STATE OF NEW JERSEY

DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF WATER RESOURCES

PROGRAM DESIGN

FOR THE

STATE WATER SUPPLY MASTER PLAN

prepared by

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PROGRAM DESIGN

FOR THE

STATE WATER SUPPLY MASTER PLAN

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PREFACE

The New Jersey State Department of Environmental Protection is statutorily responsible for overseeing water supply management in the State. Its duties include the regulation and allocation of the State's water resources, as well as assuring that adequate potable supplies of acceptable quality are available to meet public water demand. The Department seeks to play a strong leadership role in the fulfillment of these responsibilities.

A number of significant water supply decisions must be reached in the near future. Some of these decisions relate directly to the improved protection of the State's precious water resources, while others are associated with investment in new water facilities and the operation of existing water facilities. These decisions require a resource base that is not to be found today in the Department of Environmental Protection. To address this situation, Governor Byrne has sought and received fiscal authorization from the New Jersey State Legislature to conduct a State Water Supply Master Plan, and the Department of Environmental Protection is now proceeding to undertake this important effort.

Over a thirty-six month period an extensive study will be carried out to achieve a number of objectives. The solutions to long standing issues such as the drought standards to be used for designing and operating reservoirs will be recommended; a set of desirable short and long range water supply development projects will be identified and analyzed for strengths and weaknesses; and

improved management and planning arrangements will be established to keep the State Water Supply Master Plan current and implementable. This effort will basically provide for a thorough analysis of the State's water supply programs and water supply needs, and how those needs can be met by the State and the water industry.

In order to assure a thorough and open planning process, this Program Design for the State Water Supply Master Plan has been prepared. Its functions are: to explain the reasons for a State Water Supply Master Plan, its goals, the benefits to be derived from the planning effort; how it will actually be carried out; and what the work tasks will be.

The Program Design consists of two substantive parts. The first part is the Plan of Study, which focuses upon the goals, organization, and management of the State Water Supply Master Plan in a general fashion. The second part is the Scope of Work, which details the work tasks to be completed over the course of the Study. It is this part, in conjunction with the Department's Request for Proposal, that will be used as the basis for Technical Proposal responses from consultants.

The Program Design was the subject of an informational public hearing on July 15, 1975 at which time interested parties were permitted to comment on any and all portions of the first draft of this document. Comments which have been received have been carefully reviewed, and a number of changes have been included in this revised

Program Design. A third major part has been added to this document entitled Appendix. The Appendix contains a Synopsis of the Public Informational Hearing on the Program Design, including an identification of and responses to several major policy issues raised in the public comments.

The Department and their consultants for the Program Design wish to sincerely thank the large number of individuals and organizations who have contributed to the preparation of this document. It is hoped that further cooperative efforts and assistance will be forthcoming from the interested publics as the State Water Supply Master Plan is conducted and then implemented in the months and years ahead.

PART I.

PLAN OF STUDY

PART I. - PLAN OF STUDY

A. INTRODUCTION

This Plan of Study is a general statement describing the basis for conducting a State Water Supply Master Plan, the goals of this study, and how it will be organized. Its purpose is to explain in an explicit and thorough manner why the State Water Supply Master Plan is being developed and how it will be accomplished. Furthermore, the Plan of Study explains the policy thrust of the effort and the areas of concentration. The core of the Plan of Study is presented in the eight sections, lettered B. through I.: the first five describe the reasons for this planning effort, and the remaining three outline how the planning effort will be managed.

Section B., Authority, describes the Department of Environmental Protection's responsibilities and its authority to conduct the State Water Supply Master Plan as the agency responsible for water resources planning in New Jersey. In the Statement of Background, Section C., New Jersey's water resources are placed into a perspective of how they are used and where some water supply problems and opportunities arise. Section D., the Purpose of the Study, details why a State Water Supply Master Plan is necessary to assist public officials in reaching

decisions on some very complex and long-standing issues. In Section E., the objectives of the study, as well as specific, tangible goals are identified. Section F., the Planning Program, completes the discussion of the reasons for the planning effort by explaining how the State Water Supply Master Plan will fit into a thoroughly upgraded State water supply planning and management program.

The next three sections of the Plan of Study relate to the management of this undertaking. Section G., Study Management, provides a description of how a project management team will be assembled within the Division of Water Resources to: oversee consultants who will be selected to carry out work tasks; insure public participation; and integrate this planning effort with parallel water resources planning activities being pursued throughout New Jersey, and the adjoining States of New York and Pennsylvania. The methods to be employed in developing effective liaison with interest groups and the general public are identified in Section H., on Public Participation. Finally, in Section I., the role, responsibilities, and selection of consultants are explained.

These eight sections provide a basis for understanding what the study is about and how it is to be accomplished. They are complemented by Part II. of this Program Design, the

Scope of Work which follows them and explains what the specific work activities for the State Water Supply Master Plan will be.

B. AUTHORITY

The New Jersey Department of Environmental Protection (DEP) has been assigned the duty to conduct a State Water Supply Master Plan. Moreover, DEP has the responsibility for the protection and development of the water resources of the State, under laws conferring authority to control and regulate the use, development, and diversion of all surface and subsurface waters.[1] The principle of State responsibility for planning, supervision, and allocation is deeply rooted in law and is supported by judicial decisions which have repeatedly held that the control of water resources within New Jersey resides with the State, in its sovereign capacity as representative of New Jersey's citizens for the benefit of the people in common.

Such responsibility has been vested in a series of State executive agencies, endowed with quasi-judicial powers, since 1907 when Chapter 252 was enacted, requiring State approval of plans for the diversion of surface waters in the interest of equitable allocation founded upon public necessity. The provisions of this law were extended to subsurface waters in 1910 by Chapter 304.

[1] See Exhibit 9 for statutory citations.

The name of the agency has been changed from time to time under reorganizations of State departments and the duties have been expanded, but the essential principles have remained the same. Today, as set forth in the Revised Statutes as Titles 13 and 58, the Department of Environmental Protection is responsible for formulating plans to insure the prudent allocation, development, and preservation of water supply facilities with the Water Policy and Supply Council and the Division of Water Resources being jointly responsible for the formulation of such plans.

C. STATEMENT OF BACKGROUND

New Jersey is a unique State blessed with abundant water resources. While only forty-sixth in size, it has a population of some 7.4 million people residing on 7,509 square miles. New Jersey is the most densely populated of the fifty states and is highly dependent upon water to support its industry, agriculture, recreation, and other fundamental services necessary to sustain life itself. While the State is in a humid region of the country and has a relatively plentiful supply of water resources, the demands that accompany urbanization and suburbanization have intensified to the point where, in several regions, New Jersey is presently outstripping its developed supplies of potable water.

In the northern part of the State, New Jersey depends primarily on surface water supplies which are contained in rivers, streams and reservoirs. (See Exhibit 1-A.) There are some five million residents in the northeastern metropolitan area of the State, residing on 2,200 square miles in the watersheds of the Hackensack, Passaic and Raritan River Basins and some minor coastal streams. In this northern third of the State, ground water development has approached an optimum level in a number of aquifers. Surface water is totally developed in the Hackensack Basin and fast approaching that level in the Passaic Basin; in contrast, the Raritan Basin is only partially developed.

There are some one hundred separate water purveyors supplying the residential, commercial and industrial needs of the Raritan, Passaic and Hackensack River Basins, the State's principle northern basins. However some eighty percent of the water used is delivered by only eight purveyors who depend primarily on developed surface water supplies. Four of these are private water companies, two are municipally owned, and two are commission operated.

In the southern part of the State, New Jersey's population and industry rely primarily on ground water supplies which are drawn from the major aquifers of the area. Approximately two-fifths of the recorded public water use in the State comes from

EXHIBIT I-A

■ DIVERSION LOCATION
● RESERVOIR LOCATION

STATE OF NEW JERSEY
- SNJ-1 RAVEN ROCK, D&R CANAL
- SNJ-2 SPRUCE RUN RES
- SNJ-3 ROUND VALLEY RES

NORTH JERSEY DISTRICT WATER SUPPLY COMMISSION
- NJD-1 DIVERSION POINT
- NJD-2 WANAQUE RES.

PASSAIC VALLEY WATER COMMISSION
- PV-1 LITTLE FALLS DIVERSION POINT
- PV-2 POINT VIEW RES.

NEWARK WATER DEPARTMENT
- N-1 CHARLOTTEBURG DIVERSION POINT
- N-2 PEQUANNOCK RES. SYSTEM

JERSEY CITY WATER DEPARTMENT
- J-1 BOONTON RES. DIVERSION POINT
- J-2 ROCKAWAY RIVER RES. SYSTEM

TRENTON WATER DEPARTMENT
- T-1 DELAWARE DIVERSION POINT

ATLANTIC CITY WATER DEPARTMENT
- AC-1 DIVERSION POINT

HACKENSACK WATER COMPANY
- H-1 ORADELL DIVERSION POINT
- H-2 HACKENSACK RES. SYSTEM

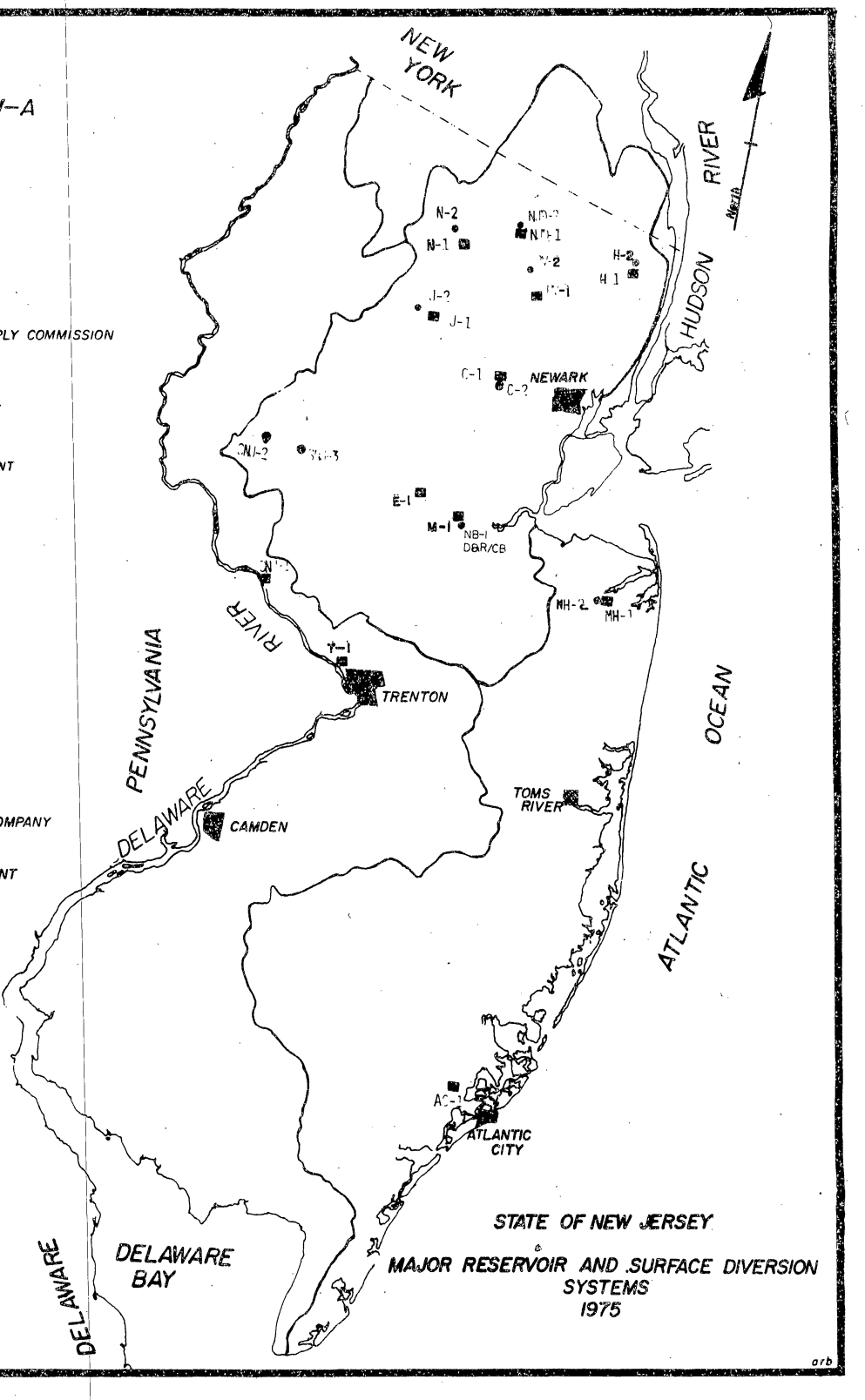
COMMONWEALTH WATER COMPANY
- C-1 PASSAIC DIVERSION POINT
- C-2 PASSAIC RES. SYSTEM

