based on these estimates, **over 600 miles of county roads are presently in poor or very poor condition and are in need of immediate replacement or repair.**

TABLE III-2  
CONDITION OF MUNICIPAL AND COUNTY ROADS AND BRIDGES  
(Percent of Total Miles in Responding Municipalities)

	% Very Good <sup>1</sup>	% Good	% Fair	% Poor	% Very Poor
Municipal Roads <sup>2</sup>	15.4	33.5	32.0	13.4	5.7
County Roads:					
On Fed. Aid Hwy Sys.	19.1	47.8	24.1	7.6	1.4
Off Fed. Aid Hwy Sys.	21.6	36.9	28.6	10.0	2.9
County Bridges	8.8	26.8	38.9	19.0	6.5

SOURCE: 1982 Survey by County and Municipal Government Study Commission and Division of State and Regional Planning, 108 Municipalities and 19 Counties Responding.

<sup>1</sup>See Appendix for Definition of Rating Categories

<sup>2</sup>Adjustments made in reported municipal road mileage figures to conform with existing New Jersey Department of Transportation Inventory

### Bridges

Of the some 8100 bridges and culverts under the jurisdiction of the 19 county governments responding to the commission's survey (all counties except Cumberland and Hudson), 19 percent are rated as being in poor condition, showing signs of "serious deterioration", and requiring "major reconstruction and replacement". Another 6.5 percent of the bridges and culverts are rated in very poor condition, are described as being "potentially hazardous", and are "closed or should be closed". **Together, one-fourth, or approximately 2,000 of the bridges and culverts in the 19 responding counties are in poor or very poor condition and need to be either reconstructed or replaced.**

In addition, the New Jersey Department of Transportation has inventoried 657 overhead railroad bridges throughout the state (a bridge which carries a road over a railroad). The Bureau of Bridges and Design reports that counties and municipalities are responsible for the road beds, but not the bridge structure, on approximately one-half of these spans. Because of jurisdictional questions which have arisen over the responsibility for maintenance and reconstruction of these structures, they have been nicknamed the state's "orphan bridges".

The overhead railroad issue offers a unique subset of the overall problem of county bridge investment needs. According to a 1983 report on the overhead railroad bridge issue by the North Jersey Transportation Coordinating Council:

- Because of questions over the ownership of these structures, "little or no work has been done on these bridges in decades" allowing deterioration to continue to the point where "many bridges will have to be completely replaced."
- 8 percent of the overhead railroad bridges in the 11 counties in the NJTCC region are "structurally obsolete" and another 42 percent are "structurally deficient," requiring an estimated 191.4 million dollars in rehabilitation and reconstruction.
- "New Jersey statutes are no longer adequate for providing public safety on these bridges".<sup>2</sup>

**The Commission therefore recommends that legislation be passed authorizing counties to develop and to present to the State Department of Transportation an inventory and assessment of the costs of repairing and reconstructing overhead railroad bridges within their boundaries.**

### Capital Investment Needs:

#### Municipal Streets and Roads

While municipal engineers rated the road system under their jurisdiction as being in generally good to fair condition, a significant number of engineers indicated that their jurisdictions were presently on an inadequate repair and replacement cycle for streets and roads. **Of the 108 municipal engineers responding to this question, 71, or 65.7 percent, felt that their municipality was on an inadequate repair and replacement cycle for municipal streets and roads.**

**TABLE III-3**  
**PROJECTED<sup>1</sup> ANNUAL UNMET CAPITAL NEEDS**  
**MUNICIPAL ROADS AND STREETS**  
(by selected indicators<sup>2</sup>)

Municipal Type	Unmet Capital Needs (000,000)	Percent of Total	Municipal "Distress"	Unmet Capital Needs (000,000)	Percent of Total
urban	\$ 4.2	7.4%	Most distressed	\$10.2	19.9%
urban/suburban	9.6	17.1	2nd Most distressed	5.4	10.5
suburban	29.3	52.0	Middle	6.4	12.6
suburban/rural	8.1	14.4	2nd Most prosperous	18.5	36.0
rural	5.1	9.1	Most prosperous	10.8	21.0
TOTALS <sup>3</sup>	\$56.3	100.0%	TOTALS	\$51.3	100.0%

Population Size	Unmet Capital Needs (000,000)	Percent of Total	County Regions	Unmet Capital Needs (000,000)	Percent of Total
over 50,000	\$ 9.2	16.4%	DVRPC <sup>4</sup>	21.7	34.9%
25,000-50,000	3.2	5.8	Bay/Ocean	5.2	8.5
10,000-25,000	22.0	39.2	Northeast Urban	12.5	20.1
2,500-10,000	17.4	31.2	Central Suburban	18.9	30.4
under 2,500	4.1	7.4	Northwest Exurban	3.8	6.1
TOTALS	\$55.9	100.0%	TOTALS	\$62.1	100.0%

SOURCE: Survey by the New Jersey County and Municipal Government Study Commission and Division of State and Regional Planning, 108 Municipalities responding.

<sup>1</sup>See Appendix for Projection Methodology

<sup>2</sup>Indicators developed by the Division of State and Regional Planning

<sup>3</sup>Totals Vary Due to Projection Methodology

<sup>4</sup>Delaware Valley Regional Planning Commission

Based on the difference between engineer estimates of the minimum annual capital investment needed to maintain an adequate repair and replacement cycle in these "inadequate" jurisdictions, and the actual capital investment that these municipalities have been making on an average over the previous five years, the "annual capital shortfall" or "unmet capital investment needs" for these 71 municipalities totals 24.8 million dollars. Projecting this capital shortfall to all municipalities in the state, ***New Jersey's unmet capital investment needs for municipal streets and roads totals 56 million dollars each year.*** (See Table III-3)

#### ***County Roads***

The annual capital investment shortfall estimates for counties indicates that unmet county road needs represent a less severe problem compared to municipal streets and roads. While twelve of the nineteen counties responding indicated that their jurisdiction was on an inadequate repair and replacement cycle for county roads, only three counties require an additional capital investment substantially above their present level of commitment (1 million dollars or more). (See Table III-4) ***In total, the twelve counties on an inadequate cycle require an additional capital investment of approximately 14.7 million dollars each year to adequately maintain their existing road system.***

Supporting the county engineers assessment is the fact that half of the reporting counties indicated that their jurisdiction resurfaces approximately 5 percent of their road mileage each year—a rate which would be the equivalent to a twenty year replacement cycle, which is considered adequate based on current engineering practices.

#### ***County Bridges***

The annual capital shortfall for county bridges represents a significant problem based on total unmet needs compared to present efforts. Out of the 19 counties responding to the Commission survey, 17 claimed that their jurisdiction was on an inadequate repair and replacement cycle for bridges. (See Table III-5) ***Together these 17 counties required an additional capital investment of 38.9 million dollars each year to maintain an adequate repair and replacement cycle for bridges, or a shortfall nearly 4 times as much as is presently being spent on bridges each year.***

***Together, the combined unmet capital investment needs for local roads and bridges total 110 million dollars each year.***

#### ***Distribution of Municipal Road Needs***

The distribution of the annual capital shortfall for municipal streets and roads indicates that unmet needs are not just limited to older urban areas, but are significantly distributed in suburban communities as well. Over one-half of municipal road needs are (according to engineer estimates) in communities which are classified as suburban in character by the Division of State and Regional Planning (See Appendix for description of classifications). One quarter of the annual capital investment shortfall is in urban municipalities and another quarter is in municipalities classified as rural. (See Table III-3)

***In general, the annual capital shortfall for municipal streets and roads tends to be distributed in small to medium size suburban municipalities which are relatively younger and more prosperous than other municipalities on an inadequate repair and replacement cycle.***

While a cursory examination of the data indicates that this distribution parallels that of actual municipal street and road mileage throughout the state, a more comprehensive analysis indicates that the distribution of unmet street and road needs is dependent on both differences in present effort and estimated needs between the various categories of municipalities. In general, the municipalities which have the highest unmet needs also tend to have a higher level of present effort (based on per mile average capital investment levels) and a much higher level of estimated needs than other municipalities on an inadequate repair and replacement cycle.

These differences between municipalities appear to be the result of differences in both the perception of municipal street and road needs by the municipal engineer, as well as real differences in needs.

On the one hand, growing suburbs and rural centers face a situation in which growth has put a tremendous strain on all existing infrastructure systems, but particularly on the street and road systems. For the most part, the streets and roads in these communities were designed and constructed when the municipality was far less developed. As a result, the systems have neither the capacity nor the structural capability to meet the increased demand placed upon them. Even in those suburban communities in which growth has tailed off, roads which were constructed during the growth years in the decades after 1950 are now reaching the limits of their useful life and need to be either reconstructed or upgraded. Combined with needs to update the county road systems in these areas, the suburban regions of the state face significant capital investment needs for local roads.

On the other hand, certain caveats need to be raised. While every attempt has been made to introduce a high degree of specificity into the overall estimates of needs, these estimates are ultimately based on the judgement and opinions of the local engineer. However careful the responding engineers were in providing the Commission with an unbiased and professionally grounded opinion, there is likely to have been introduced a significant amount of subjectivity into the needs estimates. In general, the perception of local needs can be shaped by many factors, including the local fiscal environment. In particular, present local investment efforts may shape the engineer's perception of what can, and should, be attempted in the future in regards to upgrading and rehabilitating the municipality's streets and roads.

Evidence from the Commission's survey indicates that this may be true. Respondents from younger, more prosperous suburban municipalities not only indicate a higher estimated need (measured in dollars per mile), but they also indicate a higher comparative level of present effort than other inadequate cycle municipalities. The low comparative needs estimates in urban municipalities may well be based on engineer experience in operating within a limited or constrained local fiscal environment. Engineers in older, more distressed urban communities may well need more capital investment than indicated, but—based on current effort—their present expectations are that they will actually have to get by with substantially less. Based on present levels of effort, the engineers in more prosperous communities seem to be more

**TABLE III-4**  
**ANNUAL CAPITAL INVESTMENT**  
**SHORTFALL SUMMARY**  
**COUNTY ROAD SYSTEMS**

COUNTY	CAPITAL EXPENDITURES					Average Capital Expenditures (1977-81)	Repair and Replacement Cycle	Minimum Capital Funding Needed Each Year <sup>1</sup>	Annual Capital Investment Shortfall
	1977	1978	1979	1980	1981				
Atlantic	0	2000000	2500000	3000000	2000000	1900000	Adequate	1900000	0
Bergen	1525000	1420000	1160000	2115000	990000	1442000	Adequate	1442000	0
Burlington	1500000	1500000	1000000	20000	10000	806000	Inadequate	1000000	194000
Camden	1470312	1865051	2214876	2160066	3118016	2165664	Adequate	2166000	0
Cape May	200000	200000	300000	200000	100000	200000	Adequate	200000	0
Essex	475000	770000	324000	752000	840000	632200	Inadequate	5000000	4367800
Gloucester	0	207700	326000	539000	1500000	514540	Inadequate	1000000	485460
Hunterdon	150000	3365000	3977000	2043000	1560000	2219000	Adequate	2219000	0
Mercer	1311000	1523000	2763000	3087000	2526000	2242000	Adequate	2242000	0
Middlesex	196800	807237	1252137	1069807	5497990	1764794	Adequate	1765000	0
Monmouth	505800	730500	432200	796200	718000	636540	Inadequate	1600000	963460
Morris	3017255	2222934	2567554	2834771	4188297	2966162	Inadequate	3000000	33838
Ocean	1931000	6764000	1966000	2546000	586000	1757250 <sup>2</sup>	Inadequate	2500000	742750
Passaic	961000	50000	3500000	2409000	2191000	1822200	Inadequate	2000000	177800
Salem	700000	700000	750000	1000000	1290000	888000	Inadequate	2000000	1112000
Somerset	1900000	850000	200000	2000000	2500000	1490000	Inadequate	7000000	5510000
Sussex	1335000	1485000	1350000	1325000	1280000	1355000	Inadequate	1500000	145000
Union	50000	50000	100000	50000	350000	120000	Inadequate	500000	380000
Warren	180100	449489	346543	423909	853866	450781	Inadequate	1000000	549219
<b>TOTAL</b>	<b>17408267</b>	<b>26959911</b>	<b>27029310</b>	<b>28370753</b>	<b>32099169</b>	<b>25372131</b>	<b>12 Inadequate</b>	<b>40034000</b>	<b>14661326</b>

<sup>1</sup>Based on county engineer estimates of minimum funding needed each year to maintain an adequate repair and replacement cycle

<sup>2</sup>Average excludes 1978—which county engineer indicated was one shot expenditure not typical of long term expenditure patterns

**TABLE III-5**  
**ANNUAL CAPITAL INVESTMENT**  
**SHORTFALL SUMMARY**  
**COUNTY BRIDGES**

COUNTY	CAPITAL EXPENDITURES					Average Capital Expenditures (1977-81)	Repair and Replacement Cycle	Minimum Capital Funding Needed Each Year <sup>1</sup>	Annual Capital Investment Shortfall
	1977	1978	1979	1980	1981				
Atlantic	0	100000	0	0	0	20000	Inadequate	300000	280000
Bergen	1950000	1310000	2180000	2600000	800000	1768000	Inadequate	5000000	3232000
Burlington	2000000	2000000	1500000	0	0	1100000	Inadequate	1500000	400000
Camden	1284998	33834	76056	77288	1594030	613241	Adequate	613000	0
Cape May	0	0	0	100000	0	20000	Adequate	20000	0
Essex	437000	437000	437000	437000	437000	437000	Inadequate	1000000	563000
Gloucester	0	237750	215000	320500	48000	164250	Inadequate	2000000	1835750
Hunterdon	39000	1635000	470000	1438100	2390000	1194420	Inadequate	2000000	805580
Mercer	1120000	619000	575000	900000	240000	690800	Inadequate	2000000	1309200
Middlesex	300000	300000	600000	100000	1500000	560000	Inadequate	5000000	4440000
Monmouth	33886	279764	540639	262526	209370	265237	Inadequate	1200000	934763
Morris	343000	1354453	295462	171577	320000	496898	Inadequate	10000000	9503102
Ocean	404000	1374000	754000	583000	260000	675000	Inadequate	863000	188000
Passaic	794000	255000	19000	284000	305000	331400	Inadequate	1000000	668600
Salem	15000	22000	20000	25000	30000	22400	Inadequate	400000	377600
Somerset	1030000	400000	0	0	1454500	576900	Inadequate	10000000	9423100
Sussex	0	0	425000	400000	400000	245000	Inadequate	2000000	1755000
Union	271000	1014000	862000	1364000	203000	742800	Inadequate	2700000	1957200
Warren	36800	0	160000	0	736461	186652	Inadequate	1500000	1313348
<b>TOTAL</b>	<b>10058684</b>	<b>11371801</b>	<b>9129157</b>	<b>9062991</b>	<b>10927361</b>	<b>10109998</b>	<b>17 Inadequate</b>	<b>49096000</b>	<b>38986243</b>

<sup>1</sup>Based on county engineer estimates of minimum funding needed each year to maintain an adequate repair and replacement cycle

optimistic in what additional effort might be taken to upgrade and rehabilitate their street and road system.

While speculative, the above analysis is important not only for offering an explanation of the distribution of street and road needs, but also in framing the issue of subjectivity which arises not only for the street and road analysis, but also for other infrastructure systems as well (particularly the underground systems). The need levels discussed here are not and should not be taken as absolutes, but should be used as an overall guide to determine, in a relative and comparative way, the additional efforts needed to meet local infrastructure needs. This is discussed further in the appendix section describing methodology, but should be kept in mind throughout a review of the Commission's report.

#### **Intergovernmental Process:**

According to county and municipal engineers, the time needed for DEP and DOT reviews and permitting adds significant costs in the form of delays and administrative oversight for street, road, and bridge projects. As can be seen in Table III-6, State reviews appear to be the most time consuming, with DEP and DOT review processes (including stream encroachment permits) being cited by county and municipal engineers a total of 34 and 32 times respectively. As noted by one county engineer:

"NJDOT requirements and approvals add several years to projects, thus increasing costs 30-50 percent. Projects in the past have taken 5-7 years from conception to implementation. During this time, governing bodies have changed and project opposition has developed, in some cases terminating the project. Projects should be implemented within two years of their (initial local) approval."

**TABLE III-6**  
**STATE AND FEDERAL REVIEWS AND PERMIT PROCESSES CITED AS BEING**  
**MOST TIME CONSUMING BY COUNTY AND MUNICIPAL ENGINEERS**

Review/Permit Process	Times Cited			Total
	Municipal Roads	County Roads	County Bridges	
NJDEP REVIEWS <sup>1</sup>	21	5	8	34
NJDOT REVIEWS	20	5	7	32
Conrail, Coast Guard, and Historic Preservation	5	2 <sup>2</sup>	4 <sup>3</sup>	11
Federal Aid Reviews	-	2	4	6
U.S. Corps of Engineer	-	1	3	4
No Problem	8	-	-	8
Miscellaneous	3	2	2	7
No Comment	59	6	1	66

<sup>1</sup>Inc. Stream Encroachment Permits

<sup>2</sup>Historic Preservation

<sup>3</sup>Coast Guard Review

In general, federal regulations appear to be more of a problem for counties. While no municipal engineer cited federal regulations as being a problem, federal regulations were cited twice as causing delays in implementing county road projects and four times for county bridge projects. Coast Guard and U.S. Corps of Engineering reviews were mentioned specifically as causing delays in bridge projects, being cited 4 and 3 times respectively.

Several county engineers responded that they often will use their own county funds, passing up available federal aid to avoid the delays which occur as a result of lengthy project reviews and federal regulations. As one county engineer put it:

"under the present NJDOT and FHWA system, it takes over 10 years to get a bridge project built. At this rate, counties cannot afford to participate in federally funded programs, since the delay increases project costs."

To address this problem, both county and municipal engineers favor greater local flexibility, in general, and specifically recommend a larger role for county engineering departments in certifying local road and bridge projects. Of the engineers responding to the survey, 20 municipal and 11 county engineers favor a larger county role in review and certification of the design standards and specifications of local projects, with one county engineer suggesting that a uniformity of standards could be achieved through the development of State guidelines for local certification and project approval. (See Table III-7)

***The Commission recommends that county engineers be authorized to review and approve all local projects pursuant to overall standards established by the State Department of Transportation for municipal and county roads. (NOTE: The Department of Transportation's proposed swap of FAUS monies will remove federal regulations and the review of federal engineers from all such construction projects.)***

#### **State and Federal Aid Programs:**

The existence of a "gap" between estimated capital investment needs and actual capital expenditures indicates that there is a need for some type of outside fiscal aid or assistance to help local governments finance their capital projects for streets, roads, and bridges. Since the mid-1970's, State strategy has relied primarily on providing the local match for available federal aid, as well as providing local governments with financial aid directly, through the use of capital grants. The two main sources of funding for these programs have been appropriations from the General Operating Fund of the State and receipts from State bond issues. Using this strategy, the State has provided local governments with approximately 370.4 million dollars in State and federal aid for roads and bridges between fiscal years 1979 and 1983, or approximately 74.1 million dollars each year.

