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MAY 31 1963

DELAWARE RIVER BASIN COMMISSION

COMPREHENSIVE PLAN

PHASE I.

ADOPTED MARCH 28, 1962

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WALTER M. PHILLIPS, Acting Secretary

WILLIAM MILLER, Acting Counsel

NO. 62-4

A RESOLUTION by the Delaware River Basin Commission to adopt Phase I of the Comprehensive Plan for the Delaware River Basin.

WHEREAS, Phase I of the Comprehensive Plan was tentatively approved by the Commission on February 6, 1962, subject to public hearing; and

WHEREAS, a public hearing was held by the Commission on Phase I of the Comprehensive Plan in Easton, Pennsylvania, on February 28, 1962, upon public notice duly given pursuant to the Compact; and

WHEREAS, the Commission has duly considered the views expressed at the said public hearing and all other communications received by the Commission, and has consulted with interested parties in accordance with the Compact; Now Therefore

BE IT RESOLVED:

1. The Comprehensive Plan, Phase I, as prepared and published for public hearing on February 28, 1962, a copy of which is annexed hereto and made a part hereof, is hereby adopted as and for the Comprehensive Plan authorized under Section 13.1 of the Compact.

2. The Commission staff is authorized and directed to cause sufficient copies of the Comprehensive Plan, Phase I, to be printed as, in its judgement, may be required for public use, and to make such copies available at a price covering the cost of printing and distribution; provided that copies for official use may be distributed without charge.