MIDDLESEX WATER COMPANY
- M-1 CANAL DIVERSION POINT

ELIZABETHTOWN WATER COMPANY
- E-1 RARITAN DIVERSION POINT

MONMOUTH CONSOLIDATED WATER COMPANY
- MH-1 DIVERSION POINT
- MH-2 SWIMMING RIVER RES. SYSTEM

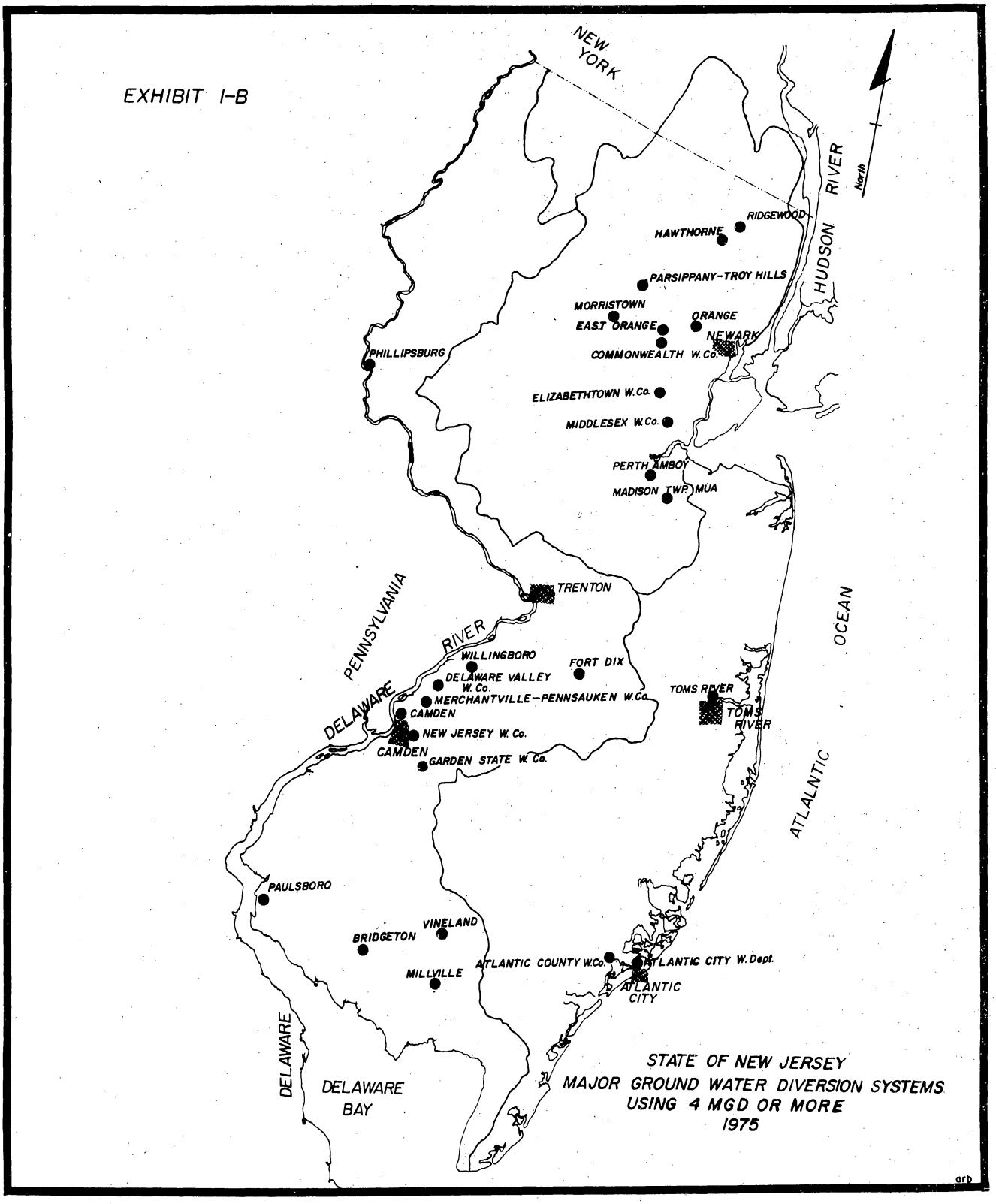
NEW BRUNSWICK WATER DEPARTMENT
- NB-1 D&R CANAL DIVERSION POINT



STATE OF NEW JERSEY
MAJOR RESERVOIR AND SURFACE DIVERSION SYSTEMS
1975

arb

EXHIBIT I-B


NEW YORK
HUDSON RIVER
North
RIDGEWOOD
HAWTHORNE
PARSIPPANY-TROY HILLS
MORRISTOWN
ORANGE
EAST ORANGE
NEWARK
COMMONWEALTH W. Co.
PHILLIPSBURG
ELIZABETHTOWN W. Co.
MIDDLESEX W. Co.
PERTH AMBOY
MADISON TWP. MUA
TRENTON
PENNSYLVANIA
RIVER
DELAWARE
WILLINGBORO
FORT DIX
DELAWARE VALLEY W. Co.
MERCHANTVILLE-PENNSAUKEN W. Co.
CAMDEN
NEW JERSEY W. Co.
CAMDEN
GARDEN STATE W. Co.
TOMS RIVER
TOMS RIVER
OCEAN
ATLANTIC
PAULSBORO
VINELAND
BRIDGETON
MILLVILLE
ATLANTIC COUNTY W. Co.
ATLANTIC CITY W. Dept.
ATLANTIC CITY
DELAWARE
DELAWARE BAY
STATE OF NEW JERSEY
MAJOR GROUND WATER DIVERSION SYSTEMS
USING 4 MGD OR MORE
1975
arb

underground sources, almost equally divided north and south of Trenton. (See Exhibit 1-B.)

Industry uses the greatest amount of non-potable water in the State, and actually requires more water during the drier summer months. Although agriculture requires only about 5% of the total depletive water used during a year in the Delaware River Basin, it accounts for nearly one-third of all water depletion during the summer months when surface water is least available. Moreover, for both industry and agriculture, the quality of the water and the source location are most important considerations.

In summary, New Jersey's vast water resources have been heavily developed, and in some cases abused. For the entire State, there is an urgent need to develop a water supply plan and management system where water resource use is optimized; unnecessary competition, conflict and duplication are ended; and a clear process for water supply decision-making is defined. This planning process seeks to assign the responsibilities necessary for the maintenance of an effective and efficient water supply management program to those entities most capable of responding to the respective activities.

D. PURPOSE OF THE STUDY

In addition to the reasons that have been noted, the State Water Supply Master Plan will afford decision-makers

far greater understanding than is now available to address major water supply issues that are of importance to all New Jerseyites. Some of the issues to be addressed include:

- the need for an understanding of alternative water supply development projects;
- how to terminate the overdrafting of major reservoir systems;
- the role of the Delaware and Hudson Rivers as sources of water supply;
- the formulation of drought and emergency contingency plans;
- the adoption of design drought standards for the determination of dependable yields from construction of future water facilities and operation of existing facilities;
- the specific methods of financing for new potable supplies;
- maintenance of quality of treated supplies.

These items give but a flavor of the issues faced by the State decision-makers, the water industry and the public over the next several years. And they primarily focus on either regulatory issues or water utility investment issues.

Although the responsibility for comprehensive water supply planning and development rests with the State, at this time there is no real power to order new supplies to be developed on a timely basis nor to see that such projects are implemented. The approval power in regulating diversions is insufficient power

to insure that the waters of the State are used effectively, efficiently, equitably, and with regard to needs and resource capabilities. In terms of its jurisdiction, the State cannot insure that a municipality unable to develop its own supply and without the prospect of being supplied by other water agencies, can obtain needed water Even were the State empowered to order purveyors to develop new supplies as needed, there does not exist today a full comparison of alternative projects that would explain to the decision-maker the technical, environmental, economic and social benefits and costs of each respective project.

The purposes of the State Water Supply Master Plan, then, are to identify and compare alternative options available for meeting statutorily mandated State water supply responsibilities; to develop sets of plans for meeting these responsibilities; to investigate and identify the means necessary to implement such plans; and to advance plans or programs to insure that New Jerseyites have water in sufficient quantity and of high quality to meet their needs.

E. OBJECTIVES AND GOALS

The overriding objectives of the State Water Supply Master Plan can be succinctly stated as the following:

- The strengthening of the State's water resources regulation capability to protect the vital natural resource, to allocate diversion rights in an

equitable and resource conscious manner, to assure that potable water supplies are of high quality, and to carry out these activities with a minimum of delay.

. The strengthening of the State's water resources development and utility operations capabilities to assure that adequate quantities of water are made available to New Jersey residents, to place the State's water utility operations on a self-sustaining footing, to overcome financial deficits associated with the existing State water supply facilities, and to consolidate the institutional and financial management of State water utility operations.

. The strengthening of the State's program for water supply planning to enable State policy makers to have a thorough understanding when making regulatory and investment decisions, to annually guide the State's water supply management program, and to conduct the water supply planning and management programs in a manner that incorporates active public participation.

Translated into specific terms, some of the typical specific goals would include:

- The development of a comprehensive data base on past and present water use, water diversions and water supply infrastructure;

- The preparation of a detailed analysis and comparison of alternative projects and programs to meet future water supply needs;

- The formulation of drought and emergency contingency plans, and watershed resource management plans that will identify practical approaches to improving the management of surface and ground water;

- The examination of conservation programs and the identification of areas within New Jersey where water resources must be protected and the means whereby this protection can be accomplished;

- The recommendation of a comprehensive system for the setting and review of State water fees to cover the annual costs of operating and maintaining the State's water supply facilities, service the debt associated with the facilities, and provide a pool of capital for the development of new projects; and

- The development of a computerized information system to serve as a repository for data required in the decision-making process that would be integrated with water quality and flood control information systems (e.g., the review and evaluation of applications for diversion rights).

These specific goals are directly related to the objectives of the study, although they do not represent all of the study's goals. Rather, they identify the anticipated outputs that would assist State officials in achieving objectives. These goals will be further refined in the Scope of Work for the study, where they will be translated into specific work activities.

F. PLANNING PROGRAM

Undertaking a State Water Supply Master Plan is the most important step that can be taken to improve the decision-making capabilities of public officials. At the same time, it must be integrated into a water supply management planning system. Thus a full-fledged State planning program for water supply is required, to aid decision-makers, the water industry, and the public at large.

It is envisioned that the State Water Supply Master Plan will become an official document of the State of New Jersey, and that it will be updated from time to time. The Plan will serve as a benchmark against which major applications for diversion rights

can be evaluated by the Water Policy and Supply Council. It will also serve as a clear articulation of State policy on water supply matters to the water industry as respective parties of the water industry prepare their own plans. Finally, it will be a significant opportunity for the public to play a role in water supply management.