#### **State Aid: Direct Grant Programs**

Since the elimination of the *Municipal Aid Construction (Herrick Act) Program* (N.J.S.A. 27:15-1.14) and other State aid programs in 1974,<sup>3</sup> there has been no consistent State aid provided from the State's budget to municipalities and counties for their street and bridge needs. Between fiscal years 1946 and 1977, direct State

**TABLE III-7**  
**ACTIONS RECOMMENDED BY COUNTY AND MUNICIPAL ENGINEERS TO**  
**HELP LOCAL GOVERNMENTS MEET THEIR LOCAL ROAD AND BRIDGE NEEDS**

Recommended Action	Municipal Roads	Times Cited County Roads	County Bridges	Total
<b>Review Process</b>				
Eliminate state review/make county Engineers responsible	20	11	9	40
Eliminate or reduce overlapping reviews, streamline process, institute better interagency coordination at state level	12	12	9	33
Set time limits on Reviews	8	5	5	18
<b>Fiscal Aid</b>				
Increase road and bridge aid	25	10	4	39
Develop a stable and dedicated source of funding	12	6	3	21
Block grants directly to counties	4	8	10	22
Miscellaneous	1	2	3	6
No comment	58	1	2	61

grants to county and municipal governments for streets, roads, and bridges totaled approximately 588.5 million dollars, or 18.9 million dollars each year.<sup>4</sup> Between 1978 and 1983, direct State aid totaled only 47.3 million dollars, or 7.9 million each year—for the most part reflecting the expenditure of funds for continuing projects authorized earlier.

The two remaining state aid programs funded through the State's general operating fund are both limited in scope and do not directly address local needs for repairing and rehabilitating existing streets and roads. Funds from these programs provided local governments with only 1.8 million dollars in fiscal year 1983 and resulted in the improvement of 1.8 miles of New Jersey's 30,000 miles of local streets and roads and 12,500 lighting units.<sup>5</sup>

#### **State Provision of Local Match**

With the elimination of the direct State aid programs in the mid-1970's, State aid strategy shifted to providing the local share of the match for federal aid monies available under the Federal Aid Urban System, Federal Aid Rural Secondary, and the Federal Bridge and Highway Safety Programs. Between 1979 and 1983, the State has expended approximately 41.1 million dollars in State General Operating Funds to match 157.4 million dollars in available federal aid. (See Table III-8)

#### **State Aid: Bond Issues**

Since 1979, the State has relied primarily on bonding in providing direct capital aid to local governments for roads and bridges, and for providing the match of available federal monies. The two main bond issues directed at local roads and bridges are the following:

##### **1979 Transportation Bond Act**

The Transportation Rehabilitation and Improvement Bond Act of 1979 (P.L. 1979, c. 165) authorized the appropriation of 475 million dollars of State bonds for various highway and transit projects, of which 80 million dollars was earmarked for improvements in county and municipal roads. (See Table III-9) Monies made available from bond receipts have been used to supply local governments with funds for a wide variety of transportation projects, including the resurfacing and reconstruction of local streets and roads, urban revitalization projects, special demonstration projects, and the local share of federal aid projects. In addition, the use of \$20,000,000 in matching funds from the 1979 Bond issue has provided local governments with 58.5 million dollars of Federal Aid Urban System monies. The remaining 60 million dollars has been obligated to local governments in the period from 1979 to 1984 under a 90/10 state/local grant program. Forty-eight million dollars of this money was distributed to local municipalities and counties under a formula grant program. Thus, the 1979 Transportation Bond issue provided about \$15,000,000 per year in addition to the FAUS matching program for local government. Unfortunately, these funds have all been obligated to local projects and no funds have been proposed to replace them.

##### **1983 Bridge Bond Issue**

The Bridge and Rehabilitation Fund Bond Act of 1983 authorized the appropriation of 135 million dollars of state bonds, of which 37.5 million dollars was earmarked for local governments over the next several years for a variety of bridge rehabilitation projects around the state. It is expected to match approximately 70 million dollars of available federal bridge monies.

#### **Federal Aid**

As indicated above, federal aid continues to be the most important source of outside funding for local governments in meeting their investment needs for streets, roads, and bridges. The federal aid programs targetted primarily to local streets, roads, and bridges are the Federal Aid Urban System (FAUS) program, the Federal Aid Rural Secondary (FARS) program and the Federal Aid Bridge and Highway Safety (FABHS)



TABLE III-8  
STATE AID (GENERAL OPERATING FUNDS) EXPENDITURES AND FEDERAL FUNDS MATCHED  
LOCAL ROAD AND BRIDGE FACILITIES  
FISCAL YEARS 1979-1983  
(in thousands)

	1979	1980	1981	1982	1983	Total 1979-1983
State Aid (From General Fund)						
State Provision of Local Match						
Federal Aid Urban System Highway Projects	14,032	9,577	4,537	3,459	763	32,368
Federal Aid Rural Highway Projects	1,840	2,506	264	862	303	5,774
Federal Aid Bridge and Highway Safety	647	1,339	751	110	142	2,989
TOTAL MATCH	16,519	13,422	5,551	4,431	1,208	41,131
County and Municipal Aid	4,782	1,329	1,410	1,517	1,623	10,661
State Aid Road System Projects	9,385	4,497	544	3,716	237	18,379
Local Aid Engineering	2,102	2,196	—	—	—	4,298
TOTAL DIRECT AID	16,269	8,022	1,954	5,233	1,860	33,388
TOTAL STATE AID	32,788	21,444	7,505	9,664	3,068	74,469
Federal Funds <sup>1</sup>						
Federal Aid Interstate Highway Projects <sup>1</sup>	—	—	—	—	70	70
Federal Aid Urban System Highway Projects	15,308	24,873	13,458	20,360	9,601	83,600
Federal Aid Rural Highway Projects	7,520	609	841	4,735	2,208	15,913
Federal Aid Bridge and Highway Safety	11,945	16,746	10,723	11,128	6,169	56,711
Emergency Relief Funds	823	151	—	21	—	995
State Aid Road System	—	—	—	—	103	103
TOTAL FEDERAL AID	35,596	42,379	25,022	36,244	18,151	157,392
TOTAL STATE AND FEDERAL AID	68,384	63,823	32,527	45,908	21,219	231,861
Local Funds (Local Share)						
Federal Aid Urban System Highway Projects	269	58	—	—	266	593
Federal Aid Rural Highway Projects	11	—	—	—	—	11
Federal Aid Bridge and Highway Safety	504	655	552	—	—	1,711
State Aid Road System Projects	—	—	—	60	—	60
TOTAL LOCAL SHARE	784	713	552	60	266	2,375
TOTAL	69,168	64,536	33,079	45,968	21,485	234,236

SOURCE: State of New Jersey Annual Budgets

<sup>1</sup>Transfer Program Funds

(Note: Figures in Table III-8 are expenditures and do not include monies that have been authorized for local transportation projects, but have not been expended.)

TABLE III-9  
1979 TRANSPORTATION REHABILITATION AND IMPROVEMENT FUND  
STATEMENT OF EXPENDITURES AND APPROPRIATION BALANCES  
AS OF JANUARY 31, 1983

Classification	Bond Appropriations	Bond Expenditures			Bond Appropriations Available	Federal Funds Attracted
		Obligations	Requisitions	Total		
Highways <sup>1</sup>	\$245,000,000	\$175,344,000	\$27,878,000	\$203,222,000	\$ 41,778,000 <sup>1</sup>	\$271,773,000
State Aid						
FAUS Match	\$ 20,000,000	\$ 16,376,000	\$ 1,639,000	\$ 18,015,000	\$ 1,985,000	\$ 58,489,000
Urban Revitalization	8,125,000	7,474,000	626,000	8,100,000	25,000	—0—
Special Demonstration	875,000	836,000	46,000	882,000	( - 7,000)	—0—
Emergency	3,000,000	2,045,000	229,000	2,274,000	726,000	—0—
Formula Grants	48,000,000	47,077,000	359,000	47,436,000	564,000	—0—
	\$ 80,000,000	\$ 73,808,000	\$ 2,899,000	\$ 76,707,000	\$ 3,293,000	\$ 58,489,000
Public Transportation						
New Jersey Transit	\$131,683,000	\$ 56,150,000 <sup>2</sup>	\$ —0—	\$ 56,150,000	\$ 75,533,000	\$264,900,000 <sup>2</sup>
Erie Lackawanna	18,317,000	17,313,000	—0—	17,313,000	1,004,000	149,391,000
	\$150,000,000	\$ 73,463,000	\$ —0—	\$ 73,463,000	\$ 76,537,000	\$414,291,000
	\$475,000,000	\$322,615,000	\$30,777,000	\$353,392,000	\$121,608,000	\$744,553,000

Notes: <sup>1</sup>Highway appropriations include \$33 million designated for Department salaries and incidental costs incurred in connection with Bond projects of which \$20 million has been expended.

<sup>2</sup>NJ TRANSIT's data relative to obligations and federal funds attracted is as of October 31, 1983.

Definitions: Requisitions—funds encumbered as a result of Department actions, e.g. highway projects, Plans, Specifications, and Estimates, right of way certifications, and preliminary engineering consultant selection actions.

Federal Funds Attracted—represents federal participation in Bond projects.

SOURCE: New Jersey Department of Transportation

program. All three programs are authorized under the **Federal Surface Transportation Act of 1982** and are funded by receipts from federal gasoline taxes. In terms of overall funding levels, FAUS is the larger of the two road aid programs, providing New Jersey with approximately 30 million dollars in available monies each year, compared to only 5.5 million annually for the FARS program. There are 5,359 miles of New Jersey roads in FAUS (518 State, 2,988 county and 1,972 municipal), and an additional 1,791 miles in the FARS (77 State, 1,449 county and 79 municipal). Monies for both programs are provided on the basis of a 75/25 percent federal/local match, with the State providing almost all of the local match since the mid-1970's.

Increases in the Federal Aid Bridge and Highway Safety Program reflect the new federal commitment to the reconstruction and rehabilitation of the nation's deteriorated bridges, with funding for this program undergoing significant increases between 1982 and 1986. As a result, approximately 130 million dollars of federal monies will be available in fiscal years 1985 and 1986 for a variety of State and local bridge projects. Using funds available from the 1983 Bridge Bond Act, the State hopes to match approximately 70 million dollars of these monies for local bridges. Monies are provided on an 80/20 federal/local matching basis, with the State providing the local match. (NOTE: Certain bridge projects require local government to provide 4 percent and the State 16 percent).

While State aid strategy has been to provide funds for the local match of available federal dollars, the State has historically performed poorly in obtaining monies that have become available. In 1976, New Jersey ranked seventh in total monies available from the FAUS program, but only 48th in obligating federal monies to local projects, primarily due to New Jersey's failure to provide for a state match. This situation has significantly improved. New Jersey Department of Transportation officials report that New Jersey now ranks twenty-eighth out of all states in utilizing available federal highway monies. However, additional efforts should be made to continue this upward trend.

The utilization of federal aid monies will be critical both in the near future and in the long-term. Based on the allocation of authorized funds from the Federal Surface Transportation Act of 1982, New Jersey can qualify for a total 70 million dollars of FAUS and FARS monies in fiscal years 1985 and 1986, and another 130 million for state and local bridges. (See Table III-10) Assuming reauthorization in 1986, the availability of federal aid for streets, roads, and bridges will continue to be an important part of local capital investment strategies.

***It is essential that New Jersey devise a funding mechanism to replace the 1979 Transportation Bond Act to assure that State, county and municipal governments can match available federal dollars.***

The Department of Transportation has recommended that the State have a stable funding program for State highways, mass transit, and local roads and bridges, which will ensure that available federal funds will be matched. ***The Commission rec-***

TABLE III-10  
NEW JERSEY'S SHARE OF AUTHORIZED FUNDS:  
SURFACE TRANSPORTATION ACT OF 1982

Highway Program	FY 1982	FY 1983	FY 1984	FY 1985	FY 1986	FY 1982-86 Total	FY 1985-86 Total
Interstate Construction	\$ 89,026,000	\$102,205,000	\$102,205,000	\$102,205,000	\$102,205,000	\$ 497,846,000	\$204,410,000
Interstate 4R	8,762,000	24,811,000	30,536,000	35,626,000	40,079,000	139,814,000	75,705,000
Primary	19,990,000	42,300,000	48,209,000	52,799,000	56,243,000	219,541,000	109,042,000
FARS	2,714,000	5,500,000	5,530,000	5,530,000	5,530,000	24,804,000	11,060,000
FAUS	29,524,000	29,961,000	29,961,000	29,961,000	29,961,000	149,368,000	59,922,000
Bridges	11,747,000	53,585,000	55,504,000	59,343,000	70,859,000	251,038,000	130,202,000
Hazard Elimination	4,981,000	4,981,000	4,981,000	4,901,000	4,901,000	24,745,000	9,802,000
Rail/Highway Crossing	3,156,000	3,156,000	3,156,000	3,156,000	3,156,000	15,780,000	6,312,000
TOTAL	\$169,900,000	\$266,499,000	\$280,082,000	\$293,521,000	\$312,934,000	\$1,322,936,000	\$606,455,000

**ommends that the State's proposed transportation funding program be enacted into law.**

However, the distribution of federal aid roads around the State, limits the effectiveness of the State matching of available federal funds as a broad based local aid strategy for roads and bridges. Only a small portion of local road miles qualify for federal aid. At present, approximately 67 percent of county roads and only 9 percent of municipal roads qualify under the FAUS and FARS programs. (While only one-half of New Jersey's local bridges and culverts are under the federal aid system, these bridges can still receive aid from the off-system portion of the Federal Bridge Replacement Program.) In general, FAUS is the better funded of the two programs, with approximately 6 times the funding allocation of FARS. However, FAUS funds are, by definition, primarily targeted to urban areas, with nearly three fourths of all streets and roads that qualify for FAUS monies in the nine most urbanized counties in the state.

Included in the State's transportation funding proposal is a Federal Aid Urban Substitution program ("FAUS Swap") which provides that the State will supply direct State aid to local governments to replace the existing system of Federal-State-local matching programs. According to the Department of Transportation, the proposed swap of FAUS funding will allow the alternate funds to be used anywhere in the county, including roads that are not on the Federal Aid System. In addition, funding for road projects in non-Urban counties will be increased.

**The Commission recommends that the proposed FAUS swap component of the State's transportation funding proposal be enacted into law.**

It is clear that New Jersey has a unified road system which is owned and operated by the State, its counties, and its municipalities. New Jersey drivers use each component of the system on a regular basis, with local roads accounting for a significant share of total vehicle miles driven. **It is essential that a stable and adequate funding program be enacted for all three components of our highway-road-street system. However, the importance of county and municipal road systems should be recognized in any State funding initiative. As such, the Commission recommends that an additional local street and road component be enacted in the Transportation Trust Fund Proposal to replace the non-FAUS local aid component of the 1979 Transportation Bond Act.**

## NOTES

1. Linear Road Miles Independent of the Number of Lanes.
2. For a comprehensive overview of the overhead railroad bridge issue, see: North Jersey Transportation Coordinating Council, *Overhead Railroad Bridges in New Jersey: Legal and Financial Issues*, Newark, NJ, June 1983; and "Data Addendum" to the report, September 19, 1983.
3. For a Complete Overview of These Programs See Chapter 2 of the County and Municipal Government Study Commission's Report, *"Local Highway and Road Programs"*, Trenton, NJ, September 1978.
4. Ibid.

5. These programs include the *Reimbursed Highway Safety Lighting Program* (N.J.S.A. 27:7-21) which provides counties and municipalities with monies to maintain lighting units, and the *Construction Damage Program* (N.J.S.A. 27:13-10) which provides aid to county and municipal governments to reconstruct roads damaged by heavy construction equipment.
6. State of New Jersey Budget, 1984-1985.



According to Department of Environmental Protection estimates, rehabilitation and expansion of wastewater collection and treatment systems in New Jersey will require an investment of 6.2 billion dollars by the end of the century. (Photo courtesy Hamilton Twp. Sewerage Authority)

## Chapter IV WASTEWATER COLLECTION AND TREATMENT SYSTEMS

Wastewater collection and treatment facilities are one of the most important of the local infrastructure systems in their relationship to the health and environmental condition of New Jersey's towns and waterways. State and local government leaders and environmental officials have long realized that New Jersey, with its dense and heavily populated industrial areas, coexisting with its major rivers, wetlands, and shore areas, requires a system for the treatment of liquid waste which is effective, efficient and meets the highest environmental standards. Guided by federal mandates and tough standards developed on its own, New Jersey and its local governments have been making a concerted effort to upgrade and expand New Jersey's system of wastewater collection and treatment facilities.

Along with this effort comes the knowledge that the costs of such a venture will range in the millions to billions of dollars. As such, it has been critical to develop a method by which the state can prioritize its collection and treatment needs and to develop rational criteria by which to allocate available capital resources. Through the development of the Department of Environmental Protection's priority list<sup>1</sup> and needs survey provided to the Federal Environmental Protection Agency, the State has made a concerted effort to analyze, account for, and rank New Jersey's current capital needs in this area. As a result of the DEP's efforts, these documents are by far the best compilation of local infrastructure needs aggregated in one source at the State government level.

In analyzing the needs and conditions of wastewater treatment and collection systems in New Jersey, the Commission has determined that these systems offer two sets of related, but somewhat distinct, capital investment needs.

### *Collection Systems*

The collection system is that network of pipes which transport liquid wastes from their source to interceptor lines and treatment plants. This system consists of sanitary sewers, which transport domestic liquid wastes, and combined sewers, which transport domestic liquid waste and storm water runoff. The municipality, or the municipal sewerage or utilities authorities, are the jurisdictions primarily responsible for the local collection system, while regional and county sewerage or utilities authorities are often responsible for the interceptors, pumping stations, and treatment plants.

In older jurisdictions, collection system needs are usually associated with the need to repair and update existing pipes, separate "combined" sewer pipes into sanitary sewers and storm drainage pipes, and to limit the "infiltration" of ground water into the sewer collector system. In new jurisdictions, collection system needs are usually associated with the need to expand the existing network of pipes into new areas of the community and to tie them into new or existing waste treatment facilities.





According to Department of Environmental Protection estimates, rehabilitation and expansion of wastewater collection and treatment systems in New Jersey will require an investment of 6.2 billion dollars by the end of the century. (Photo courtesy Hamilton Twp. Sewerage Authority)

## Chapter IV

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### **Treatment Systems**

The ultimate goal of any wastewater collection and treatment system is to treat "raw" sewage so that it is in an environmentally acceptable form when it is discharged into the surrounding waterways. Both State and federal mandates are clear in this regard. As such, capital investment needs for treatment facilities are usually based on the need to expand existing treatment capacity and to upgrade the present level of treatment for discharged wastes. The State has compiled an extensive list of capital investment needs for treatment facilities to enable it to prioritize efforts and to efficiently allocate available federal and State monies for the upgrading and expansion of these facilities.

### **Size and Extent of the Systems:**

#### **Collection Systems**

There is no complete inventory presently available of the total miles of local wastewater collection 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 must 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 from the responses to the commission's survey. In the 97 communities which responded to the survey and which had some type of collection system, there are presently 6300 miles of sanitary sewerage pipe or approximately 63 miles of sanitary sewers per jurisdiction. In addition, 11 municipalities that responded to the survey indicated that they had a total of 1129 miles of combined sanitary and storm drainage pipes.<sup>2</sup>

#### **Treatment Facilities**

The Department of Environmental Protection estimates that 80% 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. A total of 82 communities responding to the Commission's questions on wastewater treatment report that, collectively, 441 million gallons of their generated sewerage is treated daily and that they spend approximately 95.6 million dollars, or 1.2 million dollars per jurisdiction, annually to treat it.

This sewage is treated by a variety of public and private treatment plants throughout the state. Of the communities responding to the Commission's survey, 51% reported that their waste was treated by a regional sewerage agency, 20% reported that their waste was treated by a municipal authority, and 19% reported that their wastes were treated by a plant operated by the municipality. (The remaining 10% indicated that their municipal waste was either not treated, or was treated by some other type of treatment, including septic systems.)

### **Condition of the Systems:**

#### **Collection Systems**

In general, the condition of local sewage collection systems is determined to be good to fair by municipal engineers. Of the 98 jurisdictions that reported on the condition of the collection system, 35.7 percent indicate that the collection system in their municipality is in good condition, while 39.8 percent report that the system is in fair condition. **However 24.5 percent, or nearly one fourth of responding municipalities, report that the collection system in their jurisdiction is in poor or very poor condition**, with "capacity problems" or "significant infiltration problems," and in need of major repair or replacement. (See Table IV-1)

In addition to assessing the general condition of these systems, municipal engineers specify infiltration as being a particular problem, with approximately 50 percent of responding jurisdictions indicating that their collection system had some type of infiltration problem.

Because they are underground and "invisible," collection systems, along with water distribution systems, offer the most difficulties in assessing present condition and existing needs, particularly in the older jurisdictions. While municipal officials who were interviewed during the course of this study expressed general confidence that the condition of the collection systems in their municipalities were relatively good, they felt that the lack of knowledge of the actual condition of these facilities had prevented them from anticipating future needs and, instead, had resulted in a "crises management" approach to the repair and replacement of these facilities. As noted by one municipal engineer:

"Most municipalities . . . do not have a comprehensive program for inspecting and surveying the condition of the sewer collection system. Funds for such a program

**TABLE IV-1**  
**CONDITION OF SEWERAGE COLLECTION SYSTEM<sup>1</sup>**

Condition	Description	Percent of Municipalities Responding
Good	system functions as designed, low infiltration; no capacity problems; no major rehabilitation/replacement needed	35.7
Fair	some major rehabilitation/replacement needed; some capacity problems; moderate infiltration	39.8
Poor	immediate need for major rehabilitation/replacement; some capacity problems; excessive infiltration	20.4
Very Poor	critical need for major rehabilitation/replacement; significant capacity problems; excessive infiltration	4.1

<sup>1</sup>98 Municipalities responding, 1982 Survey of Municipal Engineers, County and Municipal Government Study Commission.



are not available on the municipal or State level. Consequently, the sewer system has degenerated to a point where "emergencies" constitute the only grounds for repair. Maintenance, repair, and preventive maintenance is almost non-existent. Perhaps [the Commission's survey] is just the beginning of State involvement in a problem that has required attention for a *long* time."

#### Treatment Facilities

An assessment of the existing structural integrity of the treatment system is not as useful a mechanism for establishing the "condition" of treatment facilities. Treatment facility condition is, rather, a function of whether the system has adequate capacity to handle the waste delivered to the treatment plant, and whether the level of treatment is adequate for the body of water that the treated waste is being discharged into. These goals are emphasized in the formulas designed by the Department of Environmental Protection to rank projects in its priority list.<sup>3</sup> The DEP gives its highest priority to upgrading current primary to secondary treatment. Within the context of increasing overall levels of treatment for sewerage discharges, the DEP gives highest priority to those projects designed to protect potable water supplies, fishable waters (particularly shell fish areas), and bodies of water used for recreational purposes.

The Commission survey of engineers indicates that the expansion of treatment capacity and upgrading of treatment levels continues to be an important need. *According to returns from the Commission's survey, 65 percent of the municipalities which have their waste treated indicate that the capacity of their treatment plant was not adequate, with 45 percent of the municipalities anticipating that they would have to invest in additional sewage treatment facilities within the next 10 years.* Of the municipalities which have their waste treated, 16 percent deliver these wastes to facilities with only primary treatment, while 61 percent deliver these wastes to secondary treatment plants, and only 18 percent deliver these wastes to tertiary (advanced) treatment facilities. Five percent of the respondents indicated that their wastes were either not treated or that the municipality uses some other type of treatment (including septic systems).

#### Capital Investment Needs:

The Commission's survey and DEP needs estimates indicate that there are significant capital investment needs for both treatment facilities and local collection systems.

#### Collection Systems

Of the 91 municipalities responding to the Commission's survey, 41.8 percent felt that their jurisdiction was on an inadequate repair and replacement cycle for their sewer collection system. These municipalities report that unmet capital investment needs for wastewater collection systems are approximately 20.5 million dollars a year. Assuming similar patterns of present per capita expenditures and estimated capital investment needs around the state, *the total unmet capital investment needs for*

TABLE IV-2  
PROJECTED ANNUAL UNMET CAPITAL NEEDS  
MUNICIPAL WASTEWATER COLLECTOR SYSTEMS

Municipal' Type	Respondents	Number Inadequate	Percent of Respondents	Per Capita Unmet Need (\$)	Annual Capital Shortfall (000's)	Percent
Urban Centers	16	12	75.0	5.96	\$ 9,976	14.9
Older Suburbs	17	11	64.7	25.44	51,106	76.5
Suburban	48	15	31.3	1.94	5,696	8.6
Rural Centers	5	0	0.0	0	0	0.0
Rural Places	5	0	0.0	0	0	0.0
Total	91	38	41.8	—	\$66,778	100.0

SOURCE: Survey by the New Jersey County and Municipal Government Study Commission and Division of State and Regional Planning, 91 Municipalities responding.

'Indicators developed by the Division of State and Regional Planning

wastewater collection systems in New Jersey are projected to be 66.7 million dollars each year. Combined with the estimated 90 million dollars per year which is currently being spent on these systems throughout the state, the total projected annual collection system needs for New Jersey are 156.7 million dollars each year.

#### ***Distribution of Collection System Needs***

Unlike unmet capital investment needs for municipal streets and roads, which are distributed primarily in municipalities which are suburban in character and generally prosperous, unmet needs for wastewater collection systems are concentrated in the urban, high-distress municipalities in the state. (See Table IV-2)

Evidence from the Commission's survey indicates that local collection system needs are primarily those of separating existing combined sewer systems into sanitary sewers and storm drainage pipes. In all, the 11 communities whose collection systems had combined sewers account for 71 percent of total unmet capital investment needs in the Commission sample.

While combined sewer separation and overflow correction account for the overwhelming majority of local collection system rehabilitation needs, little money has been spent on these projects over the past several years. According to the DEP, total capital investment needs for combined sewer projects are estimated to be 2 billion dollars or 106 million dollars each year between 1982 and the year 2000. However, between 1977 and 1982, actual expenditures for combined sewer projects have averaged only 1.2 million dollars a year. In addition, the federal government intends to eliminate Combined Sewer Overflow projects from the Section 201 Grants Program by October 1, 1984.

Even within the State's priority system, combined sewer overflow projects tend to be given lower priority than other discharge needs. While giving these projects a relatively lower priority, the DEP recognizes the potential that these projects may have in upgrading waste discharges into the state's waterways. As noted by the DEP:

"The study of such projects is extremely complex, requiring comparisons of various treatment alternatives and the associated cost with benefits gained in terms of water quality improvements. It is recognized that combined sewer overflow correction projects may provide more water quality benefits than other more highly rated categories of projects. It is the intention of the State to readjust the priority of projects under this category as more information is gained about the water quality benefits associated with specific combined sewer overflow correction projects."<sup>4</sup>

Because the question in the Commission's survey asking municipal engineers to estimate their capital investment needs concentrates primarily on investment needs for rehabilitation and reconstruction of the existing collection systems, this may tend to skew the distribution of unmet needs towards older urban areas, and away from those municipalities whose collection system needs are primarily those of expanding the existing system. However, when asked whether there were needs other than replacement and reconstruction of the existing wastewater network, only 23 percent of the municipalities responded in the affirmative. And, when asked to rank their overall capital improvement priorities, collection system rehabilitation needs edged system expansion needs as a municipal priority, being ranked as a first or second priority

TABLE IV-3  
MUNICIPAL SEWERAGE FACILITY  
CAPITAL INVESTMENT PRIORITIES<sup>1</sup>

Improvement	Number of Times Ranked First	Number of Times Ranked Second	Total Times Ranked First or Sec- ond
Rehabilitate/Replace Collection System	28	15	43
Expand Collection System	16	21	37
Rehabilitate/Reconstruct Treatment Plant	8	6	14
Increase Treatment Capacity	6	7	13
Other	14	7	21

<sup>1</sup>78 municipalities responded to this question. Four, which are not included in the tabulation above, indicated they had no priority needs. 1982 Survey of Municipal Engineers.

need 43 times (compared to 37 times for the expansion of the collection system). In general, collector needs dominated in this ranking of priorities, with rehabilitation of the present treatment system ranked only 14 times and only 13 first or second rankings for the expansion of the treatment capacity. (See Table IV-3)

Based on the returns from its own survey and DEP needs estimates, the Commission has determined that local collection system needs, particularly those relating to the separation of combined sewer systems, represent a significant unmet investment need for municipalities. ***While the Commission recognizes that the need to expand wastewater treatment capacity and upgrade the level of treatment of wastes discharged into New Jersey's waters should remain the highest public investment priority, the Commission recommends that collection system needs, particularly those of combined sewers, be recognized in future State initiatives in this area.***

#### ***Treatment System Needs***

Capital investment needs for wastewater treatment facilities are well documented within the Department of Environmental Protection's priority list and survey. According to DEP estimates, there is presently a 5.4 billion dollar backlog for wastewater system facilities throughout the state. ***Based on projected population increases to the year 2000, total wastewater collection and treatment system needs from 1982 to the end of the century total 6.2 billion dollars, or approximately 327 million dollars each year.***<sup>5</sup> Approximately 3.4 billion dollars of these capital investment needs are for secondary, advanced secondary, advanced treatment facilities, and major interceptor lines, with the remaining 2.8 billion dollars for construction, repair, and rehabilitation of collection systems, including the separation of combined sewer systems.

**TABLE IV-4**  
**INVESTMENT NEEDS FOR WASTEWATER**  
**DISPOSAL SYSTEMS, 1982-2000**  
(in millions of 1982 dollars)

Facility	Backlog Need, 1980 Population	Projected Need, 2000 Population	Annual Need 1982-2000
<b>TREATMENT AND INTERCEPTOR</b>			
Secondary Treatment	1,847	2,187	115.1
Advanced Secondary Treatment	181	220	11.6
Advanced Treatment	97	133	7.0
New Interceptors	614	852	44.8
SUBTOTAL	2,739	3,392	178.5
<b>COLLECTION SYSTEM</b>			
Infiltration Inflow Correction	226	226	11.9
Major Rehabilitation of Sewers	2	2	.1
New Collector Pipe	440	577	30.4
Combined Sewers	2,015	2,015	106.0
SUBTOTAL	2,683	2,820	148.4
TOTAL	5,422	6,212	326.9

SOURCE: U.S. EPA, 1982 Needs Survey, Cost Estimates for Construction of Publicly-Owned Wastewater Treatment Facilities, December 31, 1982.

Based on an amortization of these needs over a 19 year period (1982-2000), annual treatment needs are approximately 178 million dollars a year, with annual wastewater collection system needs estimated to be approximately 148 million dollars per year. (See Table IV-4) The Commission's projections for wastewater collection needs comes very close to the 148 million dollars a year estimated by the Department of Environmental Protection, suggesting that data from either source is representative of overall state needs.

While including both wastewater treatment and collection system needs, the State's priority list gives some idea of the distribution, by type of jurisdiction and urbanization, of the state's major treatment needs. Together the State's proposed priority lists include 280 projects, including expansion and upgrading of sewerage treatment plants, pump stations, interceptors, and force mains, as well as rehabilitation of sewers and other facilities and projects for innovative and alternative mechanisms for wastewater treatment. These projects total \$3 billion, and are distributed accordingly:

- 62 projects by 12 different County Governments, County Sewerage and Utilities Authorities for a total cost of \$1.8 billion.
- 47 projects by 25 different Regional Sewerage and Utilities Authorities, and joint meetings for a total cost of \$424.8 million.

- 123 projects by 89 different municipal governments for a total cost of \$498.1 million.
- 48 projects by 32 different Municipal Sewerage and Utilities Authorities for a total cost of \$256.1 million.

While two-thirds of the 280 wastewater projects in the State's priority list are in non-urban counties, the 102 projects which are in the urban counties of Essex, Hudson, Bergen, Passaic, Union, Middlesex, Mercer, and Camden account for three-quarters (2.2 billion dollars) of all projected costs.

#### **Federal and State Aid:**

##### **Federal Aid**

Federal funding has been an important component of New Jersey's capital investment strategies for wastewater collection and treatment systems. However, recent reductions in program funding has meant that New Jersey has to meet federal mandates with declining levels of federal funds.

The main sources of federal funding for wastewater collection and treatment facilities is the Construction Grants Program authorized under Section 201 of the *Federal Clean Water Act Amendments of 1972*. The Department of Environmental Protection estimates that between 1972 and 1982 the state received approximately 2 billion dollars of federal aid from this program to help fund 2.4 billion dollars of wastewater collection and treatment system projects.<sup>6</sup> During this period, federal funds provided 75 percent of project costs, with state and local shares 8½ percent and 16½ percent respectively. In the mid-1970's, funding for the section 201 grant program was reduced. Between 1977 and 1982, federal funds for treatment plants, collector and interceptor sewers, and combined sewers totaled 513.2 million dollars, compared to approximately 1.5 billion between 1972 and 1977. These monies were matched by 53.9 million dollars in State monies (derived from State bond issues) and another 112.5 million in local matching monies. (See Table IV-5) Combined with expenditures funded by a number of federal sources, including grant monies from the Department of Housing and Urban Development and the Economic Development Administration, as well as local bonding and contributions from local developers, total expenditures for wastewater facilities between 1977 and 1982 were approximately 879 million dollars or 146.5 million dollars each year.

With the federal aid reductions in 1981 and 1982, monies available from the 201 Construction Grant Program were reduced again, with only 85 million available in FY 1982 and 100 million available per year since FY 1983. State Department of Environmental Protection Officials indicate that, as a result of these reductions in federal aid, *"less than one fifth of (New Jersey's) needed projects can be constructed with the monies that have been authorized for the State's Construction Grants Program."*

In addition to the reduction of overall funding, major changes were made in the types of projects that could be funded by these monies, as well as the overall percentage of project costs that could be funded. *With the new amendments, funding levels for local projects dropped from 75 percent to only 55 percent of*

TABLE IV-5  
EXPENDITURES FOR WASTEWATER COLLECTOR AND  
TREATMENT SYSTEMS IN NEW JERSEY  
1977-1982  
(millions of dollars)

	Federal Grants	State General Obligation Bonds	Local Revenues	Other <sup>1</sup>	Total	Average Annual Expenditures 1977-1982
Treatment plants	254.4	26.6	56.6	40.1	377.7	63.0
Collector and interceptor sewers	252.1	27.1	55.4	159.3 <sup>2</sup>	493.9	82.3
Combined sewers and storm drains	6.7	0.2	0.5	—	7.4	1.2
TOTAL	513.2	53.9	112.5	199.4	879.0	146.5

<sup>1</sup>This category includes projects not funded under the 201 Construction Grants Program, and may have been funded by one of the following: Farmers Home Administration, HUD, EDA, bonding by local municipalities, builders and developers.

<sup>2</sup>Private investment accounts for a significant contribution to new investment for collector systems.

SOURCE: New Jersey Department of Environmental Protection, Division of Water Resources.

REPRINTED FROM . . . "New Jersey's Infrastructure Needs: A Case Study," Robert Lake, Center for Urban Policy Research, Rutgers University, September 1983.

**total project costs.** After October 1, 1984, treatment plants, interceptors, and rehabilitation projects will be the only projects funded under the program. New collection system, sewer system replacement and combined sewer overflow protection will not be eligible after this date, except in certain special cases. In addition to several other changes, Step 1 (planning) and Step 2 (design) grants will no longer be awarded. Rather, allowances for these costs will be incorporated into Step 3 (construction) grants that are allocated.<sup>8</sup>

With the reductions in the federal Construction Grants Program, New Jersey will be in serious trouble in meeting its capital investment needs for wastewater collection and treatment, and will not be able to meet mandated environmental standards.

#### State Bond Issues

The State's voters have authorized several bond issues over the past decade and a half to meet the state's water quality needs, including grants for wastewater treatment and collection projects. At the present time, however, only a minimal amount of funds are still unobligated and available from these bond issues. The two most recent state bond issues were the *Clean Water Bond Act of 1976*, which provided approximately 70 million dollars in construction grants for wastewater projects; and the *Natural Resources Bond Act of 1980*, which provided 60 million dollars of funds for wastewater projects. As of the end of FY 1983, all monies in the *Clean Water Bond Act of 1976* had been appropriated and as of December 1983, all but 16 million dollars of the funds available from the *Natural Resources Bond Act of 1980* were appropriated and obligated.

With the reduction of the federal commitment to the financing of wastewater facilities, and the significant backlog of projects to be built, it is imperative that all other possible resources be utilized in the attempt to meet the public need for safe and effective sanitary sewer systems and treatment facilities. In this regard, the State should do everything in its power to encourage local governments to utilize their own resources to construct needed sewerage systems. The Commission has recommended in another chapter that the municipal and county sewerage enabling laws be rewritten to provide clear authority for local governments to utilize a variety of self financing mechanisms. ***To encourage local governments to utilize their borrowing capacity, the State should adopt a program of bond guarantees to enable local governments to obtain the lowest possible interest rates.***<sup>9</sup>

#### Private Sector Financing:

In exploring new financing mechanisms for municipal wastewater systems, private sector financing offers a potentially important alternative. This is particularly true in the financing of wastewater treatment facilities, where lower overall costs, depreciation allowances, and tax advantages given to private firms can be passed on to the users of these facilities. Private sector financing can be accomplished through the establishment of investor owned utilities as exists in Lakewood, through developer contributions to publicly owned systems, or through contracts for private operation of publicly owned systems.

In fact, private developers already have made a significant contribution to the construction of new collection systems. However, private sector financing may be a less useful financing mechanism for rehabilitating existing collection systems. As noted by the DEP:

"Private financing is more advantageous for the construction of municipal wastewater treatment plants (through tax credits, depreciation allowances, etc.) rather than for the construction or rehabilitation of sewer lines, for which limited advantages are available."<sup>10</sup>

***The Commission recommends that the state and local governments promote the private sector financing of sewerage construction projects wherever possible.***

#### ***New State Aid Initiatives***

The State and its local governments have documented a significant need for sewerage construction programs. At the same time, the federal government has significantly reduced the amount and availability of federal funds for sewerage construction. In addition, New Jersey has expended nearly all the available State bond funds for sewerage construction grants. Based on its own need estimates, the Department of Environmental Protection has recommended that over the next 10 years 15 million dollars a year be made available for the construction of local sewerage systems.