A State Continuing Planning Program also is required to provide an orderly mechanism for reviewing applications before the Water Policy and Supply Council and in making short-range water management decisions. Through the conduct of watershed management plans (which are presently authorized by statute), the implementation of an efficient information management system, and the on-going preparation of water resources circulars and technical reports, the Continuing Planning Program will offer an organized body of facts which will substantially improve the ability of the regulatory and utility operations' units to make decisions. Moreover, the comprehensive data base will allow for the early identification of problems, especially those involving over-allocation of the limited ground water resource and over-utilization of surface water systems.

A State Program Planning Process also will be necessary to articulate and review annual program goals, objectives, and activities in a public fashion. Through the formulation of an annual Program Plan for Water Supply Management, much like the one now prepared for water pollution control, it will be possi-

ble to identify the policies, programs, and resources required to achieve annual goals. Additionally, this document will act to organize human and other resources to achieve specific objectives in a timely manner. Each year a New Jersey State Program Plan for Water Supply Management would be prepared and discussed at public hearings. In this manner, an open and official planning process will be created in which all parties can debate the merits of the annual Program Plan.

These three primary elements or components of the overall State water supply planning program - a State Water Supply Master Plan, a Continuing Planning Program and a Program Planning Process for water supply management - are further compared in Exhibit 2. This planning system will substantially upgrade in-house capabilities, while also fully incorporating other levels of planning. Specifically, planning conducted by the water industry and political subdivisions of the State of New Jersey will take place within a rationalized framework. Additionally, plans of the U. S. Army Corps of Engineers, other Federal agencies, New Jersey's sister states, and the Delaware River Basin Commission will all be in clearer focus with these improvements.

G. STUDY MANAGEMENT

The conduct of a State Water Supply Master Plan is a major undertaking that requires a great degree of control, coordination, and integration on the part of the Division of Water Resources.

EXHIBIT 2

A COMPARISON OF THE THREE LEVELS OF STATE WATER SUPPLY PLANNING

	State Water Plan	Continuing Planning Program	Program Planning Process
What	A series of plans, evaluations and resource documents	Watershed plans, technical reports and water resources circulars	A strategy and policy document with criteria to guide managers and to measure progress
Who	DWR by a project manager and small staff	DWR by a program manager and staff	Division Director and key management staff
When	A major one-time effort to be undertaken immediately	An ongoing function	On an annual basis; reviewed for progress quarterly
Why	To overcome existing deficiencies and gaps in long and short range planning	To provide an organized basis for day-to-day decision-making	To organize staff; to provide goals to strive against; to establish a means to measure progress
How	Using limited funds derived from the 1969 Water Conservation Bond Act	By utilizing the format developed in the State Water Plan; with the continued assistance of other agencies; in combination with a similar program required for water quality	By using key personnel and a great deal of effort, thought, enthusiasm, understanding and commitment to clearly articulate program direction for a specified time period

It is the Division of Water Resources that will be responsible for expanding its staff and managing funds appropriated to support the study, hiring consultants to conduct large portions of the work, retaining professional advisors to oversee the conduct of the work, and providing a forum for public participation and review. Additionally, the Division of Water Resources will be responsible for integrating this effort with parallel efforts in the water quality management area, as well as with the water resources planning activities.

An initial step, and in many respects the foremost, will be to select a Program Manager and in-house staff to manage all facets of the study. In addition to the Program Manager, the program management team should be comprised of at least two professionals of recognized and diverse abilities. Consideration should also be given to the retention of a third individual to manage the public participation program on a full-time basis.

Many tasks over the course of the study will require highly specialized expertise. It is virtually impossible to attract this expertise into the State government on a full-time basis, for the short period of time required for the study. To correct this problem, it is necessary to retain consultants to conduct many phases of such planning efforts. For this particular study, a diverse array of consultants will

be assembled to perform contract activities under the direction of the Program Manager.

To assist the Program Manager in overseeing the development of the State Water Supply Master Plan, the Division of Water Resources has engaged two experts eminently qualified in the field of water resources: Dr. Abel Wolman of Johns Hopkins University and General William Whipple, Director of the New Jersey Water Resources Research Institute.

H. PUBLIC PARTICIPATION

Recent experience in the water quality management field emphasizes the need for effective liaison and working relationships between the various units and levels of government, concerned interest groups and the general public. The nature and the degree of cooperation, coordination, and public participation, in addition to the organizational arrangements and procedures adopted, will greatly determine the quality, sufficiency, and public acceptability of the State Water Supply Master Plan.

A considerable number of advantages can be served by instituting cooperative and coordinated relationships among various interests and developing programs of public information and community involvement. These advantages include:

- The collection and exchange of information;
- The determination of public preferences and priorities;
- The development and formulation of a basis for support;

- The opportunity to anticipate conflicts and produce plans which closely respond to the public's needs; and

- The obtaining of necessary responses and reactions to water supply planning and program activities.

It is extremely important to formulate and maintain channel of communication and to develop an appreciation for the complex institutional and political context within which water supply planning must be accomplished. Several alternatives can be employed to provide all segments of the body public with an opportunity to be heard and express their opinions:

- Conducting periodic public meetings and conferences;

- Using functional advisory groups, drawn from the public and private sectors and designed to review proposals;

- Creating citizen's committees to provide advice, assistance and commentary;

- Selecting liaison personnel from the governmental branches and agencies to coordinate the process; and,

- Designating regional bodies to serve as points of information, distributions, and communication for the body public.

Prior to the selection of consultants, the Program Manager will be responsible for assuring that all events associated with the study are conducted in an open and public fashion. Initially, the Water Policy and Supply Council has been used as a forum to comment on the draft Program Design for the State Water Supply

Master Plan. Once consultants are selected, the Program Manager will be responsible for developing a detailed program of public participation. (See Appendix page III-1 for a more definitive discussion of the recommended public participation program.)

I. CONSULTANTS

Consultants will play a critical role in the conduct of the State Water Supply Master Plan. While the Program Manager will oversee the study, it will be consultants who will actually carry out the information gathering, identification of problems and opportunities, analysis of issues, and formulation of program and plans to upgrade the management of water supply activities in New Jersey.

A detailed consultant selection methodology will be used to evaluate the study proposals submitted to the Division of Water Resources. In general, the successful consultant will be able to indicate:

- a working knowledge of New Jersey's system for water supply management and issues to be addressed over the course of the study;
- a study proposal that reflects a thorough understanding of the State's objectives and goals, as well as the organizational and operational capabilities to allow for their achievement;

- substantial experience in the water supply management field emphasizing impartial and innovative thinking;
- that necessary resources and experienced personnel will be assigned to the project;
- an ability to meet study goals according to schedule; and
- insights as to how the study will be conducted, the manner in which the public will be involved, and how this study will be integrated with parallel planning efforts and activities.

It will be the responsibility of the Program Manager to monitor the activities of consultants. He will be the contact point for all consultant inquiries and will be responsible for providing ongoing guidance. Any alterations to the agreed upon schedule for study completion must be made in writing by the Program Manager to the consultants. Any schedule alterations requested by consultants will also be made in writing directly to the Program Manager. Accordingly, every effort will be made to associate payments to consultants with the delivery of outputs, and these outputs are to be defined in writing through consultant contracts.

It is anticipated that the consultant selection process will require each consultant to submit a Technical Proposal and a separate sealed Budget Proposal. A Screening Committee will review the Technical Proposals against a specified set of

criteria, and select for further consideration the most qualified firms without opening the sealed Budget Proposals. Those firms selected by the Screening Committee will be required to make an oral presentation to a Selection Committee composed primarily of policy level State officials. Final selection by the Selection Committee will be based upon Technical Proposal, oral presentation and budget considerations. The Budget Proposals of firms not selected will be returned with the seals unbroken.

P A R T II.

S C O P E O F W O R K

PART II. - SCOPE OF WORK

A. INTRODUCTION

Part II. of the Program Design for the State Water Supply Master Plan consists of the Scope of Work, which is a detailed portrayal of how this plan will be carried out. In addition to this introduction, there are four important sections which comprise the Scope of Work: an Overview, the Contract Tasks, a Schedule of Performance and Outputs, and the Responsibilities of the Department of Environmental Protection and Consultants.

In the Overview, Section B., the conceptual approach to the work effort is described. This section provides a framework for associating the actual contract activities with policy goals and a perspective regarding the Division of Water Resources' view on how the study process is to be focused.

The Overview is followed by the most crucial section of the Scope of Work, the Contract Tasks which appears as Section C. In the Contract Tasks section, the detailed work activities are enumerated and grouped. It is this section that explains precisely what is to be done by consultants over the first thirty months of this three year study. Additionally, it provides a basis for consultants to prepare proposals that will describe their methodological approaches and anticipated resource allocations.

Following the Contract Tasks section comes a section on Schedule of Performance and Outputs. This provides overall time perspective and tentative time periods for the performance of each major contract activity. The Schedule of Performance and Outputs element also indicates the responsibilities of the consultants regarding the preparation of draft and final outputs.

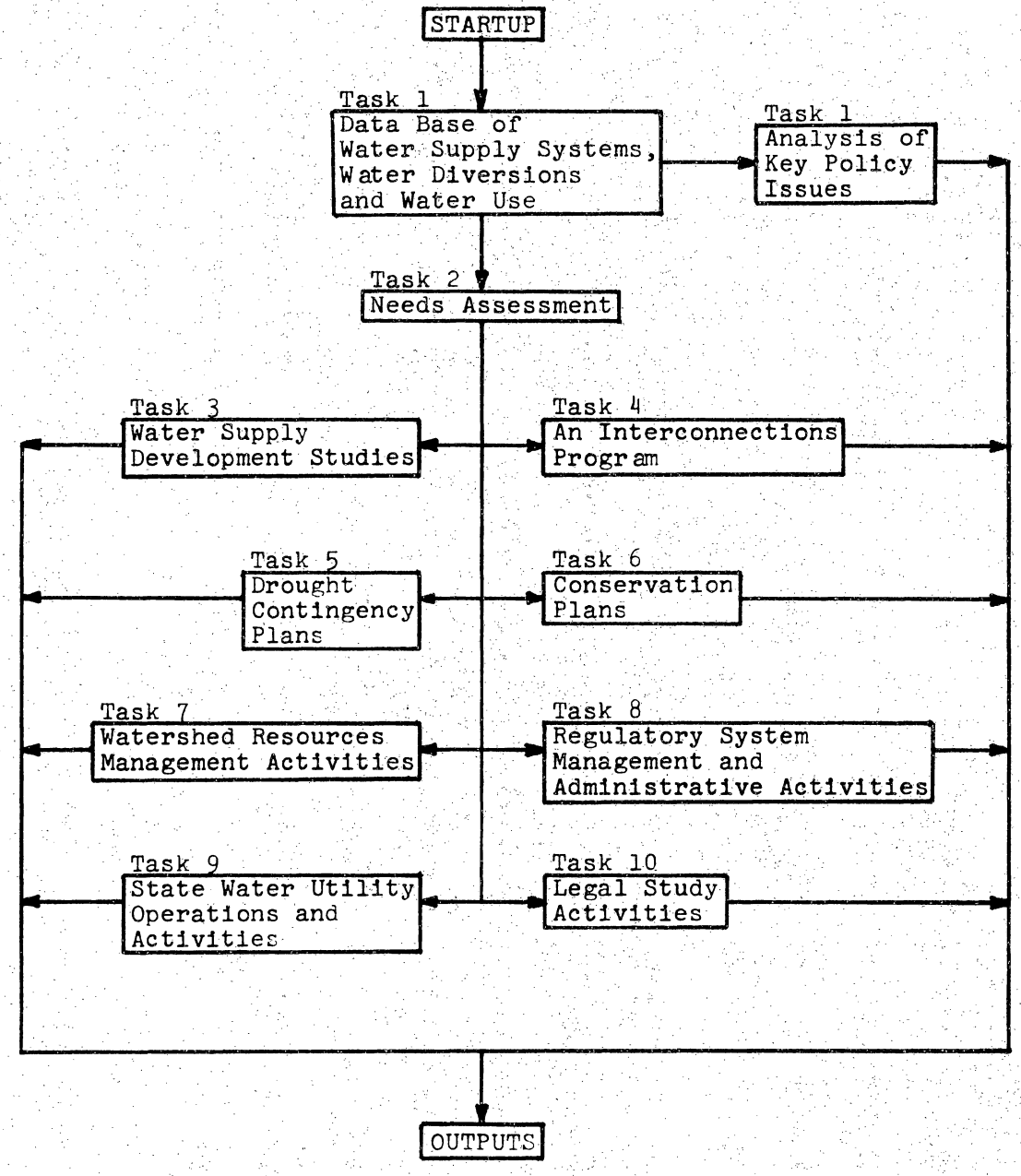
The final section of this Scope of Work is the Responsibilities of the Department of Environmental Protection and the Consultants. It describes the duties of the Department in relationship to the consultants over the course of the study. Also, it explains how the consultants are to organize and relate their efforts with those of the Department and other interests.