***The Commission concurs with the Department of Environmental Protection findings and recommends that the State make 15 million dollars a year available for the next ten years for the construction of local sewerage treatment and collection systems. The Commission further recommends that monies should only be made available to stimulate projects which would not be constructed without State aid, and that any new State aid program should recognize the need to repair and rehabilitate the older collection systems in the state.***

#### **NOTES**

1. *Proposed Priority System and Project Priority Lists for Fiscal Year 1984*. Department of Environmental Protection, 1983. This list is used to rank local wastewater treatment and collection projects for the allocation of Federal Grant monies in the state.
2. Municipalities which responded to the Commission's survey and indicated that either all or part of their collection system consisted of combined sewers included: Bayonne, Camden, Elizabeth, Jersey City, Montvale, Newark, New Brunswick, Orange, Perth Amboy, Princeton Township, and Trenton.
3. See "Proposed Priority System Methodology for Fiscal Year 1984 Construction Grants Program" pp. 9-19 in *Proposed Priority System and Project Priority Lists*.
4. *Ibid.* p. 13.
5. See Data for New Jersey as submitted to U.S. EDA, *The Office of Water Program Operation 1982 Needs Survey: Cost Estimates for Construction of Publicly Owned Wastewater Treatment Facilities* Washington, DC. December 31, 1982.
6. *Proposed Priority System and Project Priority Lists*, p. 1.
7. *Ibid.*
8. See *Ibid* pp. 4-8. For these and other changes in Federal Construction Grant Programs.

9. While not discussed in detail in this report, State guarantees of local bond issues will effectively lower the interest rates that municipalities pay to borrow money to pay for wastewater projects. While the specific savings may vary, discussions with State and local officials suggest that their use should be encouraged.
10. *Proposed Priority System and Project Priority Lists*, p. 2.





Because water distribution systems are buried underground and are essentially "invisible," many municipalities report that they rely on a "crises management" approach to maintaining their system. (Photo courtesy Chester Higgins, Jr./New York Times)

## Chapter V WATER DISTRIBUTION SYSTEMS

Water distribution systems supply the most dramatic examples of the service disruptions and crisis situations which can arise with the failure of one of the local infrastructure systems. The scenes of people queueing up for fresh water from trucks, while engineers and municipal officials work feverously to fix a major water main break, remain vivid reminders of the critical need to anticipate and plan for future infrastructure investment needs. While such an event is an unusually severe example of what can occur with the failure of the water distribution system, municipal engineers and other officials (while maintaining that their water systems are in good condition and well-maintained) are seriously concerned that they will be unable to anticipate a major disruption of service and the economic and health problems that could be associated with such an event.

In addition, slow incremental deterioration of the water distribution system can, over time, decrease the efficiency of the system to the point where only a fraction of the water intended for users reaches its destination. In a state with such a heavy water demand, it is critical that local governments maintain and, where appropriate, rehabilitate their water distribution system to ensure that the delivery of fresh potable water is efficient, safe, and uninterrupted.

It is in this context that the Commission began its analysis of the local water distribution system.

### **Role of State and Local Governments:**

Government in general, and municipal government specifically, have had a long standing and recognized responsibility to provide fresh potable water to its citizens.<sup>1</sup> This responsibility has become more critical and complex as the state has developed from a generally rural society to a diverse, densely populated state with many different types of residential, industrial, and commercial activities. However complex the administrative procedures, regulations, and laws concerning water supply have become, there remains essentially three main components associated with the governmental responsibility of providing water to New Jersey's residents:

1. providing adequate sources of water **supply**, ensuring that the needs of present and future residents of the state are met;
2. maintaining and protecting **the quality** of the water supplies of the state, preventing their contamination by chemical or biological agents, or other effluents;
3. providing and maintaining a system to transport water from its sources of supply and to **distribute** it to its users.

Over the years, a strong State role has developed in both ensuring that the state has an adequate supply of water, and that the quality of this supply is protected.<sup>2</sup> In addition, the State has developed a role in operating water supply facilities. How-



ever, the establishment and maintenance of a system to distribute this water specifically to the residents of the community is still predominantly a local government responsibility. In fulfilling this responsibility, municipalities can provide or have provided water to their residents in any number of ways. They can acquire and operate their own water system, grant a franchise to a private water company, or contract out this service to private water companies, other municipalities, regional commissions, water supply districts, counties, or municipal, regional or county utilities authorities. Most of these decisions were made over the course of the last century. However, communities which are upgrading their service patterns from homeowner wells to multiple user service systems are still making these decisions.

#### Number and Type of Purveyors:

Over the years, New Jersey has developed a system of water supply and distribution that is composed of a myriad of private and public purveyors. All told, there are approximately 620 different water purveyors in the state, divided evenly between public and private entities. The major categories of purveyors include:

##### Private Purveyors

1. The major private investor owned companies including Elizabethtown, Hackensack Water Company, and others. These major private purveyors serve approximately 40 percent of the state's population.
2. Smaller private systems whose service areas vary from several thousand users to only a handful. Some of these minor purveyors serve only one development, business or institution.

##### Public Purveyors

1. Municipal operated utilities (MOU's) including municipal water departments. This category includes some of the largest water purveyors in the state, including the Jersey City and Trenton Water Departments.
2. Municipal, regional and county utilities authorities, created by local governments to supply water, sewerage, and solid waste services to municipalities. At present, there are 79 such authorities in the state, not all providing water services.
3. Regional commissions, including the Passaic Valley Water Commission and the Pennsauken-Merchantville Water Commission.
4. County governments are authorized to provide water services to municipalities under the County Water Supply Financing Act (NJSA 40:14C-1 et seq).
5. In addition to these purveyors, the North Jersey Water Supply Commission and the New Jersey Water Supply Authority are state agencies which wholesale water to other purveyors.

Together, the 25 largest public and private water purveyors in the state serve approximately 80 percent of the state's population and account for 82 percent of total water diversions in the state. (See Table V-1)

#### Size and Extent of the System:

Figures available from the Department of Environmental Protection and returns from the Commission's survey give some indication of the number of miles of pipe

TABLE V-1  
DISTRIBUTION SYSTEM DATA FOR THE TOP 25 PURVEYORS IN NEW JERSEY

Rank	Purveyor Name	Population Size	Average Demand (mgd)	Total Length of Trans. & Dist. System (ft)
1	Elizabethtown Water Company	576,800	126.99	10,132,817
2	North Jersey-District Water Supply Comm.	800,000	90.58	—
3	American Water Works Services Company	237,660	34.66	4,466,128
	Commonwealth Water Company	246,062	28.74	4,874,874
	Monmouth Consolidated	462,630	39.194	6,528,167
4	New Jersey Water Company	800,000	98.1	—
5	Hackensack Water Company	603,200	111.56	2,576,807
6	Newark Water Department	260,000	69.33	1,478,400
7	Jersey City Water Department	540,000	85.45	2,352,768
8	Passaic Valley Water Comm.	225,000	32.24	2,937,825
9	Trenton Water Department	85,000	24.30	675,840
10	City of Camden	117,860	29.30	—
11	Middlesex Water Company	80,000	13.65	—
12	New Brunswick Water Department	47,685	9.42	—
13	Atlantic City Water Department	85,000	9.55	697,800
14	East Orange Water Department	38,000	5.69	—
15	Perth Amboy Municipal Utilities	70,425	7.6	1,004,072
16	Garden State Water Company	49,900	7.3	—
17	Merchantville-Pennsauken Water Comm.	56,705	7.02	1,438,000
18	Southeast-Morris County Municipal Utilities	32,000	6.42	—
19	Vineland Water-Sewer Utility	57,303	6.10	1,352,000
20	Ridgewood Water Department	30,000	6.61	498,000
21	Rahway Water Department	61,500	6.04	1,378,000
22	Toms River Water Company	65,000	4.79	845,000
23	Parsippany-Troy Hills Township Water	48,000	3.44	—
24	Willingboro-Municipal Utilities Auth.	22,000	3.0	—
25	Hawthorne Water Department	35,000	3.61	296,000
	Orange City Water Department	5,732,730	870.684	43,532,498
	TOTALS			(8,245 miles)

SOURCE: New Jersey Department of Environmental Protection, 1979.

and the size of New Jersey's local water distribution network. According to the DEP, total water use in the state (1980 estimates) is almost 1.1 billion gallons of water each day, diverted from a variety of surface and groundwater sources. For planning purposes, the Division of Water Resources in the Department of Environmental Protection has divided the state into 6 water supply planning regions. (See Figure V-1) As indicated by Table V-2, most of the water use in the state (approximately 72 percent) occurs in the northeastern and central parts of the state (Region 1). It is in this region that most of the state's largest and oldest purveyors are located. (See Figure V-2)

While no complete statewide figures are available for total miles of pipe in the state, according to recent DEP records, 16 of the top twenty five purveyors in the state report that they have a total of 8,250 miles of water distribution pipe. The public purveyors which responded to the Commission's survey report a total of 2900 miles of water pipe, or approximately 50 miles per jurisdiction.

#### Condition of the Distribution System:

Based on responses to the Commission's survey, the water distribution systems maintained and operated by public purveyors in New Jersey are in generally good to fair condition. (See Table V-3) Of the 58 jurisdictions responding to the survey, 50 percent report that their distribution system is in good condition and 36.2 percent rate it as being in fair condition. Only 13.8 percent of the responding jurisdictions rate their systems as being in poor condition overall and in "immediate need of major rehabilitation and replacement," while no municipal engineers report that their jurisdiction's water distribution system is in very poor condition. In general, private water utilities adequately maintain their distribution systems, with none of the private purveyors reporting that their system is in poor or very poor condition and only one reporting their system as being in fair condition.

TABLE V-2  
PROJECTED WATER NEEDS BY REGION  
(mgd)

Region <sup>2</sup>	1976 Demand	PROJECTED ADDITIONAL DEMAND <sup>1</sup> (MGD Above 1976 Demand)					
		1976	1980	1990	2000	2010	2020
1	756	55	63	107	151	186	203
2	79	0	12	30	38	44	50
3	28	0	5	16	17	20	22
4	21	0	0	2	5	7	9
5	107	0	5	15	26	33	36
6	56	0	4	11	18	23	27
Total	1047	55	89	181	255	313	347

<sup>1</sup>These needs are based on projections made in 1976 and do not reflect implementation of projects designed to meet these needs.

<sup>2</sup>See Figure V-1 for boundaries of planning regions.

SOURCE: Department of Environmental Protection, Water Supply Master Plan, 1982.

Figure V-1

#### WATER SUPPLY PLANNING REGIONS

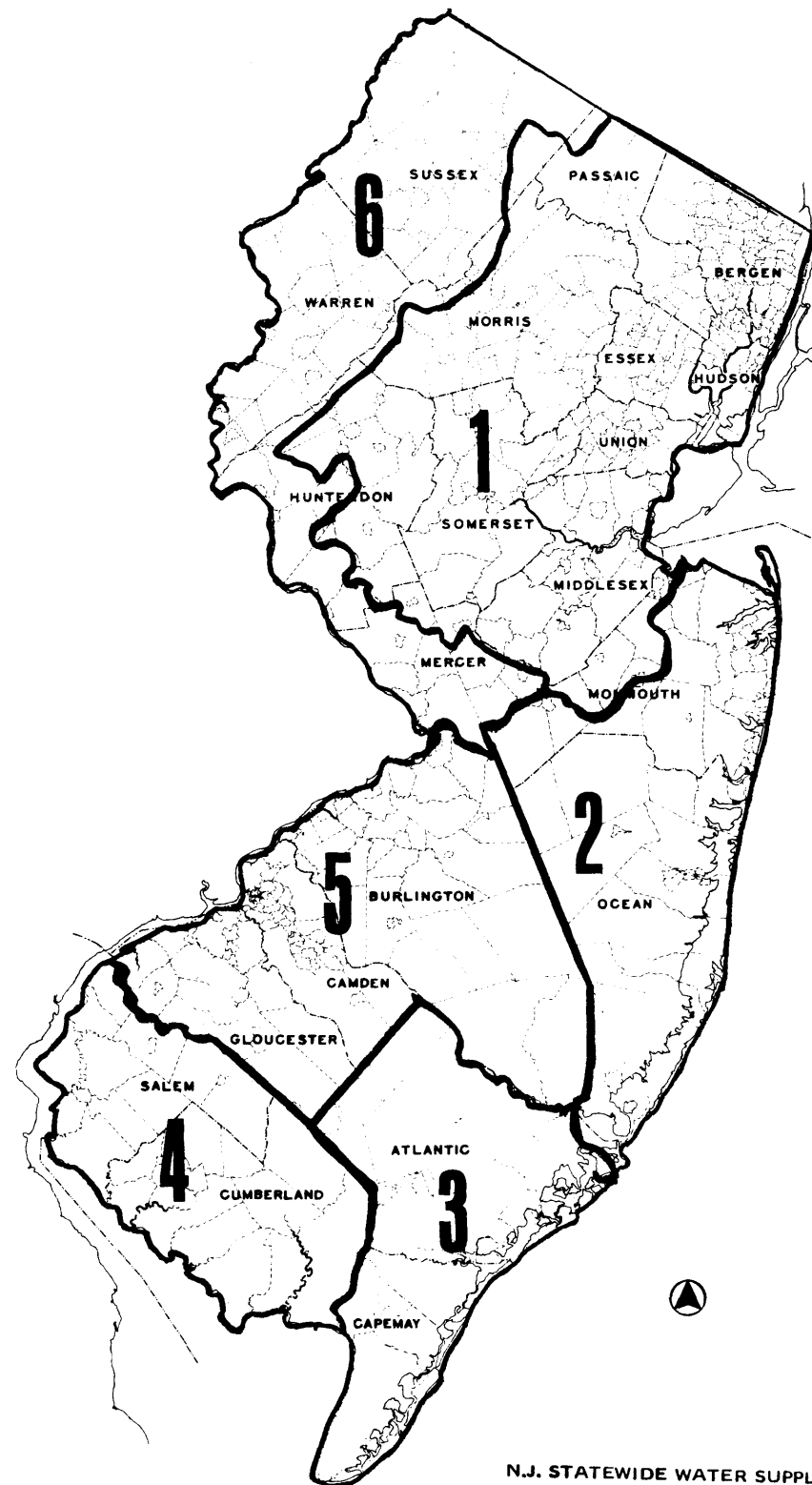
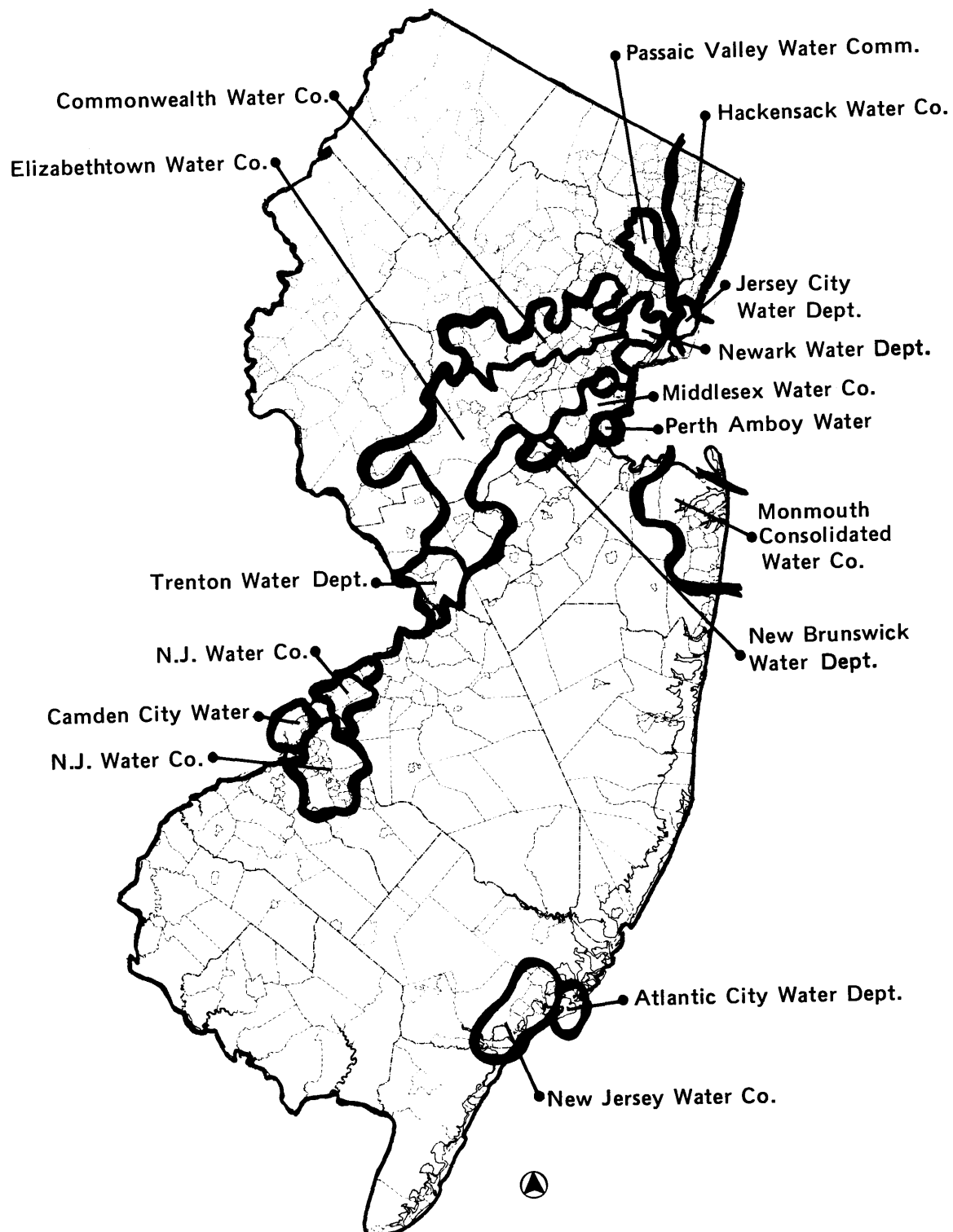


Figure V-2

## MAJOR WATER PURVEYOR SERVICE AREAS

TABLE V-3  
CONDITION OF WATER SYSTEM

Condition	Description	Percent of Respondents	
		Commission <sup>1</sup> Survey	DEP <sup>2</sup> Survey
Good	system basically sound, no major repairs/rehabilitation needs; low leakage in 95% of system	50.0	70.0
Fair	some major rehabilitation/replacement needed; excessive leakage in no more than 20% of the system	36.2	27.3
Poor	immediate need for major rehabilitation/replacement; excessive leakage in no more than 50% of the system	13.8	2.0
Very Poor	critical need for major rehabilitation/replacement; excessive leakage in over 50% of the system	0.0	0.0

<sup>1</sup>1982 Survey of Municipal Engineers, County and Municipal Government Study Commission (59 Public Purveyors Responding)

<sup>2</sup>1979 Survey of Public and Private Water Purveyors

The overall rating of the distribution system by the municipalities responding to the survey was slightly lower than a similar survey conducted by the Division of Water Resources in the Department of Environmental Protection in 1979. In that survey, only 2 percent of all purveyors (which included both public and private) reported that their system was in poor condition, with 27.3 percent reporting that the system was in fair condition and 70 percent responding that the system was in good condition.<sup>3</sup>

While municipal engineers rate their systems as being in generally good to fair condition overall, they are concerned that they cannot accurately assess the true condition of their distribution system. ***Because the system is buried underground and is essentially "invisible", engineers interviewed note that they are unable to anticipate major system failures and service disruptions and, as a result, tend to rely on a "crises management" approach to maintaining the system.***

One of the problems in maintaining the distribution system is the age of the pipe that is buried under the ground. This is a particular problem for older jurisdictions whose municipal water distribution system was installed and constructed decades ago. Engineers responding to the Commission's survey report that the average age of the water distribution system in their municipality is about 50 years, with some pipes 100 years of age or older.

The primary construction material for these pipes is cast iron, with 70 percent of the jurisdictions reporting that the pipes in their system are constructed from this material. Few jurisdictions reported that these cast iron pipes were cement lined to protect them from corrosion or rusting, suggesting that the older cast iron pipes may have experienced significant deterioration and are in a potentially weakened condition.

## Capital Investment Needs:

### Water Distribution System Needs

While most municipalities report that their water distribution system is in generally good condition, almost fifty percent of the engineers indicate that their municipality is presently on an inadequate repair and replacement cycle for their water distribution system. Based on reported needs and current expenditures, the unmet capital investment for these "inadequate cycle" municipalities is approximately 15.7 million dollars each year. Based on a similar per capita need throughout the state, **total unmet capital investment need for water distribution systems in New Jersey is projected to be approximately 35 million dollars each year.** Combined with projected annual expenditures of 28 million dollars, the total annual water distribution system needs for New Jersey's public purveyors are approximately 63 million dollars each year.

Unmet capital investment needs are predominantly concentrated in high-distress, urban municipalities in the state (See Table V-4), with the capital investment needs of the larger municipal systems accounting for this distribution. These large municipal systems are older and have deteriorated to the point where an almost complete reconstruction of the system is necessary. Combined with low capital investment levels in recent years, and the fact that water revenues from these urban systems are often diverted into the general operating fund of the municipality, urban water distribution systems represent an important public capital investment need that is presently not being met.

**The Commission recommends that the Department of Environmental Protection and the Board of Public Utilities conduct a pilot infrastructure and financing study of the Newark or Jersey City systems to determine the means to upgrade those systems.**

### Private Purveyors

Private purveyors that responded to the Commission's survey indicated that there are presently no unmet capital investment needs for their water distribution systems. Of the private purveyors which responded to the survey, not one indicated that they were on an inadequate repair and replacement cycle for their water distribution system. In addition, only two municipalities that were serviced by private water purveyors felt that their municipality was on an inadequate repair and replacement cycle for their water distribution system.

This difference in unmet needs may be explained by the fact that private purveyors tend to invest somewhat more per capita in their distribution systems than do public purveyors. Together, the three large private investor owned water suppliers responding to the Commission's survey—Elizabethtown, Hackensack and Commonwealth Water Companies—spend approximately 12.2 million dollars each year, or \$7.57 per capita on capital investment for their water distribution system, compared to only 1.9 million dollars, or \$6.55 per capita for the 59 public systems responding to the survey.

The Department of Environmental Protection cites the management of the major private water purveyors in the state as an example of the standard by which public water purveyors should operate. In general, the DEP states that:

TABLE V-4  
PROJECTED ANNUAL UNMET CAPITAL NEEDS  
MUNICIPAL WATER DISTRIBUTION SYSTEMS  
(By level of urbanization and distress)<sup>1</sup>

Municipal Type	Unmet Capital Investment Needs (000's)	Percent of Total
Urban Centers	\$16,454	53.9
Urban Suburbs	9,562	31.3
Suburban	4,520	14.8
Rural Centers	12	0.0
Rural Places	0	0.0
Total	\$30,548	100.0

Distress	Unmet Capital Investment Needs (000's)	Percent of Total
High Distress	\$24,956	81.0
2nd Most Distressed	583	1.9
Middle	2,328	7.6
2nd Most Prosperous	1,316	4.3
Most Prosperous	1,616	5.2
Total	\$30,799	100.0

SOURCE: Survey by the New Jersey County and Municipal Government Study Commission, 1982. 67 municipalities responding.

<sup>1</sup>Indicators developed by the Division of State Aid and Regional Planning.

"The future of the State's water system has been premised on the ability of the water purveyors to finance, construct, and operate their own system, and to fulfill their responsibilities. To accomplish this objective, it is necessary that all purveyor systems—both public and private—are operated in a sound financial and businesslike manner. **Public purveyors in particular must function on a self-liquidating basis.**" (emphasis added)

Specifically,

"The larger investor-owned utility represents a major contribution to good water service in New Jersey. These utilities are among the best operated and maintained in the State."<sup>4</sup>

### DEP Needs Estimates

In 1979, the Department of Environmental Protection undertook its own survey of capital investment needs for water distribution systems. Based on returns from 47 public and private water purveyors around the state, DEP determined that the **total** capital investment needs for water distribution systems was approximately 215 million dollars, or \$47 per capita for the 4.6 million people served by these purveyors. Projecting these needs to the state as a whole, DEP estimated the total capital

investment needs for water distribution systems to be approximately 330 million dollars.<sup>5</sup>

Assuming a six year amortization of these costs over time (not including interest payments) the DEP estimates for water distribution system needs are approximately 55 million dollars each year. This is comparable to the Commission's projected annual distribution needs for public purveyors, but somewhat lower than the 83 million dollars a year (as determined by the Commission's projections) which is needed by both public and private water purveyors.

### **Water Supply Needs**

In addition to the capital investment needs for water distribution systems, there are also significant investment needs for water supply and treatment facilities. Based on DEP estimates in the Water Supply Master Plan, there will be significant increases in water demand over the next several decades and into the next century, with the greatest growth in water need expected to be in the northeastern and central part of the state. Assuming no major diversion to the northeast from groundwater sources in the southern part of the state, this demand will have to be met by increased reservoir capacity and the construction of major distribution pipelines.

According to the DEP's action program for 1983 to 1986, there are approximately 325 million dollars worth of immediate capital investment needs for water supply projects in New Jersey. Projects expected to be funded from loans from the 1981 Water Supply Bond Act include additional water supplies for the northeast region (various projects totalling 65 million), construction of the Manasquan Reservoir Project (40 million), and improvements to the Delaware and Raritan Canal (20 million). In addition, the DEP expects the 1981 Water Supply Bond Act to fund (where appropriate) NJDWSC's share of the costs for the Monksville Reservoir/Wanaque South Project (total expected project cost about 100 million) and has identified 100 million dollars of costs to various electric utilities for construction of the Merrill Creek Project.<sup>6</sup>

Continuing revisions of the Water Supply Master Plan will determine where additional capital investment will be needed. However, the existing distribution of water supply costs and project needs indicates that all types of purveyors—including public and private—will be involved in the development of new water supplies across the state.

### **Potable Water Treatment Needs**

In addition to water supply and distribution needs, water treatment needs are expected to become a significant component of the future capital investment strategies of water purveyors in the state. While there are no exact figures on the total costs necessary for a program to maintain and improve the quality of the state's water supplies, tougher State and federal standards are expected to increase overall treatment costs for purveyors in the near future. These increased costs will eventually have to be factored into the total capital investment needs for all water purveyors in the state.

## **State and Federal Aid:**

### **State Bond Monies**

To meet New Jersey's capital investment needs for water distribution and supply, the state has gone to the bond market to provide the funds necessary to finance needed water system projects.

The most recent of these bond issues is the *1981 Water Supply Bond Act*, which authorizes the sale of 350 million dollars in State bonds for a variety of State and local water projects. Programs targetted for fiscal years 1983 to 1986 include 65 million dollars in loans for the rehabilitation of "inadequate water distribution and transmission systems," 25 million dollars in loans for the buyout of small water purveyors, and 15 million dollars in various interconnection projects. In addition, DEP has identified another 325 million dollars in water supply projects to be funded wholly or in part by monies from bond receipts. ***Because of the State's efforts, adequate funds remain in the 1981 Water Supply Bond Act to finance the immediate needs of the municipally operated utilities.***

### **Federal Aid**

There is no major federal program addressing local water system needs. However, some federal monies for water projects are available through various development programs funded by the Department of Housing and Urban Development and the Federal Economic Development Authority, as well as through the Farmers Home Administration. These monies are small in scope, and accounted for only 8.5 million in aid between 1977 and 1983.<sup>7</sup>

### **Small Water Purveyors:**

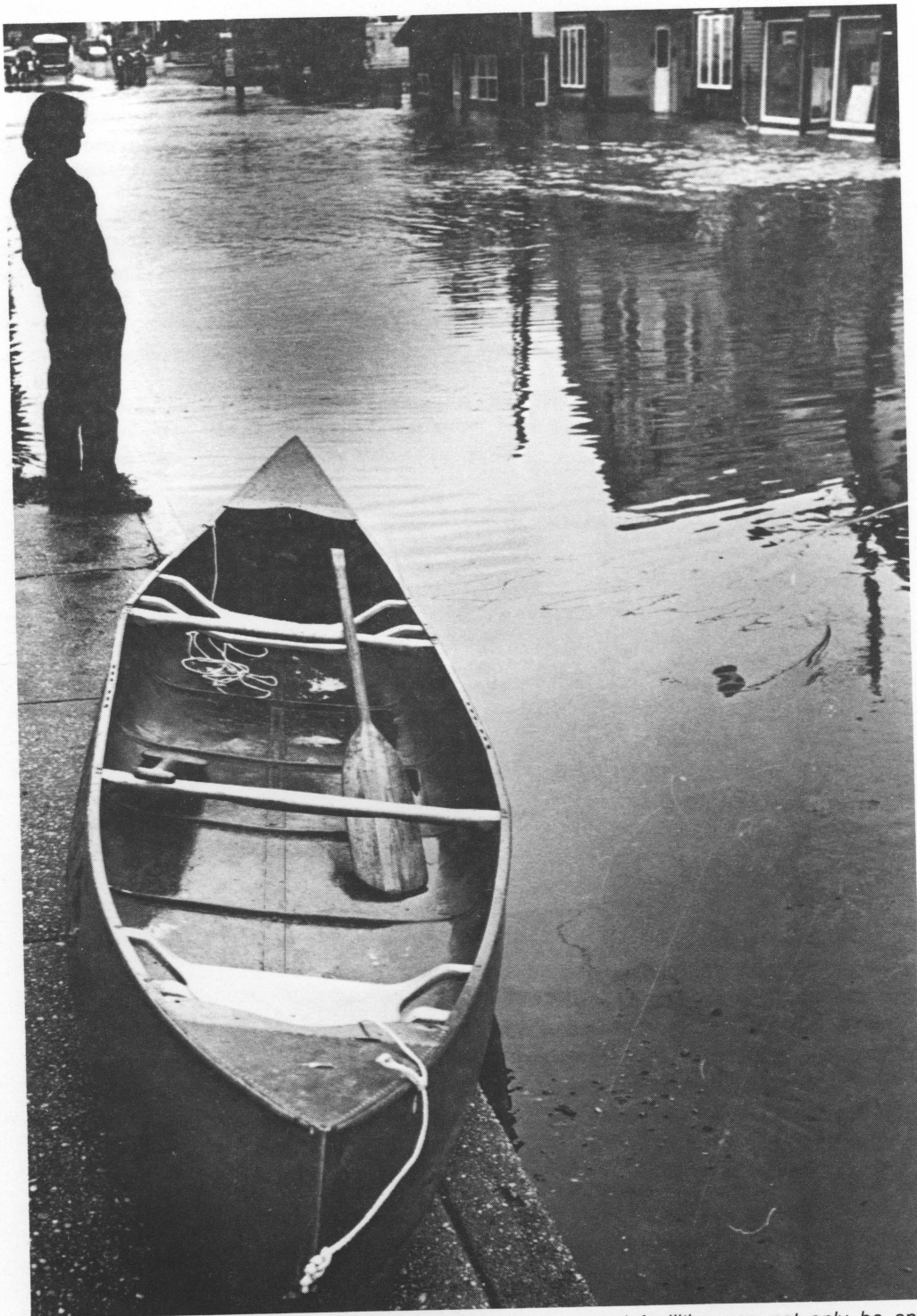
While the DEP has cited large private purveyors as contributing positively to the quality of water service in New Jersey, they are concerned over the operation of the State's numerous small water purveyors which, in many cases, serve only a single development, institution, or complex. Often, these small purveyors do not have the necessary administrative and technical resources as well as the capital necessary for maintaining its system.

The result is declining service reliability (specifically in regards to adequate water pressure and quality) for the water customer. Eventually, it becomes necessary for larger private purveyors or municipalities to buyout and rehabilitate these systems. Costs for such buyouts will, in the future, be significant as more and more small purveyors fail or deteriorate over time. The DEP has already earmarked 25 million dollars in 1981 bond fund monies for loans to municipalities or water companies for this purpose. However, the DEP clearly sees the buyouts as a local responsibility, based on the fact that the municipality is the one which initially approves the local franchises for these purveyors.<sup>8</sup> If these purveyors fail, DEP feels that the municipality must be prepared with an alternate plan and approach to assure safe, adequate water for its residents. ***To further pursue existing State initiatives, the Commission recommends that the Department of Environmental Protection and the Board of Public Utilities analyze the long range future for every small water company in the state and recommend ultimate independence or absorption of the small water company by the municipality or private water company.***



## NOTES

1. For a comprehensive overview of the administrative structure and legal foundations of water supply and distribution see *The New Jersey Water Supply Handbook*, County and Municipal Government Study Commission, November 1983.
2. Ibid, Chapter 4, As well as pp. 11-13 in *Water Supply Management in New Jersey: Summary of Findings, Conclusions, and Recommendations*, County and Municipal Government Study Commission, April 1975.
3. Department of Environmental Protection, "Estimated Costs of Rehabilitation of Distribution Systems: TASK I.E.5", *The New Jersey Water Supply Master Plan*, August 1979, p. 3.
4. Department of Environmental Protection, *The New Jersey Statewide Water Supply Master Plan*, April 1982, p. 25 and p. 75.
5. "Estimated Costs of Rehabilitation of Distribution Systems", p. 4-8.
6. "Revised Action Program 1983-86", *The New Jersey Water Supply Master Plan: Update. August 1983*, p. 5.
7. Robert Lake, *New Jersey's Infrastructure Needs: A Case Study*. Center for Urban Policy Research, Rutgers University, New Brunswick, N.J., September 1983, p. 55.
8. New Jersey Statewide Water Supply Master Plan, p. 77.



Flooding due to inadequate storm drainage or flood control facilities can not only be an inconvenience, but can also disrupt the local economy and cause significant property damage. (Photo courtesy Michael Plunkett/Trenton Times)

## Chapter VI

### Flood Control and Storm Drainage

The recent floods in the Passaic River Basin and the effects of the March 1984 storm on the shore communities of the state have given impetus to efforts to upgrade, and where needed, rehabilitate the state's flood control and storm drainage facilities. These systems, which in certain respects represent the most neglected of all the local infrastructure systems, provide New Jersey's residents with protection from devastating property losses and loss of life due to major floods. Even minor flooding, if it happens on a frequent and recurring basis, can have a significant impact on the local economy, disrupt local traffic flows, and—if it continues over a long period of time—can create health problems. Whatever the magnitude of the flooding problem, local governments throughout the state must provide a system to control storm water runoff and protect lives and property.

While flood control facilities are often not underground, as are water distribution and wastewater collection systems, in many respects public capital investment for flood control facilities does represent an "invisible" infrastructure need. Because the "return" from this investment is only realized periodically, or becomes apparent only when a major flood occurs, investment in flood control facilities is often postponed or delayed in favor of other public needs.

However, the investment in flood control facilities is a critical component of capital investment strategies at the local government level, becoming even more critical as growth and development in the state's flood plains and in upstream locations have put more people and property in danger of periodic flooding.

#### Size and Extent of the System:

While there is no direct inventory of flood control systems in the state, every municipality has some type of storm water control problem and, as a result, needs to invest in flood control and storm drainage facilities. The magnitude of this investment is primarily dependent on whether the municipality is located in a major flood plain or other flood prone area. Naturally, those municipalities and counties which are closest to major river basins (See Figure VI-1) or have within their boundaries flood plains, marshes, or other areas prone to regular flooding, have to invest in (and have the most to gain from) flood control facilities.

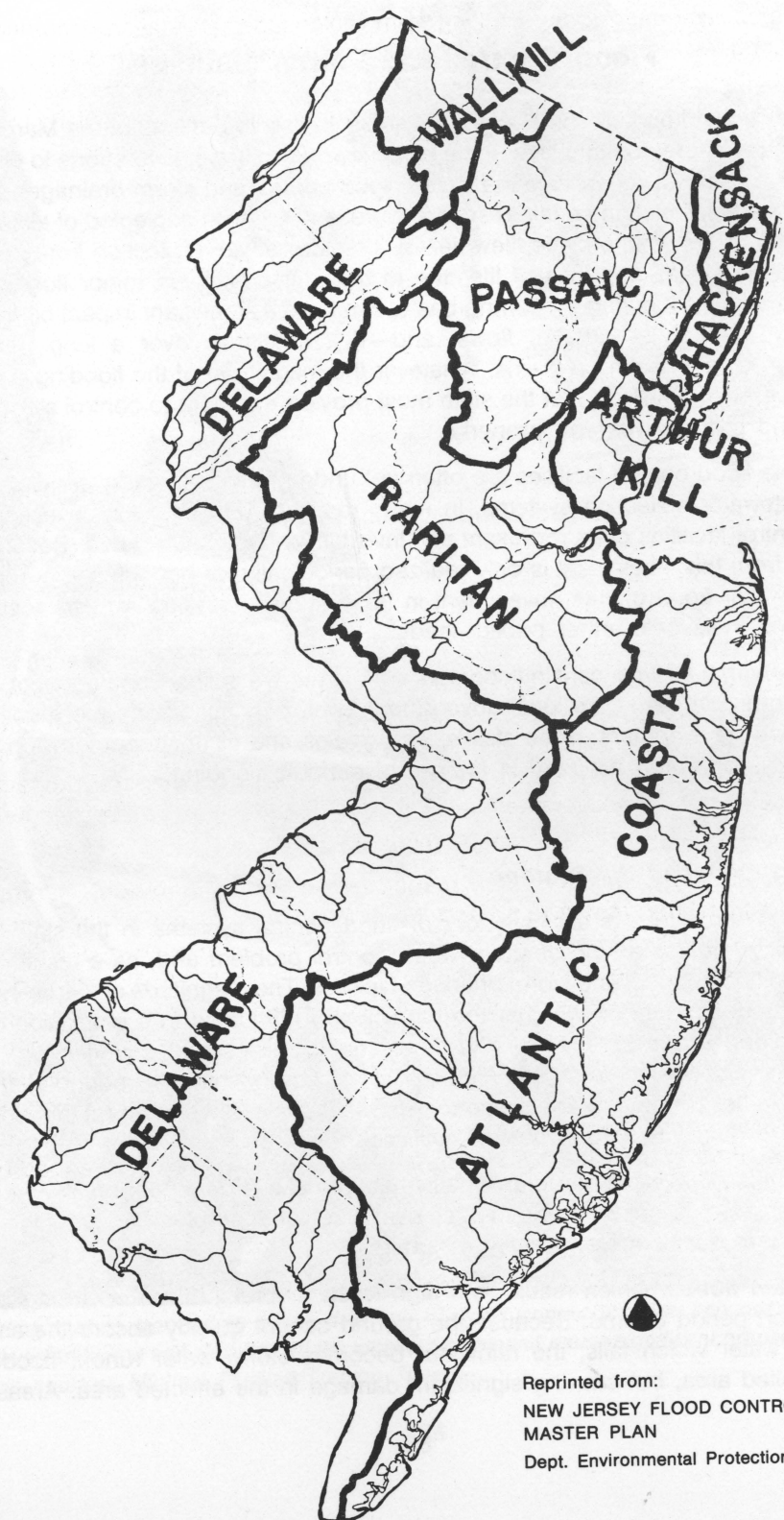
The type of investment a municipality has to make is dependent on whether the flooding problem is localized or part of an overall regional problem. Some of the types of floods that occur in New Jersey include:<sup>1</sup>

- **Flash floods:** which result from high levels of precipitation occurring over a short period of time. Because the ground cannot quickly absorb the amount of water which falls, the rainwater becomes storm water runoff, flooding a limited area, but causing significant damage in the effected area. Areas with



Figure VI-1

MAJOR RIVER BASINS



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NEW JERSEY FLOOD CONTROL  
MASTER PLAN  
Dept. Environmental Protection

stream beds and steep topography are particularly susceptible. These types of floods occur mostly in the hilly regions in the central and northwestern part of the state.