B. OVERVIEW

The Scope of Work is organized in a manner that constantly assists public officials, interested parties, and potential contractors to focus upon how the contract tasks fit into the State's water supply management program and precisely how the intended outputs are to be used. Two important functions are to be accomplished by this study through the performance of a total of ten major tasks which appear in the Flow Diagram of the Contract Tasks, Exhibit 3. First, data base is to be created that will upgrade the informational resources necessary

EXHIBIT 3

FLOW DIAGRAM OF THE CONTRACT TASKS FOR THE SCOPE OF WORK



Note: Tasks 1 through 10 are discussed in detail in Part II, Section C, Contract Tasks.

for prompt, accurate decision-making. Also, series of policy determinations and assessments will emanate from this effort (See Tasks 1 and 2). Second, a series of detailed studies are to be conducted which will result in specific plans that will become the foundation upon which water supply management programs will be conducted in the future. Typical outgrowths of these study efforts include: a Water Supply Development Plan; an Interconnections Program; Conservation and Contingency Plans; Watershed Resource Management Plans; and a State Water Utility Operations Program Plan (See Tasks 3, 4, 5, 6, 7, 8, 9 and 10).

Referring again to Exhibit 2, it is instructive to gain a general appreciation for the contents of the ten contract tasks. In Task 1., a detailed quantitative data base (past and present) of water supply systems, water diversions and water use will be assembled. The function of this data base is to present a clear, comprehensive and orderly comparison of the strengths and weaknesses of New Jersey's water supply systems. The data base will be utilized to formulate responses to several key policy issues, such as the selection of a design drought standard which is included in Task 1. It will also serve as a fixed point of reference for the conduct of the other tasks of the study.

Task 2. is a concisely developed needs assessment of future population distribution and water use growth prospects. The

assessments are to be conducted for each of the six water supply regions of the State, and are to include summaries of water supply problems which have been identified as requiring analysis in other portions of this planning effort.

In the remaining tasks of this study effort (Tasks 3. through 10.), the focus shifts to the conduct of eight separate plans which individually aim at improving the operational aspects of the particular functional area it analyzes, and which jointly will form the basis for the future conduct of the State's water supply management program. Collectively, these eight study tasks represent the primary components of the State Water Supply Master Plan.

In Task 3, all known water supply development alternatives will be listed and evaluated to indicate the yields, costs, environmental consequences, conservation opportunities, social impacts, and legal issues associated with respective projects. The individual projects will be combined into a series of alternative programs of development. The result of this effort will be a comprehensive understanding of the characteristics of individual projects and alternative programs of development which will permit decision makers to mold future capital expenditures for water supply development to the circumstances which evolve in the future.

An Interconnections Program will be developed in Task 4. to assure that individual systems can respond to unforeseen disasters such as the Trenton water crisis of September 1975. Recommendations for additional interconnections and an emergency response program will be required as outputs of this task.

Plans to guard against drought or contingency events must also be formulated. Task 5. will yield Contingency Plans which are capable of responding to both a sudden, intensive drought and a multi-year drought. On a regional basis, a phased program of measures will be developed to respond to understood indicators of drought severity.

Conservation of the resource is fundamental to any overall plan to manage available water supply reserves. Task 6. is directed at developing a series of meaningful and implementable Conservation Plans. Conservation policies and programs will be assembled from the literature or proposed by the consultant, and evaluated to determine the most significant options. Both short and long range plans will be developed from the most promising individual policies or programs.

The complexity of issues inherent to the most important applications for diversion rights, which have exceeded the resource base available to assist in decision-making, will

be the focus of Task 7. There is an urgent need to upgrade and organize the data base for analyzing particular issues and organizing a framework within which individual applications can be viewed. For these reasons, watershed resource management plans will be developed with primary foci directed at identifying water budgets for principal streams in New Jersey and preparing a program of groundwater investigation.

New Jersey State statutes mandate the Department of Environmental Protection to assume the leadership position in water supply management. An upgrading of the current regulatory program will be required to review and implement many portions of the State Water Supply Master Plan. Joint policies and procedures between the Department of Environmental Protection and the Public Utilities Commission will need to be advanced, as will a more timely review process by the Water Policy and Supply Council. Similarly, the Division of Water Resources will be required to upgrade its ability to support policy determinations and enforce regulations. These administrative activities and others will be conducted in the regulatory system management and administrative plan which is Task 8.

Task 9., a management study, will be conducted to improve the posture of State water utility operations. This study will propose the proper institutional form for the management of State water supply facilities, develop the method whereby new projects

will be financed, and identify the steps necessary to place the operation of existing and new facilities on a self-sustaining basis. The State water utility operations plan will be one of the most crucial outputs of this entire effort.

A number of outstanding legal issues will be addressed in Task 10. Typical items for analysis would include the constituent elements of a comprehensive diversion rights law, the legal feasibility of reserving diversion rights into the future by political subdivisions, and New Jersey's rights to freshwater from the Hudson River and how rights might be obtained. Some legal issues are incorporated directly into the particular study area where they have an impact. However, a few do stand out as general legal issues, and they will be addressed in the Legal Study component of the Plan.

Out of these final eight study tasks will emerge a series of outputs or plans. They will present the options available to decision-makers, complete with an identification of necessary legal, technical, administrative, and fiscal alterations. From the alternative options, decision-makers will have an ability to choose the proper course of action for New Jersey to follow in future water supply management activities, have the documentation to support their selected course, and implement the needed alterations to New Jersey's water supply management system at an operational level.

C. CONTRACT TASKS

To assist the public in understanding this study and to aid consultants in formulating their proposals, the ten contract tasks comprising the State Water Supply Master Plan are described in detail in the paragraphs below. Each unit of work or task is intended to include all studies, research, computations and conferences required to complete the assigned work and preparation of draft and final outputs as provided in the Schedule of Performance and Outputs, Exhibit 8. The contractor is encouraged to use his judgment, expertise and initiative in accomplishing the prescribed work for this planning effort. In each of the ten tasks, particular attention will be given to reporting clearly any assumptions made, the basis of the assumptions, the basis for any projections used and any methodology utilized. Data and tabulations will be presented so as to indicate clearly and explicitly the Contractor's approach to the analysis and to allow other interested parties to recover all basic inputs for application in independent analyses. A list of reference materials and sources used will also be prepared in standard citation format for each contract task.

TASK 1. A Past and Present Quantitative Data Base of Water Supply Systems, Water Diversions and Water Use

Presenting a comprehensive understanding of past and present water supply systems, water diversions, and water use/users is the fundamental basis for all subsequent elements of this planning effort. The contract activities in this area are:

A. Develop an accurate, comprehensive, understandable and structured data base of the State's water supply systems using largely the existing information sources of the Department of Environmental Protection, the Public Utilities Commission, the National Pollutant Discharge Elimination System, and the records of individual purveyors.

B. Present a clear and comprehensive picture of the strengths and weaknesses of New Jersey's water supply systems at a depth of presentation sufficient to permit ready utilization of the data by State and regional water supply management decision-makers. For each of the water supply systems the inventory is to include (but not be limited to) the following:

1. a delineation of the service area - indicating the number of customers, the system growth potential (qualitatively determined), and service area boundaries.

2. an identification of the infrastructure - including interconnections, capacities, and safe yield limitations.

3. a determination of existing diversion rights or grants, let-down requirements, and stream flow requirements.

4. an analysis of water diversion/water use records by

   - providing a 45 year record of diversions (1930-1975);

   - providing a record of use at five (5) year intervals for the 1930-1975 period, including the quantities of water wholesaled to major industrial users and other purveyors (to whom), quantities of water retailed, source of water (surface or ground), nature of the withdrawal (public; private, regulated; or private, non-regulated), treated from untreated supplies, first use from reuse situations, and type of use (residential, commercial, industrial and agricultural).

5. an analysis of administrative considerations, by identifying the

   - wholesale and retail price schedules for the 25 largest purveyors; and,

   - major contractual arrangements for permanent and temporary supplies.

C. Assemble the data on a priority basis beginning with the largest purveyors where the effort should be highly individualized, and descending in level of detail to the smaller purveyors where forms or questionnaires may be used. Internal mechanisms should be developed to validate the accuracy and consistency of the data. Documentation should be presented in the final report which quantitatively expresses the level of understanding (confidence) in the data base, and which clearly identifies any weaknesses or uncertainties identified by the consultant.

D. Compile and present the information gained from these inventories into cogent, and understandable maps; figures; charts; tables; and narrative descriptions, analyses and interpretations. The style and format of presentation should facilitate updating by State staff on at least an annual basis.

E. Using the data base developed above, and such other data as may be necessary, perform the following work items:

1. Analyze the economic, legal, environmental and engineering issues related to the selection (or re-evaluation if the Department has made such a decision prior to the initiation of this study) of a design drought, imposing withdrawal limits on reservoir yields, and establishing minimum stream flows. In particular, evaluate the effectiveness and impacts of requiring minimum freshwater flow requirements for the major river systems in New Jersey, and the statutory minimum flow requirements from Round Valley-Spruce Run. Formulate these findings into a series of options for consideration by public officials. Also, provide a generalized approach to express the target drought events in quantitative or statistical terms, as opposed to the typical historical approach.

2. Develop detailed maps which depict interconnections and transmission facilities, utilizing the 1943 Interconnections Map and the 1975 Northeastern Water Supply Study Interconnections Report as points of departure.

3. Document deficits and potential deficiencies among individual purveyor systems and areas of need as of today and in the immediate future (through 1990).

4. Identify the self-supplied industrial and agricultural water users along with quantities of water diverted, and maximum permissible diversions.

5. Survey those immediate capital facilities needs which have been identified by each of the major purveyors throughout the State. By category, the survey should include reservoirs, treatment facilities, interconnections, transmission mains, and distribution systems. Emphasize the immediate and near future needs of the purveyors, with specific attention being given to estimating the rehabilitation costs for the major urban water systems.

F. Evaluate the adequacy of the existing State information system for water supply data. Through the process of conducting the data base, test out the effectiveness of any proposed revisions to the information system. When or if a revised information system is proposed by the consultant, evaluate the necessity, benefits and costs of computerization. If recommended, develop a set of specifications which would provide for the development of a computerized information system for water supply which would be compatible with New Jersey's water quality information system.

TASK 2. Needs Assessment

The development of an accurate needs assessment to serve as an understood basis for decision making and analysis is a necessary component of this planning effort. The contract activities in this area are:

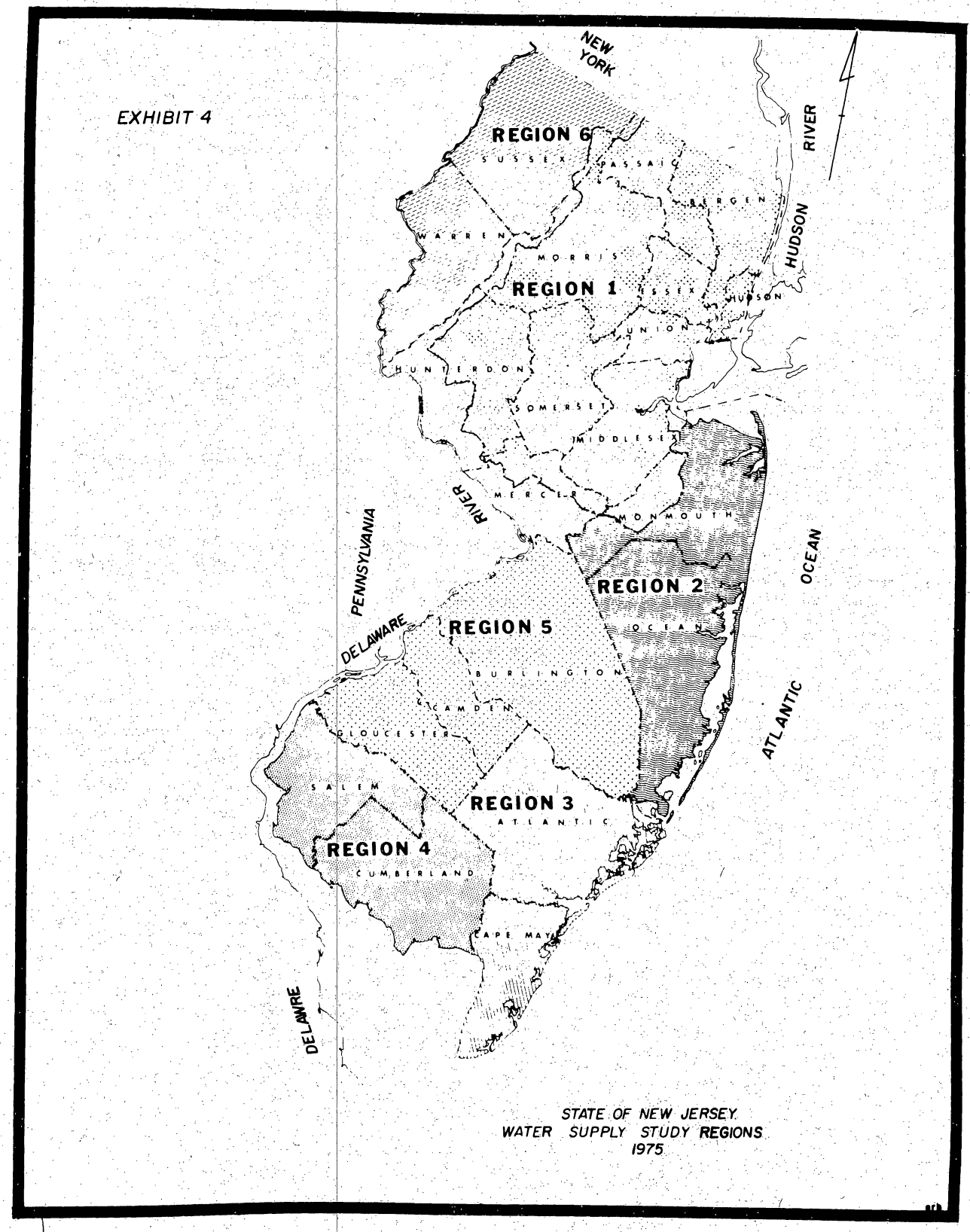
A. Using available sources, identify in a qualitative manner the trends and patterns of population distributions, and residential/industrial/commercial water use growth on a sufficiently aggregated basis to be useful in indicating where detailed water supply planning efforts should be focused.

B. Prepare needs and problems summaries, for each of the six study regions depicted in Exhibit 4. Base the needs and problems summaries upon the needs assessment of the previous subtask A., existing reference sources, and interviews with key agencies and personalities.

C. Analyze the implications of the needs assessment data and the problem summaries with respect to water supply planning issues. In particular, discuss and quantify the sensitivity of water planning to available projections.

D. Formulate an approach that will enable State decision makers to ascertain the most beneficial and efficient methods for determining population, economic, and water use projections. Also, make specific recommendations regarding what information should be obtained (maintained) and the best sources (agencies) for obtaining this information.

EXHIBIT 4



STATE OF NEW JERSEY
WATER SUPPLY STUDY REGIONS
1975

TASK 3. Water Supply Development Studies

The analysis of all available alternatives to meet the State's Water Supply Needs is an essential ingredient of the planning effort. The contract activities in this area are:

A. List in detail the alternative projects available to meet future needs and address identified problems and issues. Both water development and transmission projects should be considered for each of the water supply study regions of the State (defined in Exhibit 4.). Each region should be further divided into subregions composed of water system study areas for purposes of detailed study in sub-tasks C., D. and E. Exhibit 5 identifies some of the key problems or issues by regions. Some of the alternative projects to be studied, which are listed in Exhibit 5., are located on Exhibit 6.

B. Determine whether additional projects uncovered through the consultants' efforts, suggested by the State, or proposed by the water industry or the public, should be added to the list for analysis. The number of any such additional projects is not expected to exceed twenty (20). Some suggested areas for consideration in the formulation new or additional projects include:

- making maximum use of existing reservoirs and transmission facilities through importation and pump storage projects which would expand safe yield;

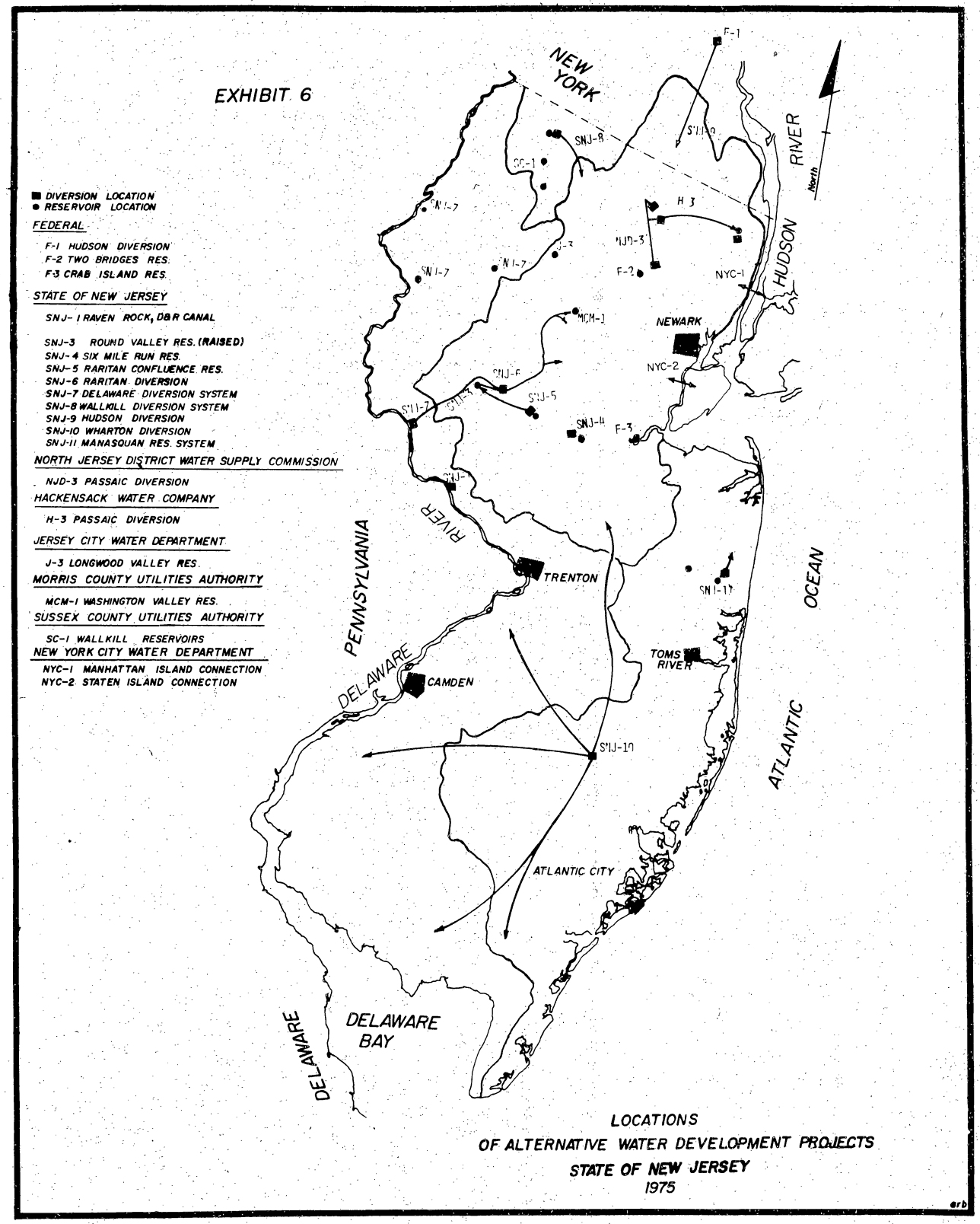
- groundwater recharge schemes for treated wastewater effluents by well injection, recharge basins and spray irrigation;

- industrial reuse of second class water recovered from wastewater treatment plants;

C. Taking full advantage of all relevant and available information, reports, and records, develop a data bank to carry out the analysis of the alternatives. In particular, the consultant is expected to utilize the ongoing Section 208 studies, all relevant water quality planning reports, National Water Commission reports, Tocks Island studies, and Northeast Water Supply Study reports. During the analysis, detailed attention should be directed at identifying and explaining all major features and aspects of each project.

EXHIBIT 5. MAJOR WATER SUPPLY PROBLEMS, ISSUES AND ALTERNATIVE PROJECTS

Water Supply Study Regions		Major Problems or Issues	Alternative Projects
Region 6:	Delaware Basin tributaries north of Trenton and Wallkill Basin (Warren and portions of Sussex, Morris, Hunterdon & Mercer Counties)	. Further export of the regions surface supplies to the Northeast . Coordinated management and development of water quality & water supply facilities . The extent of available ground water reserves . Lack of backup for the Trenton Water System	. Delaware River development projects - direct diversion with storage in the Delaware Basin at Flat Brook, Honey Run & Musconetcong - direct diversion with storage in the Raritan & Passaic Basins - high flow skimming with storage in the Raritan & Passaic Basins - combinations of the above . Wallkill development for in-basin use or diversion to Passaic Basin . Localized development of ground water
Region 5:	Burlington, Camden & Gloucester Counties	. Protection of Camden wellfields . Prudent management of groundwater . Protection of Pine Barrens water resources	. Localized development of ground water . Conjunctive use/management of water resources
Region 4:	Salem and Cumberland Counties	. Groundwater contamination . Protection of Pine Barrens water resources . Prudent management of groundwater . Saltwater intrusion	. Localized development of ground water . Conjunctive use/management of water resources
Region 3:	Cape May and Atlantic Counties	. Protection of the Pine Barrens water resources . Saltwater intrusion	. Localized development of ground water . Conjunctive use/management of water resources
Region 2:	Ocean and Monmouth Counties	. Saltwater intrusion . Overuse of the Englistown formation . Isolated water service areas . Protection of Pine Barrens water resources	. Localized development of ground water . Conjunctive use/management of water resources . Upper and Lower Manasquan Reservoirs
Region 1:	Raritan, Passaic and Hackensack Basins (Middlesex, Somerset, Union, Essex, Hudson, Bergen & Passaic Counties, & portions of Monmouth, Mercer, Hunterdon, Morris, and Sussex Counties)	. Transfer of Raritan basin water to urban Northeast . Weakness in available water system backup during disaster events . Positive and negative effects of suburbanization . Overdrafting safe yields by several major systems . Establishment of design drought and minimum stream flow requirements	. Confluence Reservoir, Pump Station, and Force Main . Raritan-Passaic Pipeline . Two Bridges Pump Storage to Wanaque Reservoir . Wanaque-Oradell Pipeline . Raise D & R Canal to 100 MGD capacity . Six Mile Run Reservoir . Washington Valley Reservoir . Evaluate options available to encourage base load use at D & R Canal . Raise dams and dikes at Round Valley . Raritan-Raritan Pipeline . Delaware-Raritan Pipeline . Hudson River Development Proj. -pipeline to Little Falls for continuous skimming -high flow skimming with storage in NY State and inchannel flow to Little Falls -high flow skimming with storage in the Passaic Basin via pipeline to Little Falls . New York City Diversion from - Staten Island - Manhattan (G.W. Bridge) . Longwood Valley Reservoir . South River Tidal Dam . Two Bridges Reservoir . Little Falls-Oradell Pipeline . Crab Island Reservoir



LOCATIONS
OF ALTERNATIVE WATER DEVELOPMENT PROJECTS
STATE OF NEW JERSEY
1975

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D. On a region by region basis, analyze and evaluate alternative projects within each region taking great care to specify the positive and negative characteristics of each project; i.e. the monetary costs, technical conditions, environmental effects, social indications, and institutional and financial feasibility. (This analysis will provide a basic framework and data base for future detailed investment decisions. Therefore, the present evaluations will not need to match future water development schemes against a quantitative schedule of projected demand. Conversely, if the objective was immediate investment decisions, far more refined analyses would be necessary.)