- **Major regional floods:** resulting from prolonged precipitation occurring over a long period of time. These floods occur when the ground becomes so saturated that it cannot absorb additional amounts of water. The result is significant property damage occurring over a wide area (particularly in urban and suburban areas which have a large amount of development in the traditional flood plain). These floods can cause major disruptions in the local economy and pose a threat to lives. The floods which occur in the Passaic River Basin are typical of this type of flood.
- **Localized flooding:** which can occur with the backup of small streams and channels as well as storm drains and sewers. While not as life threatening as the above categories, they can result in significant disruptions of local traffic flows and local commerce, and can cause temporary abandonment of homes and other activities. If localized flooding occurs frequently and consistently, it can result in significant property damage over time.
- **Structural failures:** Flooding can occur due to the failure of existing flood control devices. While not a frequent occurrence, severe localized flooding can occur due to failure or underdesign of a flood control facility. Flood control facilities need consistent and periodic maintenance, repair and reconstruction to prevent such structural failures from occurring.
- **Salt water tidal flooding:** While not usually associated with the traditional categories of riverine flooding (and not specifically addressed in this report), the prevention of tidal, or salt water, flooding can represent a significant cost to local governments in the coastal areas of the state. As the March 1984 storm illustrated, this investment is critical to prevent loss of lives and property. At present, there are several federal, State, and local programs targeted specifically to this category of flood control facilities.

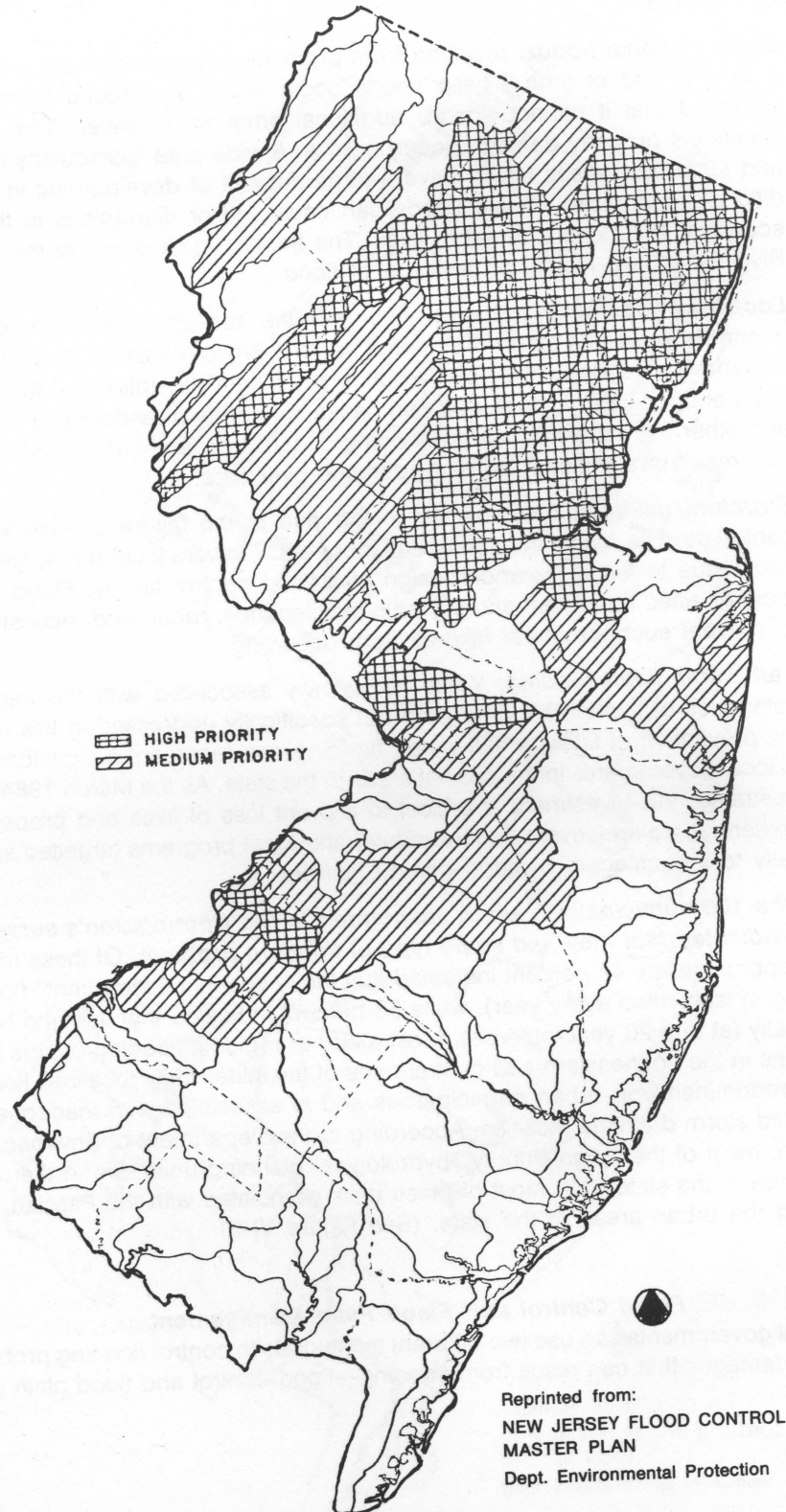
*Of the 108 municipalities which responded to the Commission's survey, 80 percent indicated that they had some type of flooding problem. Of these municipalities, approximately 42 percent indicated that they experience "frequent" flooding (occurring at least once every year), while 53 percent indicated that flooding occurs occasionally (at 2 to 20 year intervals). Most major or regional flooding occurs in the river basins in the northeastern and central parts of the state, while localized flooding occurs predominantly in urban municipalities and is associated with inadequate or deteriorated storm drainage facilities. According to the Department of Environmental Protection, most of the "High Priority" hydrological planning units<sup>2</sup> are in the northeastern area of the state, with most of these units associated with the Passaic River Basin and the urban areas of the state. (See Figure VI-2)*

**Flood Control and Flood Plain Management**

Local governments can use two different techniques to control flooding problems and limit damages that can result from flooding—flood control and flood plain management.

Figure VI-2

## HIGH AND MEDIUM PRIORITY HYDROLOGIC PLANNING UNITS



A local **flood control program** is designed to address 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. Some typical flood control facilities include:

- Channel enclosures and diversion channels;
- Levees, dikes, flood walls and pumping stations;
- Flood control reservoirs and retention basins;
- Storm drains and catch basins;
- Flood warning and monitoring systems.

In addition to the capital and operating costs associated with these facilities, flood control programs can include the costs to purchase the land on which these facilities are constructed, costs to dredge and deslag streams and other waterways, and flood control planning costs.

**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. A program of flood plain management is implemented primarily through zoning and planning techniques, but can involve significant costs if local government strategies include the acquisition of properties in the flood plain areas.

### Condition of Flood Control Facilities:

Maintaining the condition of existing local flood control facilities is critical in preventing structural failures which can result in extensive flood damage. Responses to the Commission's survey indicate that, in general, the condition of existing local flood control systems is good. However, *one third of the engineers responding to the Commission's survey rate their present flood control system as being in poor condition and "not performing its designed function for reasons of structural or material deterioration."*<sup>13</sup>

A particular problem is the deteriorating condition of the storm water drainage facilities in some of the older urban communities of the state. These facilities were designed and constructed decades ago and in many cases are combined with the sewer system in the community. Backups due to structural collapse, clogging, or low design capacity can cause significant localized flooding during times of heavy rains. In some cases, any rainfall at all can trigger a flooding situation. While not as significant in terms of regional impacts, localized flooding can result in significant property damage and can have a negative impact on the local economy if it happens on a regular basis over a long period of time.

### Capital Investment Needs:

According to returns from the Commission's survey, about half of the municipalities currently have or are developing some type of flood control program to address their flooding problems. In terms of overall capital investment, the programs con-



templated by these municipalities will cost significantly more than local governments are now spending on existing flood control facilities. Of the engineers responding to the Commission's survey, 65.7 percent indicate that their municipality is on an inadequate repair and replacement cycle for the existing flood control system in their community. (See Table VI-1) Together, these municipalities represent an unmet capital investment need of 17.2 million dollars. Assuming similar patterns of need throughout the state, *the projected unmet capital investment needs for municipal flood control and storm drainage facilities in New Jersey total approximately 53 million dollars each year, or approximately twice as much as is presently being spent on these systems each year.*

#### Distribution of Unmet Needs

Unmet capital investment needs for flood control and storm drainage are predominantly concentrated in the older suburban communities of the state, with significant amounts of need distributed both in the urban and growing suburban areas as well. For the most part, this distribution of unmet capital investment needs reflects the need to rehabilitate inadequate storm drainage facilities in the older and highly developed urban and inner suburban ring communities of the state, as well as the need to upgrade and expand existing flood control and storm drainage facilities in the growing suburban communities. The limited amount of unmet capital investment needs in the rural communities can be explained in part by the fact that in these areas flooding usually occurs in naturally marshy areas or in undeveloped flood plains and is not perceived to be a problem.

Geographically, the unmet investment needs tend to be concentrated in the northeastern counties of the state, (including Union, Essex, Hudson, Passaic and Bergen counties) reflecting the large investment needs in the Passaic Basin, as well as the need to upgrade and rehabilitate existing flood control and storm drainage facilities in the older urban areas. In addition, a significant amount of the unmet capital investment need is also distributed in those counties in the central part of the state, reflecting the flood control needs in the Raritan River Basin.

#### State Aid and Federal Aid:

Because of the scope and regional characteristics of the flooding problems in New Jersey, municipalities and counties have needed some type of outside fiscal and planning aid to help them meet their flood control needs. Both the federal and the State government, as well as county governments, have provided municipalities with some type of assistance in the planning, design, and construction of flood control facilities.

#### Federal Aid

The United States Army Corps of Engineers is the primary implementing agency for federal flood control programs authorized under the *Federal Flood Control Acts of 1936*.

The Army Corps of Engineers has a broad range of powers covering regional flood control activities and projects, as well as projects related to water supply, recreation, wetlands protection and drainage, and power supply.<sup>4</sup> Related to its flood control activities, the Corps provides state and local governments with assistance in

TABLE VI-1  
PROJECTED ANNUAL UNMET CAPITAL INVESTMENT NEEDS  
MUNICIPAL STORM DRAINAGE AND FLOOD CONTROL SYSTEMS

Municipal <sup>1</sup> Type	Respondents	Number Inadequate	Percent of Respondents	Per Capita Unmet Need (\$)	Annual Capital Shortfall (000's)	Percent
Urban Centers	15	12	80.0	5.96	\$ 9,976	18.8
Older Suburbs	15	12	80.0	11.67	23,444	44.2
Suburban	59	36	61.0	4.80	14,275	26.9
Rural Centers	3	2	66.7	1.08	215	0.4
Rural Places	10	5	50.0	10.17	5,174	9.7
Total	102	67	65.7	—	\$53,084	100.0

SOURCE: Survey by the New Jersey County and Municipal Government Study Commission and Division of State and Regional Planning, 102 Municipalities responding.

<sup>1</sup>Indicators developed by the Division of State and Regional Planning.



data collection and analysis, project planning and design, and project construction. Corps activities are usually associated with large scale flood control and water projects which are regional in scope and beyond the ability of single local units of government to address.

Since 1966, the Corps has assisted in the planning, design, and construction of various regional flood control projects in New Jersey, representing 95.5 million dollars in total project costs.<sup>5</sup> In addition, it has formulated a comprehensive flood control plan for the Passaic Valley River Basin which has been presented to the local governments in the region as a potential answer to the severe and recurring flood problems in that area.

In addition to the Corps, the U.S. Soil Conservation Service works as a regional coordinating agency for a variety of flood control and soil conservation projects in the rural areas of the state. Working with the N.J. Soil Conservation Committee and local governments, the SCC provides technical, credit, and construction assistance (outside of land acquisition) to local governments. However, recent budget reductions have limited the number of true flood control projects funded under this program.

In addition to these programs, federal monies from the Department of Housing and Community Development, primarily in the form of Community Development Block Grants, has provided monies for flood control and storm drainage facilities associated with a variety of community development projects. While not a flood control program, HUD's contribution to flood control and storm drainage through the CDBG program can be significant. As returns from the Commission's survey indicate, almost all the municipalities who reported that they received outside aid for their flood control and storm drainage systems indicated that these monies came from Community Development Block Grants.

#### **State Bond Issues**

State aid to municipalities and counties for flood control facilities has come primarily in the form of matching grants from State bond issues. The most recent of these bond issues was the *Emergency Flood Control Bond Act of 1978* which authorized the sale of 25 million dollars in state bonds for a variety of local flood control projects as well as state and local planning activities. Approximately 14 million dollars remain unobligated from this bond issue. In addition, the *Safe Dam* component of the *Natural Resources Bond Act of 1980* authorized 15 million dollars of grant monies for the construction and rehabilitation of dams in New Jersey. At the present time, all 15 million dollars from this fund remain unobligated.

#### **Local Utilization of Aid Programs**

While State and federal programs provided a variety of aid programs related to flood control, less than one fourth of the municipalities responding to the Commission's survey indicate that they actually receive State or federal financial aid for flood control and storm drainage. Of the available aid programs, Community Development Block Grants are utilized most often. Several municipalities indicated that they use bond monies from the *Transportation Bond Act of 1979* to finance storm drainage projects.

In addition to fiscal aid, about half of the municipalities responding to the Commission's survey indicate that they are receiving some type of outside planning or technical assistance for their flood control facilities. Of these municipalities, 29 cited

the county as the source of this technical assistance, while 26 indicated that this technical assistance or aid came from the Department of Environmental Protection. Only 16 municipalities indicated that the Army Corps of Engineers was providing some type of technical assistance, while 19 indicated that the New Jersey Soil Conservation Committee provided their municipality with advice.

The results of the Commission's research indicate that there is a significant need for additional capital investment in local flood control facilities. While unobligated funds remain from the *Emergency Flood Control Bond Act of 1978* and the *Safe Dams* component of the *Natural Resources Bond Act of 1980*, continuing capital investment needs for local flood control facilities will require that additional State financing be provided in the future. This will be particularly true if the flood control plans for the Passaic River Basin are implemented. **Therefore, the Commission recommends that within the next two years, the State provide a new source of capital funding to assist local governments in financing flood control projects.**

#### **Flood Control and the Intergovernmental Environment:**

Because flooding problems do not recognize local boundaries, the planning and implementation of a comprehensive flood control program must be regional in scope. For these regional plans to be effective, they must be coordinated among the various jurisdictions at the local government level. This can be an especially complex task in general, as each jurisdiction sees its own needs in a different framework than other surrounding jurisdictions. Specifically, the divergent interests of both upstream and downstream municipalities must be mediated to best address the interests of all property owners in the river basin. Without such mediation, the result can be critical delays as differences in approach are worked out, subjecting residents of flood prone areas to continued risks.

In many ways, flood control is in the same position as solid waste management in the mid-1970's and wastewater treatment in the mid-1960's. Both these problems required regional actions to plan and implement a strategy to address needs, as well as State actions to ensure that these strategies were adequately financed. It now seems logical that in the case of flood control, the State and its counties can play such a role in mediating local interests, formulating comprehensive plans, and assisting in the financing of regional flood control programs. This comprehensive regional approach would best address existing flood problems and protect property owners in the various river basins and other flood prone areas in the state.

In 1977, the Commission recognized the need for a broader than local approach to flood control in New Jersey; and recommended that:

"... the State Legislature expressly assign lead responsibility to the State government for developing and administering a coordinated intergovernmental flood management system. The State should be responsible for identifying flood hazards throughout the State and providing sustained assistance to counties and municipalities in planning and implementing appropriate solutions to such hazards."<sup>6</sup>

In response to this recommendation, the State has established a comprehensive statewide planning effort for flood control management in New Jersey. As part of this planning process, the State has created a flood control data base, identified current flood hazards and areas with the potential for significant flooding, and prioritized

projects and programs to meet the flood control needs of the state. In addition, the State, through recent bond issues, has provided local governments with funds needed to finance local flood control programs.

However, in two specific areas the State and its counties can, and should, play a stronger role.

#### ***Passaic River Basin***

While problems in coordinating regional approaches to flood control problems occur all over the state, the situation in the Passaic River Basin is the most acute. In this region, which is subject to severe and widespread floods which can cause millions of dollars of damage, there are located no less than 102 municipalities and 8 counties. Periodically, the Army Corps of Engineers dusts off its plans for the basin (usually after the occurrence of a severe flood) while local governments argue over the correct approach or plan. With many of the municipalities and counties having a different conception of how to address the flooding problems in the area, the result is delays which postpone critically needed construction. As noted by an Army Corps of Engineers spokesperson:

"(The) biggest stumbling block (to developing a comprehensive flood control plan for the region) has been New Jersey's home rule style of government. As a result, there have been some minor localized programs, but no major flood control project built in the state."

To get plans for the region off the shelf, the Department of Environmental Protection has indicated that it will take a more active role in the region. DEP officials see the appropriate role for the State as being a "broker" between the 102 municipalities and 8 counties in the basin and the Army Corps of Engineers, allowing DEP to assist in the selection and implementation of an appropriate flood control program. However, the Passaic Valley stands at a critical juncture with respect to flood control. The recent floods in the basin have illustrated the need to invest in flood control facilities in the area before a flood of the magnitude of the 1903 flood of record can seriously threaten lives and property in the region. No one can deny that the upgrading and expansion of the flood control facilities in the Passaic River Basin represents a critical unmet capital investment need for the people of the region. What is needed is a strong State role in pushing such a program forward.

***To meet these critical needs, the Commission recommends that the State assume complete control over the design and construction as well as contribute significantly to the financing of those large scale projects in the Passaic River Basin that are beyond the scope of a single municipality or county to address. In addition, the State should take the primary role (after appropriate consultation with counties and municipalities) in formulating and implementing a comprehensive flood control strategy for the region. This program should include the necessary State participation in the financing of a capital program that addresses local needs in the basin. State funds should be used for land acquisition costs to cover the non-Federal share of Army Corps projects.***

#### ***County Role***

Excluding those projects which are clearly beyond the scope of a single county government to undertake (such as some of the large-scale projects proposed in the Passaic River Basin), the appropriate unit of government to formulate and implement

a comprehensive approach to regional flood control needs is county government. Counties now have the statutory power to plan, finance, and construct flood control facilities (through *The County Flood Control Financing Act*, N.J.S.A. 40:23-24). In addition, counties have the statutory authority, through the county planning statutes (40:27-1 et seq.), to review drainage relating to subdivision and site plans and require adequate control of drainage for these developments if they impact on county roads and facilities. The counties also have the power to prepare a stormwater control and drainage plan and to accept delegation from the Department of Environmental Protection for administration of the *Flood Hazard Area Control Act* pursuant to N.J.S.A. 58:16A-55.4 et seq.

Several counties have taken a very active role in providing both fiscal and technical aid to the municipal governments within their boundaries. In Union County, the county government provides 50 percent matching grants to municipalities to fund flood control projects which have some type of regional impact. In some cases, the county takes the lead role in development, engineering and construction of flood control projects, with the municipalities taking control after the project is completed. In conjunction with its grant program, Union County has implemented a storm water management program based on the use of water detention basins to limit the amount of runoff during storms. As part of this program, model ordinances were made available to the municipalities in the county, using the availability of county grant monies as a carrot and stick approach to get municipalities to adopt the ordinances. As a result, 19 of the 21 municipalities in the county now have adopted model ordinances (the remaining two do not have significant flooding problems).

According to results of the Commission's survey, counties now play an important role in providing technical assistance to municipalities, with municipalities welcoming a much more active role by counties in regards to flood control at the local level. Twenty-nine of the 102 municipalities responding to the Commission indicate that they receive some type of technical assistance from the county. In addition, nearly 70 percent of responding municipalities "would like to see the county provide more assistance" in regards to local flood control programs, with most municipalities indicating that they would prefer that the county provide some type of additional funding or fiscal aid for local flood control facilities.

***The Commission recommends that the counties assume a stronger role in planning, financing, and implementing regional flood control programs. (No new statutory authorization would be necessary as counties presently have the power to plan and finance flood control programs.) In addition, the Commission recommends that the counties and the Department of Environmental Protection proceed to implement the cooperative intergovernmental approach to flood control construction and regulation issues as described in the Flood Hazard Control Act. The Commission notes that the Department of Environmental Protection will need to make additional funds available to the counties to assist them in preparing and implementing regional flood control plans authorized by N.J.S.A. 58:16A-55.4.***

## NOTES

1. Summarized from Section 1 in *Flood Control Management: An Overview of Issues and Responses*. County and Municipal Government Study Commission, November 1977.
2. For flood control purposes, the Division of Water Resources in the DEP has divided the state into a number of hydrological planning units (HPU's). Criteria used in ranking HPU priority include history of flooding in the HPU and incurred damages, population and property that would be threatened by a major flood, and current flood control projects and plans.
3. Based on returns from 95 municipalities.
4. For a full discussion of the federal role in water projects in New Jersey see: *The New Jersey Water Supply Handbook*, County and Municipal Government Study Commission, November 1983, pp. 13-15; as well as *Flood Control Management: An Overview of Issues and Responses*, pp. 18-23.
5. Department of Environmental Protection, Division of Water Resources.
6. *Flood Control Management: An Overview of Issues and Responses*, p. 45.
7. Jaed Miller, spokesman for the Army Corps of Engineer's New York Regional Office, as quoted in *The Star Ledger*, April 16, 1984, p. 7.

## Chapter VII

### LOCAL INFRASTRUCTURE ENABLING LEGISLATION

The Legislature has passed many laws authorizing the construction and operation of local infrastructure systems. (These are listed in Figure VII-1) There are laws authorizing various units of government, including municipalities, counties, districts, commissions, joint meetings, and several types of authorities, to construct and operate all or portions of local sewer, water and flood control systems, as well as local streets, roads, and bridges.

The provision of an adequate infrastructure network requires that local governments have the following powers:

- **Financing Powers:** To finance infrastructure systems, counties and municipalities need a variety of financial powers, including the right to charge fees, to use general taxation, to use special assessment taxation, to create sub-municipal tax districts, to accept gifts (including State and Federal Aid), and to sell general obligation and revenue bonds.
- **Acquisition Powers:** The power of acquisition usually includes the power to purchase in fee or acquire through eminent domain, as well as the power to accept gifts.
- **Contracting Powers:** The power to contract should extend to all aspects of the program or project and to all outside parties having interests in the program.
- **Planning Powers:** The power to plan should include planning, designing, surveying, and engineering.

The Commission examined each of the local infrastructure enabling statutes to determine whether the statute provided the municipalities and counties with the above described powers. In studying these statutes, the Commission has determined that municipal enabling legislation is deficient in two specific areas:

- There is no statute authorizing municipalities to construct and operate flood control facilities.
- Municipal enabling legislation for streets and roads does not provide **explicit** power to construct and operate local street and road systems.

In addition, the Commission has determined that the enabling legislation for county roads and bridges and municipal water supply and sewer systems are long, redundant, and difficult to interpret. These statutes include complicated procedures and provisions which unnecessarily restrict municipalities and counties in implementing them, and cover other functions of local government that are included in a more comprehensive format in other areas of New Jersey Law.

It should be noted that the laws authorizing the creation of sewerage authorities and utilities authorities are complete and comprehensive. Specifically, they authorize revenue bond financing through service charges—a valuable and necessary option for dealing with local sewer and water programs. (The law authorizing authorities and

**FIGURE VII-1  
LOCAL INFRASTRUCTURE ENABLING LEGISLATION**

Statute	Subject
<b>Streets and Roads</b>	
40:67-1 to 48	Municipal Streets
27:16-1 to 27:22-15	County Roads
27:19-26 to 44	County Bridge Commissions
<b>Sewers</b>	
40:63-1 to 67	Municipal Sewers
40:23-19.1 to 19.14	County Sewers
40:63-68 to 138	Regional Sewers
40A:18-1 to 64	Sub-Municipal Sewers
40:14A-1 to 37	Municipal, Regional & County Sewerage Authorities
40:14B-1 to 69	Municipal, Regional & County Utilities Authorities
48:13-1 to 16	Public Utilities
<b>Water Supply</b>	
40:63-47 to 95	Municipal Water Supply
40:14C-1 to 15	County Water Supply
40:62-108 to 151	Regional Water Supply
40:62-96 to 107	Sub-Municipal Water Supply
40:14B-1 to 69	Municipal, Regional & County Utilities Authorities
48:1901 to 25	Public Utilities
<b>Flood Control and Storm Drainage</b>	
40:69-1 to 4	Municipal Drainage
40:23-34 to 46	County Flood Control
40:30-18 to 21	County Drainage
40:14-16 to 24	Regional Flood Control

other independent agencies will be reviewed in detail in subsequent reports of the Commission.)

#### **Streets, Roads and Bridges:**

While Chapter 67 of Title 40 provides detailed procedures authorizing municipalities to control, by ordinance, the laying out, dedication, boundaries, and vacating of municipal streets, as well as the placement of signs, sidewalks, and other structures in the right of way, it does not provide municipalities with **explicit** powers to construct, maintain, contract for, or finance municipal streets. However, through court interpretations and case law, there has developed a long standing tradition that the basic powers of municipal government include the construction and maintenance of streets. Certain other needed powers, including the power to use improvement assessment financing for municipal streets, are located elsewhere in the statutes.

County powers to construct and maintain roads and bridges are more complete, with clear authorization to acquire, construct and operate roads and bridges, and to

control signs, lighting and traffic markers in the county right-of-way. In conjunction with these powers, found in Title 27 of the New Jersey Statutes, counties have the power to contract, finance, and bond for all elements of road and bridge projects. In addition, county governments exercise predominance in the design, construction and operation of bridges.

*To enable municipalities and counties to utilize consistent and comprehensive enabling legislation in this area, the Commission recommends that the revisions to Title 40 now underway incorporate a new chapter called the **Municipal and County Street, Road and Bridge Act**.* This chapter would provide both counties and municipalities with the power to plan, acquire (by fee, gift or eminent domain), construct, operate, contract (for any related purpose with any person or corporation), and finance (through general taxes, improvement assessments, gifts—including State and Federal Aid—and general obligation bonds) local road and bridge projects. In conjunction with the enactment of this chapter, existing enabling legislation on this subject would be repealed.

The existing statutes stating that counties are responsible for building all bridges and culverts which carry streams under municipal streets should be incorporated in the new law. In addition, any statutory revisions should continue to recognize the interrelationship of street and road construction with flood control and storm water management. As such, the authorization for counties to construct and maintain bridges should require the incorporation of proper flood control elements.

#### **Sewerage:**

In general, the municipal sewerage statutes provide the basic authorizing powers needed for the operation of a municipal sewer system. Specifically, the municipality is granted power to plan, acquire and construct municipal sewer systems. Financial powers include general taxation, service charge financing, district taxation and general obligation bonding. Improvement assessment procedures are not included herein but are included elsewhere. Contractual powers granted to municipalities are extensive.

Municipalities have predominance in the provision of sewerage programs. They have special ordinance powers to require home owners and businessmen to connect to the sewage system, while special provisions exist to ensure payment of the charges levied to finance the system.

While comprehensive, there are a number of redundant and overly detailed provisions. The laws also incorporate storm drainage provisions within their basic objective of authorizing sanitary sewer services. The law does not provide explicit power to keep toxic pollutants from entering the sewage system.

In 1966, the "County Sewerage Financing Law" was enacted. It provides a clear, concise layout of the basic powers to construct or finance a sewerage system. However, it does not provide counties with the power to utilize improvement assessment financing or district tax financing.

*The Commission recommends that the ongoing revision of Title 40 incorporate a new comprehensive and concise **Municipal and County Sewer Chapter**.* This chapter would provide planning, right of entry, acquisition by fee, gift and eminent domain, construction, reconstruction, operating and financing powers



to municipalities and counties. The financing powers in such an enactment should include service charges, improvement assessment financing, district taxation, general obligation bonds, gifts and aid, and general local financing. The chapter should also authorize every local agency to prevent toxic pollutants from entering the sewer system. The power to construct storm drains should be placed in this new Municipal and County Flood Control Act.

Municipal predominance should be preserved to ensure municipal control over connections to the appropriate sewage system, to ensure municipal control over the laying of sewer pipes within the municipality, and to facilitate coordination with the local street program and other municipal public works programs.

#### **Water Supply:**

Municipal enabling law for water supply contains most of the basic provisions required to construct and operate a public water supply system and a number of additional provisions which have proved beneficial over time. In regards to financing, the municipal water supply law does not contain the power to use improvement assessment financing. That power is provided elsewhere in Title 40. Municipal Water Supply Law does include special district taxation, allowing the governing body to levy a water supply tax on the properties in a certain area of the community.

As with sewers, municipal governments exercise predominance in decision making relating to water supply law. They control the right-of-way under their streets with respect to other persons or corporations supplying water, they have the power to require property owners to connect to the water purveyor utilized in the municipality, and they have special powers to ensure payment of fees or taxes. The laws do include a number of redundant procedural provisions and other powers relating to sewers and electric power systems which are covered better in other statutes.

In 1979, a modern County Water Supply Financing Act was adopted. The act provides all the basic water supply powers to county government. It authorizes county government to construct, operate, and finance water supply facilities for the people of the county, but does not authorize counties to use improvement assessment financing.

**The Commission recommends that the ongoing revisions of Title 40 incorporate a new Municipal and County Water Supply Law Chapter.** It should contain all the basic provisions contained in the County Water Supply Financing Act. It should also authorize improvement assessment financing, tax district financing, and provisions for dealing with failure to pay by customers. The law should preserve municipal predominance especially in the area of customer service and water supply distribution.

#### **Flood Control:**

A modern flood control statute was enacted for county governments in 1977. This statute provides the basic powers to construct and maintain flood control facilities, including improvement assessment procedures and broad powers to contract. A more archaic county drainage statute also exists.

Municipal governments, however, do not have clear or complete authorization

to construct flood control facilities. A municipal drainage statute exists in Chapter 69 of Title 40 providing authorization for the acquisition of real property and certain other activities relating to flood and drought control. Municipal powers to construct and operate storm drains in or out of the municipal street right-of-ways is found in the municipal sewerage statutes. However, it does not provide complete power to construct and operate flood control facilities. The need to address present flooding problems in a timely manner requires that municipalities have complete authority and a clear understanding of their powers and duties in this area. In addition, and as noted in the flood control chapter of this report, counties should be recognized clearly as the regional implementing agency for flood control management.

Based on these criteria, **the Commission recommends the immediate enactment of a new statute called the Municipal and County Flood Control Act to be modeled on the existing "County Flood Control Financing Law".** The act would authorize municipal and county governments to plan, design, survey, acquire (by fee, gift or eminent domain), construct, reconstruct, maintain, operate, contract (for any related purpose with any person), and finance (through local taxes or through local improvement assessments, gifts, including State and Federal Aid, and general obligation bonds). The statute should explicitly include the construction and maintenance of storm drains and the dredging and desnagging of waterways. The preceding enactments on flood control would then be repealed.

#### **Conclusion:**

**After undertaking a thorough review of the municipal and county enabling statutes, the Commission recommends the enactment of three new municipal and county infrastructure chapters to be incorporated in the ongoing revision of Title 40.** In addition, a new Municipal and County Flood Control Act should be enacted in the immediate future to provide complete powers to county and municipal governments to construct flood control facilities and storm drainage systems. The new laws will replace the existing inadequate laws which are hard to follow because of the gradual accumulation of unnecessary and redundant provisions over the last century. To accomplish these revisions, the Commission recommends that municipal and county engineers and attorneys be consulted in the preparation and amendment of the successor statutes.



## APPENDIX A

### DEFINITIONS USED IN COMMISSION INFRASTRUCTURE QUESTIONNAIRES

#### County and Municipal Streets and Roads

**Capital Expenditures:** includes expenditures with a useful life of 10 years or more for the repair or reconstruction of roads and streets, major street resurfacing, curb replacement, etc.

**Maintenance Expenditures:** should include those regular, on-going expenditures necessary to keep the highways or streets in proper working order. Include expenditures for signs and traffic control devices. Do not include money for street sweeping, litter control, snow removal, grass mowing, etc.

##### Condition of Roads:

Very Good	roadway recently resurfaced or reconstructed, no capacity problems (including width and alignment), excellent ride quality, no anticipated repairs
Good	roadway surface showing only minor wear with little potholing, no major defects, good ride quality
Fair	roadway surface showing moderate wear with significant potholing evident, resurfacing needed soon, some safety and other defects, ride quality marginal, some capacity limitations
Poor	roadway surface showing extensive wear with immediate resurfacing needed, extensive potholing, not able to carry noted capacity, some safety and other defects
Very Poor	extensive reconstruction needs, very poor ride quality, significant speed and capacity limitations

#### Water Systems

**Capital Expenditures:** includes expenditures with a useful life of 10 years or more for the repair, reconstruction or replacement of water system components (i.e., distribution network, pumping facilities, treatment plants, etc.)

##### Condition of Water System:

Good	system basically sound, no major repairs/rehabilitation needs; low leakage in 95% of system
Fair	some major rehabilitation/replacement needed; excessive leakage in no more than 20% of the system
Poor	immediate need for major rehabilitation/replacement, excessive leakage in no more than 50% of the system
Very Poor	critical need for major rehabilitation/replacement; excessive leakage in over 50% of the system

#### Wastewater

**Capital Expenditures:** includes expenditures with a useful life of 10 years or more for the repair, reconstruction or replacement of your municipal sewerage collection system and, if appropriate, sewerage treatment facilities.

##### Condition of Sewerage Collection System:

Good	system functioning as designed, low infiltration; no capacity problems, no major rehabilitation/replacement needed
Fair	some major rehabilitation/replacement needed; some capacity problems, moderate infiltration
Poor	immediate need for major rehabilitation/replacement; some capacity problems; excessive infiltration
Very Poor	critical need for major rehabilitation/replacement; significant capacity problems; excessive infiltration

#### Municipal Flood Control/Storm Drainage

**Capital Expenditures:** includes expenditures with a useful life of 10 years or more for the repair, reconstruction or replacement of your municipal flood control/storm drainage system

##### Condition of Flood Control Structures:

Good	performing their designed function
Poor	not performing their designed function, for reasons of structural or material deterioration

#### County Bridges

**Capital Expenditures:** includes expenditures with a useful life of 10 years or more for the repair or reconstruction of vehicular bridges, major structural repairs, bridge deck replacement, or major rehabilitation, etc.

**Maintenance Expenditures:** should include those regular, on-going expenditures necessary to keep the bridge facility in proper working order. Include expenditures for minor repairs and patching, painting, signs and traffic control devices, if any. Do not include money for street sweeping, litter control, snow removal, grass mowing, etc.

##### Condition of Bridges:

Very Good	bridge is in <i>like new condition</i> ; requires minimal or no work
Good	bridge shows signs of <i>minor deterioration</i> and is functioning as originally designed; requires minor rehabilitation
Fair	bridge shows signs of <i>moderate deterioration</i> and is functioning less than originally designed, possibly weight restricted, requires significant modernization or rehabilitation
Poor	Bridge shows sign of <i>serious deterioration</i> and is functioning less than originally designed, weight restricted; requires major reconstruction or replacement
Very Poor	bridge condition is <i>potentially hazardous</i> ; is closed or should be closed

## APPENDIX B

### DESCRIPTION OF PROJECTION METHODOLOGIES

Projections for statewide local infrastructure needs were made on the basis of returns from the Commission's survey of county and municipal engineers which was conducted in the Spring of 1982. Survey questionnaires were developed by the Commission, in conjunction with the Division of State and Regional Planning in the Department of Community Affairs, after initial attempts to collect comprehensive and consistent information concerning the condition and needs of local infrastructure systems proved to be difficult. (See Chapter 1)

Considering the length and comprehensive nature of the questionnaires, the response to the Commission's survey was good. Nineteen of the 21 counties in the state responded to the Commission's questionnaires on roads and bridges, while approximately one-fifth of all municipalities in the state responded to one or more of the four municipal surveys. (See Table B-1a to d)

For each of the surveys, the returns proved to be a fairly good representative sample of the municipalities in the state. (See Table B-2a to d) The larger urban municipalities are somewhat overrepresented in the sample, while smaller rural municipalities are somewhat underrepresented. In addition, high-distress and highly prosperous municipalities in the state are overrepresented slightly compared to the middle distress index quintiles. However, the geographic distribution of the municipalities in the sample is very close to that of the state as a whole. (See Table B-2d)

#### **Definitions of Municipal Categories:**

Early in the Commission's analysis, it was determined that the best way to understand local infrastructure needs was not only to measure the *magnitude* of the capital investment required to address these needs, but also to attempt to describe the *distribution* of these needs as well. (See Chapter 1 for discussion) Specifically, the Commission was interested in determining how infrastructure needs were distributed among New Jersey's municipalities in relation to urbanization, level of municipal distress, population size, and geographic area.