1. Special attention shall be paid (but not be limited to) the following review considerations and characteristics in the evaluation of individual projects:

   - flexibility of projects to meet a variety of future conditions;

   - evaluation of the phased development potential for individual projects;

   - the potential for land development to impact upon the quality or quantity of water supply from a given project;

   - the identification of projects which reflect major directions in decision-making;

2. The evaluations of this work item shall also address the following specific policy oriented questions:

   - Re-analyze past decisions to acquire reservoir sites. Ascertain if these decisions are still applicable, and if additional sites should be proposed as additions to the State acquisition program.

   - Conduct a detailed exploration of the degree and manner in which reuse of wastewater will influence or impact upon existing and future sources of water supply. In particular, study the advisability of continuing or revising the current State policy of transmitting raw water supplies in-channel, with particular focus on the impact to the quality of the water, emergency situations and conservation needs, and long term treatment costs.

- Evaluate the opportunities available to encourage the use of the Delaware and Raritan Canal for base load purposes in order to raise annual average use of this facility. Examine how pricing policies, substitution of supply, or conjunctive management opportunities of the various users could facilitate the achievement of this objective.

E. Combine the individual projects within the various regions into a series of alternative programs of development. The various combinations shall be keyed into major analysis divisions on a Statewide basis, where the various analysis divisions are composed of representative selections from each of the following major variables (options) in future water supply decision making.

1. Major Water Supply Development Options:

   - only Delaware River development
   - only Hudson River development
   - both Delaware and Hudson River development
   - neither Delaware or Hudson River development

2. Future Minimum Stream Flow Requirement Options:

   - high estimates of future minimum stream flow requirements
   - low estimates of future minimum stream flow requirements
   - existing minimum stream flow requirements

3. Interconnection Arrangement Options:

   - a greatly expanded network of interconnection
   - the existing system of interconnections

For each combination of the above options there should be a best practicable selection of other projects to meet regional needs, and also a corresponding estimate of costs and environmental and other review factors. The sensitivity of various water development programs to high, medium or low growth conditions shall also be discussed in detail.

F. In conducting the above analyses, all rationale is to be presented in precise and understandable terms, in order for the Department and the public to have a clear understanding of how alternative strategies are defined, evaluated and compared. Where alternatives are dismissed, there should be a full explanation. Moreover, all written presentations of the above analyses shall be made in a manner which will facilitate understanding on the part of policy makers and the body public.

G. Develop a selection methodology and approach that will enable State decision makers to indicate the basis for determining and selecting the most important projects and programs, and for evaluating the consequences of those decisions.

TASK 4. An Interconnections Program

The formulation of a realistic and attainable system and program of interconnections represents a fundamental goal of this planning effort. The contract activities in this area are:

A. Utilizing the interconnections map of 1943, the interconnections work developed by the Northeastern Water Supply Study, the interconnections information that may be obtained from the major purveyors, the data base assembled in Task 1., and whatever additional data that may be needed - analyze the safety and stability of the water supplies of the major cities and purveyors, to ensure protection against emergency disasters such as the Trenton water crisis of September 1975.

B. Analyze the basis and ability of each major system to back up other water supply systems on both an emergency and long term condition.

C. Suggest criteria and circumstances which define the cases in which an interconnection system and program will need to be instituted. This identification should be done in terms of each of the State's six regions.

D. Recommend the situations where interconnections and transmission facilities are to be rehabilitated, upgraded, or newly constructed. Determine the costs and relative importance of each situation.

E. Recommend an emergency response plan and program that should be instituted when employing the interconnections for a crisis situation. This emergency response plan and program should include (but not be limited to):

   1. prearranged information, communications, and publicity approaches;

   2. coordinated arrangements with civil defense and disaster control agencies and authorities;

   3. establishment of emergency manpower and financial resources.

TASK 5. Contingency Plans

The availability and implementability of drought or contingency plans to assure adequate water supply during stress conditions is a primary component of this planning effort. The contract activities in this area are:

A. Determine the capabilities of each major water system to sustain both an intensive one-year drought (example, 1957) and a multi-year drought (example, 1961-1965).

B. Determine the capabilities of each of the six State regions to sustain both the intensive one-year and multi-year drought.

C. Formulate a phased program of measures and approaches that should be instituted and utilized to respond to understood indicators of drought(s) severity. Among the measures and approaches to be considered (but not be limited to) are:

1. the orderly institution of water reduction measures through load shedding and decreasing water pressure;

2. the institution of emergency pricing schemes;

3. a prearranged determination of priorities for highest value water uses. (Refine and define highest value uses.)

4. the determination of necessary arrangements for emergency transmission and the installation of pumping facilities;

5. the identification and utilization of resources which are normally dedicated to other uses - i.e., Lake Hopatcong, Greenwood Lake, legislatively mandated minimum stream flows, etc.

TASK 6. Conservation Plans

The development and institution of an ongoing conservation program(s) to reduce demand and to ensure the most prudent allocation of water resources is fundamental to any water resource planning effort. The contract activities in this area are:

A. Using the Comprehensive Study of the Tock's Island Lake Project and Alternatives, The National Water Commission Reports, and recommendations by the water supply industry as a starting point, formulate policies and programs which will foster meaningful conservation of the State's water supply resources. Some specific subjects and areas to be examined in this analysis should include (but not be limited to):

1. An evaluation of the effectiveness and efficiency of metering programs, and an identification of all major systems in need of remedial or corrective action.

2. An evaluation of losses from distribution and transmission systems and precise estimates of the remedial or corrective action needed.

3. An evaluation of wastewater as a second class of supply for industrial needs, or agricultural irrigation; and the locating of certain industries to maximize use of salt and brackish waters, including the potential impact of relocation on the existing infrastructure systems.

4. An evaluation of pricing policies and schedules including the institution of inverted bulk pricing policies.

5. An evaluation of industrial water use reduction as a result of P.L. 92-500 treatment and pre-treatment requirements, and the reuse of wastewater effluents for potable purposes. (Distinguish between reuse or recycle solutions, the outright elimination of certain processes, and consider separately surface water and groundwater opportunities).

6. An evaluation of the adequacy of Uniform Building Codes or comparable measures to force utilization of water saving plumbing devices and approaches.

   - identify national and other codes in present use

   - analyze the adequacy of these codes and identify important provisions or features which would be desirable for use in New Jersey

- suggest methods for implementing desirable features

B. Evaluate the significance of each proposed policy or program (A above), and forecast its impact in as quantitative manner as possible.

C. Develop both short term and long term conservation plans which incorporate the most promising features of the individual policies and programs studied above.

TASK 7. Watershed Resource Management Activities

The following contract activities concern watershed resource management frameworks and plans needed to assist in decisions on water supply diversion applications.

A. Develop the contents, methodology and procedures for the conduct of watershed resource management plans in a manner that insures compatibility with federally mandated water quality management basin plans (Basin Plans under Section 303e of P.L. 92-500). The principal outputs of such plans shall be hydrologic water budgets for surface streams and groundwater aquifers, respectively.

B. Prepare watershed resource management plans for the surface waters within five (5) basins.

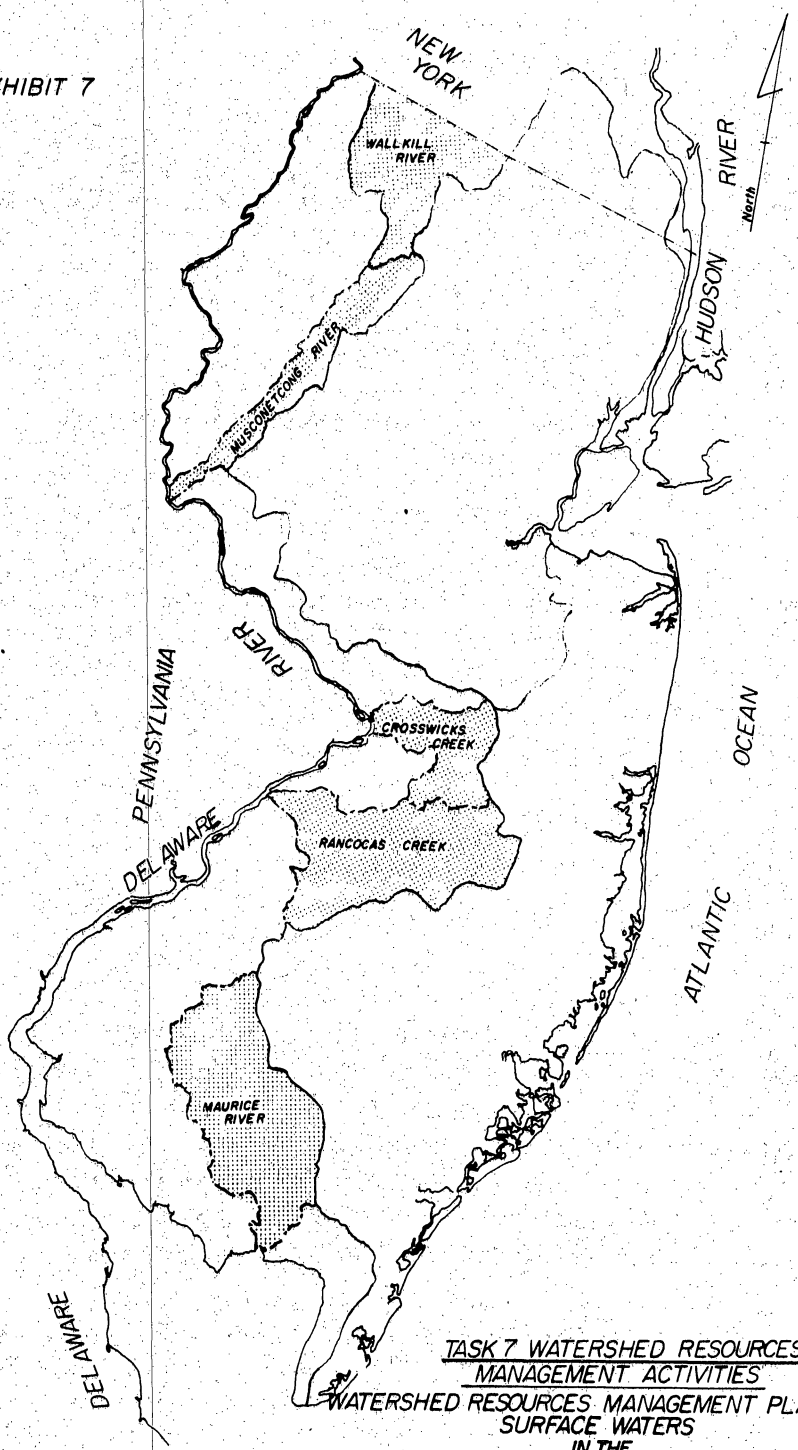
1. The basins to be studied are depicted on Exhibit 7 and include: Wallkill River Basin, Musconetcong River Basin, Crosswicks Creek Basin, Rancocas Creek Basin, and Maurice River Basin.