#### **Level of Urbanization**

Categories of intensity, or level, of urbanization were taken from the Division of State and Regional Planning's publication: *New Jersey Municipal Profiles: Intensity of Urbanization*, PT-6, January, 1972, (Updated in 1980). According to the Division of Planning, urbanization is based largely on population density, but also incorporates other factors, including land use patterns, housing conditions, commuting patterns, and "measures of central tendency with respect to socio-economic conditions." The following are definitions of the five categories used in the Commission's report, which were condensed from the original eight category classifications established by the Division of Planning:

<i>Category</i>	<i>Definition</i>
Urban Center	Densely populated with extensive development. Includes densely populated core areas surrounded by rural areas.
Urban-Suburban	Near an urban center but not as highly developed, with larger residential areas.
Suburban	Predominantly single-family residential, within a short distance of an urban area. Includes rapidly developing areas, with large tracts of open land still available for development.
Rural Center	High density core area with surrounding rural municipalities, or small developed core area surrounded by rural areas.
Rural	Scattered small communities and isolated single-family dwellings.

#### **Municipal Distress**

Categories of municipal distress were developed by Dennis Jones of the Division of State and Regional Planning. Individual municipalities were ranked by the following eight indicators:

- **Economic:**
  1. Unemployment rate
  2. Per capita income
- **Social:**
  3. Percent of welfare children to total population
  4. Percentage change in population, 1970-80
- **Physical:**
  5. Number of substandard housing units (measured by plumbing)
  6. Ratio of pre-1940 housing units to total number of housing units in the municipality
- **Fiscal:**
  7. Equalized valuation per capita
  8. Average equalized tax rate (averaged over three years)

For each of the above categories, municipalities were ranked on an absolute scale of 1 to 567. Rankings from each one of the eight categories were added together to give the municipality a total score. Municipalities were then ranked by this "final score" and divided into five separate quintiles.

#### **County Aggregates**

Municipalities were grouped according to county aggregates by dividing the state into five regions as follows:

4 DVRPC\* Counties

Burlington  
Camden  
Gloucester  
Mercer

5 Northeast Urban Counties:

Bergen  
Essex  
Hudson  
Passaic  
Union

3 Northeast Exurban Counties:

Hunterdon  
Sussex  
Warren

5 Bay/Ocean Counties:

Atlantic  
Cape May  
Cumberland  
Ocean  
Salem

4 Northeast Suburban Counties:

Middlesex  
Monmouth  
Morris  
Somerset

\*Delaware Valley Regional Planning Commission

In dividing these county aggregates, the Commission attempted to group counties with similar geographic and demographic characteristics.

**Projection Methodology:**

The projection of capital investment needs from the Commission's sample was undertaken in response to a request for a statewide local infrastructure needs assessment from the Center of Urban Policy Research at Rutgers University, which was conducting a case study on New Jersey infrastructure needs for the Joint Economic Committee of the United States Congress. While realizing the difficulties in developing accurate statewide capital investment need figures from a sample of municipalities throughout the state, the Commission and the Division of State and Regional Planning attempted to develop a methodology which came closest to providing a relatively accurate assessment of local infrastructure needs. It was determined that such a methodology would require the appropriate scaling factors, as well as method for stratifying the projections by classes or types of municipalities.

For municipal streets and roads, where Department of Transportation inventories for individual municipalities were available, linear miles of road were used as the scaling factor, with dollars per mile used as the unit of measure for expenditures and estimated needs. For water distribution, wastewater collection, and flood control and storm drainage systems, no comparative measures were available which could be directly correlated with total infrastructure investment levels. Instead, population was used as the scaling factor, with the unit of measure being per capita expenditures and estimated needs. For water distribution systems, distinctions were made between the population served by public and private purveyors or by private wells; and, in the case of wastewater systems, between sewered municipalities and municipalities served by septic systems.

**Determination of Unmet Capital Investment  
Needs for Individual Municipalities**

Before any projections could be made to determine statewide local infrastructure needs, unmet capital investment needs for individual municipalities had to be determined. For those municipalities on an "inadequate" repair and replacement cycle for a specific infrastructure system, unmet capital investment needs represent the *difference* between what the engineer estimates to be the "minimum amount of funding that is needed each year to implement an adequate reconstruction and replacement program" for that infrastructure system, and the average amount of capital expenditures that the municipality made on that system in the five years between 1977 and 1981. Thus, the annual capital shortfall represents the difference between the *estimated* annual capital investment needs of the municipality and its *actual* level of capital investment.

**General Considerations**

As discussed in Chapter 3, the determination of local infrastructure investment needs, as requested in the Commission's survey, is an impressionistic process. As such, the perceptions of individual engineers will introduce a certain amount of subjectivity into these assessments. In addition, engineers face certain difficulties in accurately assessing the condition and needs of those infrastructure systems, such as water distribution and wastewater collection pipes, which are buried underground. The Commission's needs projections are based on the assumption that these estimates by local engineers are, for the most part, accurate measures of local capital investment needs. While the perceptions of municipal engineers may vary, returns from the Commission's survey indicate that county and municipal engineers were both thoughtful and thorough in their responses.

The Commission's needs projections are also based on the assumption that previous capital investment levels by local governments on a particular infrastructure system (averaged over a period of years), will be an accurate predictor of future levels of capital investment for that system. Because the deterioration of capital facilities is not necessarily a linear process, the level of needed capital investment may increase significantly as many facilities reach the end of their useful service lives, or as growth and development place new pressures on existing facilities.

The Commission is confident that the needs assessments presented in this report represent an accurate compilation of local infrastructure needs. However, the projected needs figures should not be taken as the *exact* level of capital investment required to rehabilitate and maintain the local infrastructure systems discussed herein. Rather, these projections should be used as a way to compare present efforts with anticipated needs, as well as a way to compare investment needs between the various types of local infrastructure systems.

As the State develops programs and policies to assist local governments in meeting their infrastructure needs, it will require accurate information on the condition and needs of these systems. The Commission's report represents the first step in such a process. If anything, the limitations in projecting New Jersey's local infrastructure needs from a sample of municipalities further underscores the need to develop a more systematic and comprehensive process for obtaining accurate information on the condition and needs of these facilities.

TABLE B-1  
MUNICIPAL RESPONSE TALLIES: SURVEY OF MUNICIPAL ENGINEERS

B-1a: Level of Urbanization

Number of Municipalities Responding

Category	Streets and Roads	Water <sup>1</sup> Distribution	Wastewater	Flood Control and Storm Drainage	Maximum Possible Responses
Urban Centers	17	17	18	18	29
Urban Suburbs	17	33	18	16	126
Suburban Places	61	77	55	57	253
Rural Centers	6	4	6	6	50
Rural Places	8	9	7	9	109
Total Responses	109	140	104	106	567

B-1b: Municipal Distress

Number of Municipalities Responding

Category	Streets and Roads	Water <sup>1</sup> Distribution	Wastewater	Flood Control and Storm Drainage	Maximum Possible Responses
Most Distressed	29	31	29	30	113
Second Quintile	12	15	12	12	113
Third Quintile	15	27	18	15	113
Fourth Quintile	16	26	19	17	113
Most Prosperous	37	41	26	32	115
Total Responses	109	140	104	106	567

B-1c: Population

Number of Municipalities Responding

Category	Streets and Roads	Water <sup>1</sup> Distribution	Wastewater	Flood Control and Storm Drainage	Maximum Possible Responses
50,000+	15	15	15	15	22
25,000-50,000	16	19	19	17	45
10,000-25,000	27	43	24	27	144
2500-10,000	40	49	33	36	242
0-2500	11	14	13	11	114
Total Responses	109	140	104	106	567

B-1d: County Aggregates

Number of Municipalities Responding

Category	Streets and Roads	Water <sup>1</sup> Distribution	Wastewater	Flood Control and Storm Drainage	Maximum Possible Responses
4 DVRPC Counties	20	19	19	19	114
5 Bay/Ocean Counties	17	14	19	18	101
5 Northeast Urban	27	54	25	24	141
4 Northeast Suburban	40	48	37	40	138
3 Northwest Exurban	5	5	4	5	73
Total Responses	109	140	104	106	567

<sup>1</sup>Includes municipalities covered by responses from larger private purveyors in the State.

**TABLE B-2**  
**RESPONSE RATES: SURVEY OF MUNICIPAL ENGINEERS**

**B-2a: Level of Urbanization**

Category	Percent of Municipalities in the Sample				Maximum Possible Responses	Percent of Total Possible Responses
	Streets and Roads	Water <sup>1</sup> Distribution	Wastewater	Flood Control and Storm Drainage		
Urban Centers	16%	12%	17%	17%	29	5%
Urban Suburbs	16	24	17	15	126	22
Suburban Places	56	55	53	54	253	45
Rural Centers	6	3	6	6	50	9
Rural Places	7	6	7	8	109	19
Total	100% <sup>2</sup>	100%	100%	100%	567	100%
N	109	140	104	106	—	567

**B-2b: Municipal Distress**

Category	Percent of Municipalities in the Sample				Maximum Possible Responses	Percent of Total Possible Responses
	Streets and Roads	Water <sup>1</sup> Distribution	Wastewater	Flood Control and Storm Drainage		
Most Distressed	27%	22%	28%	28%	113	20%
Second Quintile	11	11	12	11	113	20
Third Quintile	14	19	17	14	113	20
Fourth Quintile	15	19	18	16	113	20
Most Prosperous	34	29	25	30	115	20
Total	100% <sup>2</sup>	100%	100%	100%	567	100%
N	109	140	104	106	—	567

**B-2c: Population**

Category	Percent of Municipalities in the Sample				Maximum Possible Responses	Percent of Total Possible Responses
	Streets and Roads	Water <sup>1</sup> Distribution	Wastewater	Flood Control and Storm Drainage		
50,000+	14%	11%	14%	14%	22	4%
25,000-50,000	15	14	18	16	45	8
10,000-25,000	25	31	23	25	144	25
2500-10,000	37	35	32	34	242	43
0-2500	10	10	13	10	114	20
Total	100% <sup>2</sup>	100%	100%	100%	567	100%
N	109	140	104	106	—	567

**B-2d: County Aggregates**

Category	Percent of Municipalities in the Sample				Maximum Possible Responses	Percent of Total Possible Responses
	Streets and Roads	Water <sup>1</sup> Distribution	Wastewater	Flood Control and Storm Drainage		
4 DVRPC Counties	18%	14%	18%	18%	114	20%
5 Bay/Ocean Counties	16	10	18	17	101	18
5 Northeast Urban	25	39	24	23	141	25
4 Northeast Suburban	37	34	36	38	138	24
3 Northwest Exurban	5	4	4	5	73	13
Total	100% <sup>2</sup>	100%	100%	100%	567	100%
N	109	140	104	106	—	567

<sup>1</sup>Includes municipalities covered by responses from larger private purveyors in the State.

<sup>2</sup>Actual totals vary from 100% due to rounding.



**APPENDIX C**  
**STREET AND ROAD DATA**

**TABLE C-1**  
**COUNTY AND MUNICIPAL STREET AND ROAD INVENTORY**  
**(By County)**

County	Municipal <sup>1</sup> Road Miles	County <sup>1</sup> Road Miles	County Bridges <sup>2</sup> and Culverts
Atlantic	1305.6	365.2	188
Bergen	2232.1	444.5	1037
Burlington	1476.4	503.1	1200
Camden	1237.0	375.2	134
Cape May	614.4	186.4	21
Cumberland	596.4	550.6	—
Essex	1337.2	224.9	—
Gloucester	786.7	397.8	209
Hudson	437.4	119.7	—
Hunterdon	820.4	258.3	225
Mercer	929.2	174.6	670
Middlesex	1625.1	307.5	139
Monmouth	2064.8	349.1	930
Morris	1793.2	303.1	520
Ocean	1629.4	559.2	214
Passaic	935.9	234.0	455
Salem	411.4	352.8	93
Somerset	957.1	233.9	628
Sussex	849.7	300.7	456
Union	1163.6	156.0	721
Warren	601.8	252.7	1017
<b>TOTAL</b>	<b>23804.8</b>	<b>6649.3</b>	<b>8857</b>

<sup>1</sup>NJDOT Inventories.

<sup>2</sup>From responses to 1982 Survey of County Engineers.

**TABLE C-2**  
**DISTRIBUTION OF MUNICIPAL ROAD MILES**  
**BY URBANIZATION AND POPULATION**

Level of Urbanization <sup>1</sup>	Number of <sup>2</sup> Road Miles	Percent of Total Road Mileage	Number of Municipalities	Miles per Jurisdiction
Urban Centers	2599.9	10.9	29	89.7
Urban Suburbs	4213.6	17.7	126	33.4
Suburbs	11576.1	48.6	253	45.75
Rural Centers	963.3	4.1	50	19.3
Rural Places	4451.9	18.7	109	40.8
<b>TOTALS</b>	<b>23804.8</b>	<b>100.0</b>	<b>567</b>	<b>42.0</b>

Population	Number of Road Miles	Percent of Total Road Mileage	Number of Municipalities	Miles per Jurisdiction
50,000 +	3585.7	15.1	22	163.0
25-50,000	3970.9	16.7	45	88.2
10-25,000	8052.9	33.8	144	55.9
2,500-10,000	6809.7	28.6	242	28.1
0-2,500	1385.6	5.8	114	12.1
<b>TOTALS</b>	<b>23804.8</b>	<b>100.0</b>	<b>567</b>	<b>42.0</b>

<sup>1</sup>Division of Planning Classifications.

<sup>2</sup>SOURCE: New Jersey Department of Transportation.

## APPENDIX D

### Definition of Cost Categories 1982 Environmental Protection Agency Needs Survey

Category I—SECONDARY TREATMENT. This cost category covers facilities, including outfall sewers, needed to achieve secondary levels of treatment. Since the final regulations on the secondary treatment definition in the 1981 Construction Grant Amendments have not yet been issued, the 1982 Needs Survey is based on the existing secondary treatment definition.

Category IIA—ADVANCED SECONDARY TREATMENT (AST). This category includes incremental costs above secondary treatment needed to achieve advanced secondary levels of treatment. This requirement generally exists where water quality standards require a level of removal of conventional pollutants (biochemical oxygen demand (BOD) and suspended solids) greater than 85 percent or 30 milligrams per liter (mg/l) BOD, but less than 95 percent or 10 mg/l of BOD.

Category IIB—ADVANCED TREATED (AT). Incremental costs above those needed for AST are reported in this category for facilities that require advanced levels of treatment. This requirement generally exists where water quality standards require a higher degree of removal of such pollutants as carbonaceous and nitrogenous oxygen demands, phosphorus, ammonia, and nitrates. In addition, this requirement exists where removal requirements for conventional pollutants exceed 95 percent.

Category IIIA—CORRECTION OF INFILTRATION/FLOW. Included in this category are costs for correction of sewer system infiltration/inflow problems. Costs are also reported here for preliminary sewer system analysis and for detailed sewer system evaluation surveys.

Category IIIB—MAJOR REHABILITATION OF SEWERS. This category includes cost estimates for replacement and/or major rehabilitation of existing sewer systems beyond those for correction of infiltration/inflow. Costs are reported if the corrective actions are necessary to maintain the total integrity of the system. Major rehabilitation is considered to be the extensive repair of existing sewers beyond the scope of normal maintenance programs, where sewers are collapsing or structurally unsound.

Category IVA—NEW COLLECTOR SEWERS. This category includes costs of construction of grant eligible new collector sewer systems and appurtenances designed to correct violations caused by raw discharges, and to protect public health from such things as malfunctioning septic tanks.

Category IVB—NEW INTERCEPTOR SEWERS. Included in this category are new interceptor sewers and transmission pumping stations necessary for conveying wastewaters from collector sewer systems to treatment facilities.

Category V—CONTROL OF COMBINED SEWER OVERFLOW (CSO). Costs reported in this category are for grant eligible facilities to prevent or control periodic bypassing of untreated wastes from combined sewers to achieve water quality objectives. This category does not include costs either for CSO control allocable to flood control or drainage improvement or for treatment or control of stormwaters in separate storm and drainage systems.

Category VI—CONTROL OF STORMWATER RUNOFF. This category includes costs of abating pollution in urbanized areas from stormwater runoff channeled through sewers and other conveyances used only for such runoff. These facilities are not grant eligible.

The incremental costs for removal of toxic pollutants are not included in the Needs Survey.

## FUTURE PUBLICATIONS OF THE COUNTY AND MUNICIPAL GOVERNMENT STUDY COMMISSION

- County Mandates: Balancing the Resources and Responsibilities of County Government
- The Changing Structure of New Jersey Municipal Government
- Functional Fragmentation and Forms of Municipal Government
- An Analysis of County Government Administration
- Urban Redevelopment in New Jersey
- A Status Report on Solid Waste Management

## ABOUT THE COMMISSION

The New Jersey Legislature established the County and Municipal Government Study Commission with the charge to "study the structure and functions of county and municipal government . . . and to determine their applicability in meeting the present and future needs of the State and its political subdivisions."

To achieve as broad a representation as possible in carrying out this legislative charge, a Commission of 15 members was created, nine of whom are named by the Governor, three of whom are Senators named by the President of the Senate, and three of whom are Assemblymen, named by the Speaker of the General Assembly. Of the Governor's appointees, three are nominees of the New Jersey Association of Counties, three are nominees of the New Jersey State League of Municipalities, and three are from among the citizens of the State.

The Commission's initial report, *Creative Localism: A Prospectus*, recommended a comprehensive and systematic study of the patterns of planning, financing and performing functions of government. This assessment seeks to develop more effective approaches for service provision among municipal, county and State governments through statutory amendment and changes in administrative practices and policies.

In light of these goals, the Commission has examined alternate forms of service provision on a larger than municipal scale and evaluated current systems for provision of services. This research has led to a series of structural studies dealing with county government, joint services, consolidation and municipal government forms. The Commission also engages in functional studies that are focused upon the services that local governments provide or should so provide. These functional studies have included examinations of transportation, housing, social services, health, solid waste management, flood control, libraries and State mandates. In addition, a series of informational periodicals and handbooks are published for the use of officials, administrators and others interested in New Jersey government.

While the Commission's research efforts are primarily directed toward ongoing structural and functional studies, its staff is often asked to assist in the drafting of legislation and regulatory action based upon Commission recommendations. The Commission also serves as a general resource to the Legislature, Executive agencies, local government officials and civic organizations as well as to related activities at the national level.

*Back Cover:*  
*South Clinton Avenue railroad bridge, Trenton. (Calvin Solliday/Trenton Times) Pothole in Route 518. (Mitch Toll/Trenton Times) Cars swept into crater by floodwaters—New Egypt, New Jersey. (John A. Pietras/Trenton Times)*