2. These plans shall upgrade and organize the data base for review of particular water resources diversion issues, producing an orderly framework within which individual applications can be viewed. Also, the impact of water reuse potential caused by wastewater releases to freshwater streams is to be carefully evaluated, and the short and long run threats to the integrity of the supply are to be discussed.

3. The plans shall also identify and develop practical approaches to improving the efficient utilization of the water resources available for diversion. Particular items for consideration include the advisability and the feasibility of withdrawing water at higher rates during high water periods (days), the conjunctive management of surface and groundwaters, and appropriate conservation measures and programs.

C. Prepare a program for the investigation and management of groundwater in New Jersey, taking full advantage of investigations conducted by the Division of Water Resources and its predecessor agencies; the State Bureau of Geology; the United States Geological Survey, and the Delaware River Basin Commission. Among the topics to be considered (but not be limited to) are:

EXHIBIT 7



TASK 7 WATERSHED RESOURCES MANAGEMENT ACTIVITIES

WATERSHED RESOURCES MANAGEMENT PLANS FOR SURFACE WATERS IN THE MAURICE, MUSCONETCONG AND WALLKILL RIVERS AND THE CROSSWICKS AND RANCOCAS CREEKS DRAINAGE BASINS

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1. formulation and development of guidelines for groundwater management;

2. inventory of the degree and extent of groundwater pollution problems and contamination;

3. documentation of regions where groundwater tables are stressed by existing levels of withdrawals;

4. evaluation of the existing groundwater monitoring programs and the relationship of groundwater withdrawals to stream flow;

5. establishment of priorities for subsequent detailed groundwater investigations with an emphasis on activities that will lead to improved regulatory diversion decisions and better management of the resource;

6. in specific problem areas, development of solution oriented strategies which might include time related studies, hydrologic models, or scopes of work for subsequent investigations.

TASK 8. Regulatory System Management and Administrative Activities

Establishing an administrative process and regulatory programs and procedures are two of the most important elements of this planning effort. The contract activities in this area are:

A. Perform a detailed accounting of the Water Policy and Supply Council's legally mandated functions, as well as those of the Division of Water Resources. From this analysis, segregate the quasi-judicial functions from those that are of an administrative nature (such as planning). Provide a realistic projection of the time that will be required for the Water Policy and Supply Council to carry out its quasi-judicial responsibilities in processing applications for water supply diversions.

B. Develop a detailed set of regulations to govern the operations and procedures of the Water Policy and Supply Council. This would specify the requirements for all applicants, as well as the procedures that must be followed by the Water Policy and Supply Council in reviewing and evaluating applicant's proposals.

C. Analyze the existing statutory and program relationships between the Public Utilities Commission and the Division of Water Resources. Develop regulations to require a common set of reporting requirements for use by both agencies. Also, develop a proposed set of principles that could be used by the Division of Water Resources in the event that the Division wished to take a public stance on purveyors' applications for rate increases.

D. Establish the procedures for the review and adoption of water supply plans developed by regional and other water purveyors. Additionally, develop the process whereby the State Water Supply Master Plan could be updated from time to time.

E. Develop a regulatory and administrative program for dealing with the water quality, service, and financial problems of small water companies. This program is to consider factors including interconnections, backup supplies, institution of a cooperative program for regulation of these small water companies by the Division of Water Resources, the Department of Community Affairs and the Public Utilities Commission, and the means whereby their proliferation can be controlled.

F. Analyze the State's potable water monitoring, surveillance and enforcement program and identify the alterations which would have to be made to meet the requirements of the Federal Safe Drinking Water Act.

G. Identify the procedures that the State will employ to cause necessary water treatment facilities to be constructed as required. Include in this analysis the consideration of expanded legislation to reinforce existing regulatory powers, the use of a construction grants-in-aid and loan program, and the use of State funds to accomplish these ends.

H. Analyze the principles upon which the top dozen (12) major purveyors (in volume of water diverted) have developed their pricing systems. Attempt to associate the price of water with various cost ingredients such as raw water costs, cost of treatment, and costs of distribution. Also, examine the feasibility and practicality of establishing a bulk rate transfer fee or standard charge for wholesale water transferred through interconnections. Consider a fixed uniform fee, specified ratchet schedules, sliding schedules and others.

I. Recommend a revised set of water-related fees to generate revenues sufficient to cover the costs of water supply administration and regulation.[1] Specifically:

   1. Develop a simplified set of application fees that cover the costs of the hearings and administrative efforts required to support the Water Policy and Supply Council in its review of applications;

   2. Expand existing surface water diversion fees into a comprehensive set of general diversion fees that would be required for the use of both surface and groundwater.

   3. Describe the impacts of various water fee alternatives on small and large retail customers, and resales of wholesaled water. Also, discuss the steps that would have to be taken with the Public Utilities Commission to allow these general diversion fees (but not penalty fees) to be passed through to users;

   4. Propose economic deterrents for overdrafting surface or groundwater supplies, as well as depletion for statutory minimum flows.

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[1] This fee analysis may be developed before the State Water Supply Master Plan commences.

TASK 9. State Water Utility Operations and Activities

The formulation of attainable and acceptable plans and programs for conducting the State's Water Utility Operation and Activities on a sound fiscal basis is a necessary part of this planning effort. The contract activities in this area are:

A. Using the County and Municipal Government Study Commission's report, Water Supply Management in New Jersey, as a starting point - compare and contrast in quantitative and qualitative terms, alternative arrangements and approaches for placing the State's Water Utility Operations on a self-supporting basis.

B. In terms of the alternative approaches identified in the preceding subtask A., specify the economic, fiscal, legal and political consequences of each approach.

C. Analyze in detail alternative approaches for financing future State water development. Specifically, examine the following options or any combination thereof:

   1. utilizing general obligation bonds with capital cost recovery requirements;

   2. utilizing revenue bonds with user fees being the means to recover capital costs;

   3. utilizing revenue bonds and a revolving fund to provide capital for the front end costs of water development projects.

D. Recommend an approach and the feasibility for generating a front end source of capital to finance future State Water development projects in their early years when expenses generally exceed revenues.

E. Analyze the alternative approaches available for pricing the water developed from future State projects. Specifically, examine the following options or any combination thereof:

   1. indicating a uniform price for all newly developed State water projects;

   2. indicating a project-by-project pricing of water;

   3. indicating the feasibility of including existing State water projects into a uniform or rolled in pricing system.

F. Recommend an approach and means whereby the State water utility operations can be managed on a self-supporting basis. The analysis should include (but not be limited to) the following:

1. the ability to implement a standard utility accounting system;

2. the ability to have water fees generate sufficient revenues to satisfy statutory requirements (or the appropriateness of the statutory requirements);

3. the ability to establish and sustain reserves for deferred operations, maintenance and capital improvements.

TASK 10. Legal Studies Activities

Assuring the clarification and resolution of the legal issues and questions that impact upon and evolve from the prior tasks and work items, is an integral part of the planning effort. Although additional legal issues are incorporated directly in other task areas where they have an impact, the contract activities in this area are:

A. Analyze the significance, extent and impact of groundwater "grandfather" diversion rights, as well as direct Legislative grants for surface water. Describe and discuss the legal, economic, technical and environmental impacts of maintaining or eliminating "grandfather" rights.

B. Identify and discuss the constituent elements of a comprehensive diversion rights law for surface and groundwater. Formulate a draft bill incorporating the results of this analysis.

C. Analyze the feasibility of allowing political subdivisions of the State of New Jersey to reserve diversion rights into the future.

D. Evaluate New Jersey's legal rights to Delaware River water, focusing upon how those rights might result in a large Delaware River diversion into Northeastern New Jersey. Determine the specific means whereby a large diversion could come about without the Tock's Island Lake Project. Particular attention should be given to the Comprehensive Review Study of the Tocks Island Lake Project and Alternatives recently conducted by the Army Corps of Engineers where this question was addressed.

E. Examine the prospects and alternative legal mechanisms available for New Jersey to gain access to water rights on the Hudson River with emphasis on the role of the Army Corps of Engineers to oversee the timely development of water supplies through their Northeast Water Supply Study Authorization. Delineate the steps and procedures necessary for New Jersey to participate in a Hudson diversion.

D. SCHEDULE OF PERFORMANCE AND OUTPUTS

A careful review of the contract tasks delineated in the previous section of this Program Design suggests that the end results of the State Water Supply Master Plan study will not be a plan per se, but rather a series of investigations which will increase understanding of the State-wide water supply management program. Thus a structure, a process, a series of tools, and a fundamental level of understanding will be developed that will greatly assist in future water supply decision-making. Committing funds to developing basic analysis tools and resources will lengthen and increase the value of present day planning efforts by minimizing the pyramid of assumptions normally required to arrive at definitive and rigid plans.

The Schedule of Performance and Outputs which appears as Exhibit 8 reflects the large number of areas in which analyses are expected to be carried through to the preparation of individual draft and final outputs dealing with specific work items. Certain of the draft outputs for particular work items may be combined for final output presentation. Some discretion will be afforded the consultant in establishing revisions to the schedule of final outputs. Conversely, draft outputs for individual work items should be produced to stand as separate reports in accordance with provisions of Exhibit 8.

EXHIBIT 8. SCHEDULE OF PERFORMANCE AND OUTPUTS

TASK	WORK ITEMS (S)	DESCRIPTION	ANALYSIS & EVALUATION PERIOD (1)	DRAFT OUTPUT DUE (1)	FINAL OUTPUT DUE (1)
1	A,B,C	Data Base Assembly	0- 6	-	-
	D	Compile and Present Information	-	9	12
	E,1	Design Drought Analysis	6-10	12	15
	E,2	Interconnections Map	6-10	12	15
	E,3	Deficits of Major Purveyors	6-10	12	15
	E,4	Self-supplied Industrial & Agricultural Use	6-12	14	16
	E,5	Capital Needs Survey	0- 6	9	12
	F	Evaluate Information System	12-15	16	18
2	A	Trends & Patterns of Population & Water Use	0- 4	6	9
	B	Problem Summaries for each Water Supply Study Region	3- 5	7	9
	C	Analyze Implications of Needs	5- 7	8	9
	D	Recommend a Projections Approach	12-15	18	21
3	A,B	Determine Alternative Projects & Issues to be Studied	0- 6	7	30
	C	Develop Data Bank Needed to Analyze Alternative Projects	4- 8	12	30
	D	Analyze & Evaluate Alternative Projects	6-15	18	30
	E	Combine Projects into Programs of Development	15-24	27	30
	F	Presentation of Results	-	-	-
	G	Develop Selection Methodology	18-24	27	30
4	A,B,C	Analyze Interconnection Needs	6-12	15	24
	D,E	Recommend New Interconnections and Emergency Response Plan	12-15 15-18	18 21	24 24
5	A,B	Determine Capabilities to Sustain a Drought	9-15	18	27
	C	Formulate a Program to Address Drought Situations	15-21	24	27
6	A	Formulate Conservation Policies & Programs	6- 9	12	27
	B	Evaluate Significance of Policies & Programs	9-15	18	27
	C	Develop Conservation Plans	15-21	24	27
7	A	Develop Contents & Methodology for Watershed Resource Management Plans	6- 9	12	15
	B	Prepare Watershed Resource Mgmt. Plans for Five Basins	9-21	24	27
	C	Prepare Groundwater Management Program	12-18	21	24
8	A	Accounting of WP & SC Functions	0- 4	6	9
	B	Regulations Governing WP & SC	3- 9	12	18
	C	Relationship of PUC & DWR	3- 9	12	18
	D	Procedures for Review, Adoption and Updating of Plans	3- 9	12	18
	E	Develop a Small Water Company Program	9-15	18	21
	F	Analyze Potable Water Program	9-15	18	21
	G	Procedure to Cause Water Treatment Facilities to be Built	3- 9	12	18
	H	Principles of Major Purveyor Pricing Systems	12-18	21	24
	I	Recommend Water-related Fee System	0- 6	8	10
9	A,B,C	Analyze Alternative Approaches for Financing	3-15	18	30
	D,E,F	State Water Utility Operations			
10	A	Analyze Significance of "Grandfather" Diversions or Grants	0- 6	7	9
	B	Identify a Comprehensive Diversion Rights Law	12-16	18	21
	C	Study Possibility of Reserving Diversion Rights for Future	6-12	15	18
	D,E	Evaluate N. J.'s Diversion Rights to the Delaware & Hudson Rivers	0- 9	10	12

(1) All Numbers are expressed in months from the start of the study.

The study period for consultant activities is limited to thirty (30) months with most evaluations and analysis completed within the first eighteen months; and many draft and some final outputs scheduled for completion in the initial two year period of the study.

Months 31 through 36 of this three year study are reserved for review of final outputs by the public and the Department.

Public participation is an important and ongoing activity associated with this study. In addition to an exploratory session scheduled at the start of the project, and a final session at the conclusion of the study period, approximately 5 to 7 sessions will be scheduled during the consultant's thirty month work period to review important draft outputs. At a less formal level, numerous meetings will be held with the several committees serving in a review capacity for this project. It is anticipated that about 40 informal presentations will be required of the consultant.

Throughout the conduct of the study, the Study Management Control System will be updated on a bimonthly basis. Updating will include any necessary revisions to the CPM work sequence diagram and associated cost accounting system.

E. RESPONSIBILITIES OF THE STATE AND THE CONSULTANTS

Both the Division of Water Resources in the Department of Environmental Protection and the selected consultants have a

number of responsibilities that are closely related. After the consultants for the State Water Supply Master Plan are selected, the metes and bounds of responsibilities are to be firmly established. This section provides a general framework upon which final responsibilities are to be based.

It will be the responsibility of the consultant to utilize all applicable data and studies from Federal and State agencies, county and municipal governments, and water purveyors. All of these agencies and studies stand as resources to be drawn upon throughout the performance of the New Jersey State Water Supply Master Plan. Some of the more important references are listed in Exhibit 9.

Once the consultants are selected, they will be responsible under supervision of the Program Manager, for developing a work sequence diagram (or CPM) that details the active work effort by work item, thus providing a tool for monitoring progress. This activity is designed to refine the scope of work and provide a basis for financial monitoring. Finally, the CPM diagram should allow for compatibility if multiple consultants are selected and will be computerized by the Department, to facilitate any alterations that may occur.

Monthly meetings will be held between the Program Manager and consultants, as a minimum requirement. Monthly progress reports will be submitted by the consultants to identify areas of progress and opportunities, as well as unanticipated problems that may

EXHIBIT 9. SELECTED REFERENCES

County and Muncipal Government Study Commission. Water Supply Management In New Jersey, Executive Summary. March, 1975.

Elizabethtown Water Company. Report Upon Water Supply For Northern New Jersey. February, 1970.

Institute for Environmental Studies, Rutgers University. New Jersey Trends. September, 1974.

State of New Jersey. The Governor's Commission to Evaluate the Capital Needs of New Jersey. April, 1975.

State of New Jersey, Interdepartmental Committee. Interim Report of the Interdepartmental Committee on State Water Supply Needs. July, 1974.

State of New Jersey. Legislative Commission on Water Supply. Survey of New Jersey Water Resources Development. December, 1955.

Temporary Commission on the Water Supply Needs of Southeastern New York. Supplying Water For Tomorrow - Final Legislative and Program Recommendations. February, 1975.

U. S. Army Corps of Engineers. Comprehensive Review Study of the Tocks Island Lake Project and Alternatives. 5 Volumes, 1975.

U. S. Army Corps of Engineers. Critical Choices for Critical Years, An Interim Staff Report on Alternative Water Supply Programs for the Northern New Jersey - New York City - Western Connecticut Metropolitan Area. 1975.

U. S. Army Corps of Engineers. Engineering Feasibility Report on Alternative Regional Water Supply Plans for the Northern New Jersey - New York City - Western Connecticut Metropolitan Area. November, 1971.

U. S. Army Corps of Engineers. Legal, Institutional and Cost-Sharing Responsibilities for Implementing Water Supply Projects in the Northern New Jersey - New York City - Western Connecticut Metropolitan Area. June, 1973.

New Jersey Statutes Annotated. 1966. Applicable citations as follows:

N.J.S.A. 13:1D - 1 et seq. General Department of Environmental Powers.
N.J.S.A. 13:13 - 1 et seq. Delaware and Raritan Canal.
N.J.S.A. 58:1 - 1 et seq. State Water Policy Commission
N.J.S.A. 58:2 - 1 et seq. Payment to State for Waters Diverted.
N.J.S.A. 58:4A - 1 et seq. Subsurface and Percolating Waters.
N.J.S.A. 58:5 - 1 et seq. North and South Jersey Water Supply Districts.
N.J.S.A. 58:20 - 1 et seq. Round Valley Reservation.
N.J.S.A. 58:21 - 1 et seq. Spruce Run Reservation.
N.J.S.A. 58:21A - 1 et seq. Manasquan and South River Reservations.
N.J.S.A. 58:21B - 1 et seq. Additional Water Supply Site Reservations.
N.J.S.A. 58:22 - 1 et seq. State Water Supply

force a refocusing of a portion of the study.

It will be the responsibility of the Program Manager to secure time of the Commissioner, Department of Environmental Protection, and Director, Division of Water Resources, for exchanges with the consultants. Additionally, the Program Manager will make every effort to assist the consultants in arranging meetings with public and private officials.

For the Department, the Program Manager will serve as the official contact point as far as consultants are concerned. The consultants will designate an Officer-in-Charge, a Project Manager, and necessary project staff. It will fall to the Officer-in-Charge to be responsible agent of the study consultant to the Department in satisfying contract requirements and the quality of work. It is expected that the consultant's Project Manager will handle the day-to-day supervision of the study for the consultants and will be responsible for reporting to the Department and keeping the study on course. The Program Manager and the consultants are to establish their formal working relationship at the outset of the study.

It will be the duty of the Department to review the format for draft and final outputs, as well as the quantity to be produced and the manner in which they will be reviewed, approved or disapproved, and circulated. In conjunction with the Program Manager, the consultants will prepare a tentative outline and table of contents for the various study outputs.

P A R T III.

A P P E N D I X

PART III. - APPENDIX

SYNOPSIS OF THE PUBLIC INFORMATIONAL HEARING ON THE PROGRAM DESIGN FOR THE STATE WATER SUPPLY MASTER PLAN

A public informational hearing was conducted by the Water Policy and Supply Council at Rutgers University on July 15, 1975. Because of inclement weather conditions only seven speakers made presentations, however over 20 written comments were submitted prior to the close of the record on July 18, 1975.

As a result of comments presented by the various respondents, several changes have been made in the text of the Program Design to clarify intent, to strengthen presentation and to close gaps in the draft document. In addition several major policy issues were raised in the hearing comments which require individual responses. These most critical issues are listed in the succeeding paragraphs followed by specific responses to each issue.

Issue: Specify in greater detail the procedures and requirements for comprehensive public and intergovernmental participation program.

Response: Some changes have been made in the text of the Program Design, however the degree of detail sought is considered beyond the scope of this document. It is expected that one of the early responsibilities of the Project Management Team, following the selection of consultants, will be the development of a detailed program of public participation.

Present thinking on the matter of public participation has been limited to the identification of a proposed schedule for public participation sessions (see Exhibit 8, Schedule of Performance and Outputs), and a general definition of vehicles or forums to be used for the public participation program. Because of their statutory responsibilities, the Water Policy and Supply Council is expected to continue as the official forum for public hearings on the State Water Supply Master Plan.

A working committee structure to provide for less formal, and more direct input into the study is also proposed. The several working committees should represent a variety of interests from the government, the private sector and the public at large. Among the probable working committees under consideration are the following:

- A Statewide Water Supply Purveyors Advisory Committee to be created by adding several members from South Jersey to the Northeast Water Supply Purveyors Advisory Committee. This group would represent the water industry in general as well as key federal regulatory or operating agencies (namely EPA, ACOE, USGS, and DRBC).

- The Governor's Interdepartmental Committee on State Water Supply Needs which recommended this study.

- A Planning Agency Committee composed of representatives of the 21 county planning boards, Delaware Valley Regional Planning Commission, Tri-State Regional Planning Commission, and the Hackensack Meadowlands Commission.

- Subcommittees of specialized interest groups such as watershed associations, and environmental, industrial, commercial and labor organizations.

Issue: Relate water supply issues and problems to overall state policies and programs, federal water related programs, and local land use determinations.

Response: Over the years, a serious debate has emerged among planners over the proper approach to preparing a comprehensive development plan in relation to individual functional plans like water supply. Can functional plans be prepared in the absence of a comprehensive plan, or do comprehensive plans originate from a well-developed set of functional plans for water supply, water quality, transportation, etc.?

It is suggested that sound functional plans for water supply and other areas must precede the "grand design," and in fact contribute a knowlege base necessary to develop a meaningful comprehensive plan. Therefore, the focus of this present planning effort will be the development of a sound set of water supply management plans. In the process of developing water supply plans, every attempt will be made to consider the relationship of these plans to overall state policy, federal programs, local land use concerns and water quality issues.

Issue: The relationship between water supply plans and water quality plans must be emphasized.

Response: Careful coordination will be mandated in the conduct of this water supply plan to assure that maximum interaction and exchange occurs with parallel water quality planning efforts. A basic tenet of this study is that water supply plans must be compatible with the large number of facilities and areawide wastewater plans presently under development. It is expected that certain outputs of the State's Northeast Water Quality Management Study and the various 208 Areawide Waste Treatment Management Studies will be direct inputs into the water supply plan. However, it must be understood that water quality concerns will be limited to the manner in which these concerns may potentially impact on water supply planning issues.

Issue: The study objectives have not been identified in a clear and distinct manner.

Response: The objectives and goals of this study appearing in Part I Section E are highly refined operational objectives which seek to strengthen the water supply function to a level commensurate with present and future public needs. These goals reflect a comprehensive understanding of the water supply function and assure compliance with a set of general policy oriented objectives including the following:

- The provision of adequate supplies of water for New Jersey's future needs at times and places as required.
- The assurance that water supplied is of a quality suitable for the intended use.
- The minimization of economic costs, and environmental and social impacts associated with the acquisition of necessary water supplies.

Issue: The time period allocated for this study may not be adequate.

Response: It is recognized that all of the answers cannot be developed in a three-year period. However, most work tasks presented can be addressed in this period of time. Where measurements over a period of years might be needed, programs should be defined to obtain the necessary information.

Issue: Allow interest groups to participate in the consultant selection process.

Response: Consultant selection is a state responsibility which must be carried out under a rather tight time schedule. Opening the selection process to general participation by the public could only result in unnecessary delay and confusion. The detailed selection process and individual proposal evaluations will be course be open to

public examination upon selection of the project consultant(s). It should be emphasized that the "modified bid approach" adopted by the State for selection of consultants for the Northeast New Jersey Water Quality Management Study was widely acclaimed as a model approach to consultant selection. A similar approach will be followed for selection of water supply master plan consultants.

Issue: Emphasize the need to use existing data whenever it is available.

Response: The State will not tolerate duplication and unnecessary expenses resulting from a large data acquisition program when such data has previously been compiled. Conversely, it will be extremely important for consultants to make judgments regarding the quality of available data. The collection of inadequate or marginally useful data is also to be avoided.