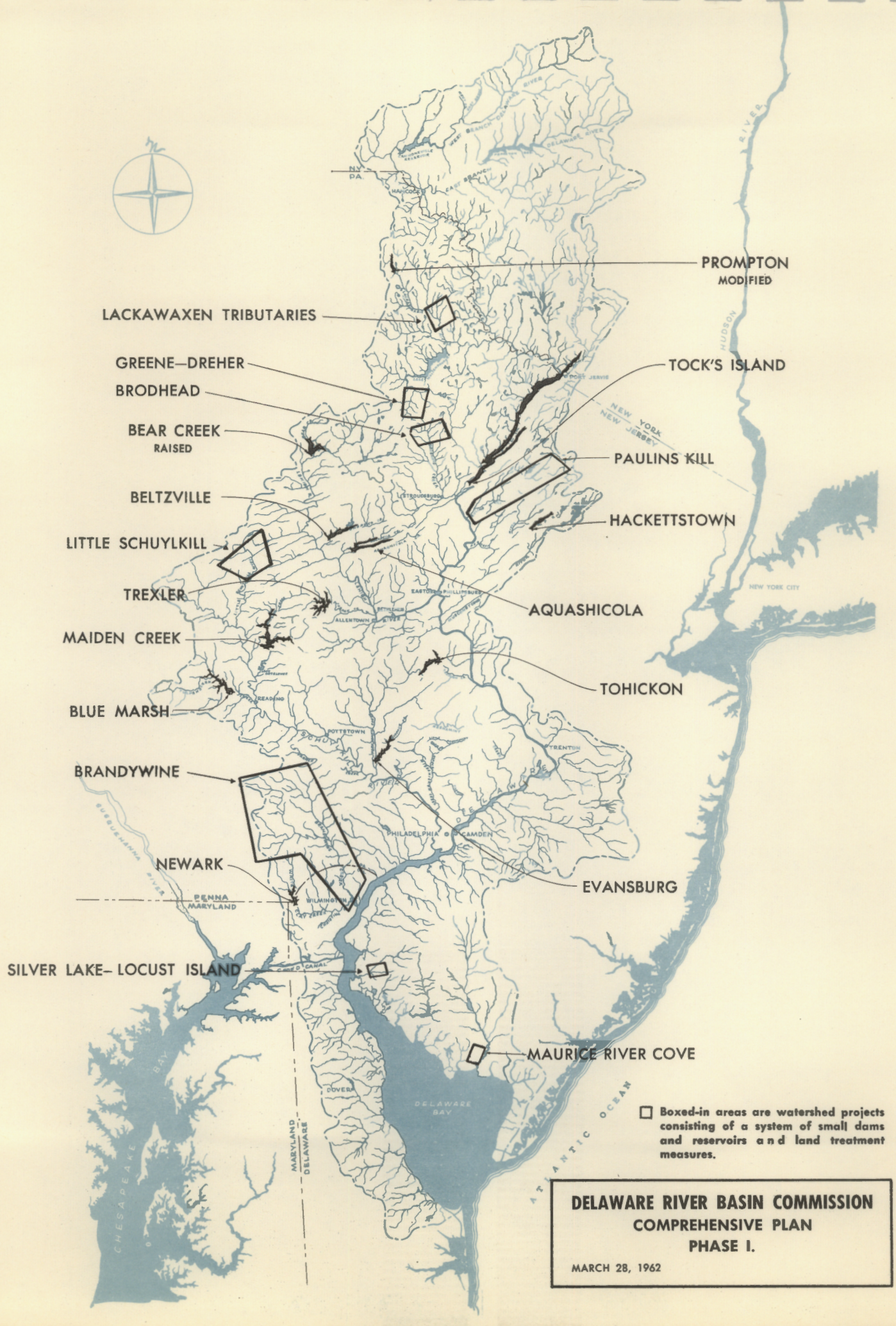
Adopted: March 28, 1962

David L. Lawrence

David L. Lawrence, Chairman

Walter M. Phillips

Walter M. Phillips, Acting Secretary



☐ Boxed-in areas are watershed projects consisting of a system of small dams and reservoirs and land treatment measures.

DELAWARE RIVER BASIN COMMISSION
COMPREHENSIVE PLAN
PHASE I.

MARCH 28, 1962

DELAWARE RIVER BASIN COMMISSION
COMPREHENSIVE PLAN

PHASE I

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COMPREHENSIVE PLAN

Phase I

Section I Authority, Purpose and Scope

a. **Authority:** The Commission is authorized and required to adopt a comprehensive plan under Sections 13.1 and 3.1 of the Delaware River Basin Compact. The plan may be adopted as a whole or in such parts as the Commission may deem appropriate.

b. **Purpose:** The purpose of the comprehensive plan, as set forth in the compact, is to provide an established framework of commission policy for the immediate and long-range development and use of the water resources of the basin. The completed plan will include all public and private projects and facilities which are required, in the judgment of the Commission, for the optimum planning, development, conservation, utilization, management and control of the water resources of the basin, in light of present and foreseeable future needs. Phase I of the plan, however, is limited to those projects and facilities which may be justified on the basis of existing studies and information, as compatible with the purposes of the compact.

c. **Scope:** The comprehensive plan, including its various parts, is intended to describe the general characteristics of river basin development which the Commission finds to be in the public interest. It does not mandate the construction of any project or the acquisition of any land. It provides only a flexible, growing and evolving general framework for the orderly development of the water and related resources of the basin.

Like the master plan or general development plan which is somewhat familiar in local government, the Commission's comprehensive plan will eventually include all of the chief factors, objectives and programs that will be involved in the development of the river basin. The plan will ultimately be a body of documents expressing a systematic set of policies and programs for the future, together with consistent means for carrying them out. It will be expressed in a variety of ways: through narrative text, maps, charts, schedules, budgets and even legislative text. It will be comprehensive in scope and unified in concept.

Continuing study of the needs of the basin will be the key to the growth and completion of the comprehensive plan. From time to time, therefore, specific projects and facilities and programs may be incorporated, deleted or modified to reflect changing conditions, research results and new technology. Changes in the plan will be adopted by the Commission only after adequate notice and public hearing.

Phase I includes specific projects and proposals, as well as basic economic premises, which can be accepted by the Commission at this time as conforming to the requirements of a comprehensive plan. In general, the criteria by which this acceptance must be measured are as follows:

The project must provide beneficial development of the water resources in a given locality or region;

It must be economically and physically feasible;

It must conform with accepted public policy; and

It must not adversely influence the present or future use and development of the water resources of the basin.

The plan does not prescribe any rigid details as to area, design or function. Even though the projects are described in the plan with some reference to technical characteristics, this is primarily for a better understanding of the type of project rather than any prescription of what may be required. Any of the projects may be modified in detail, location, acreage and other features as it moves from the present planning stage into the stage of design and blueprinting some time in the future, In particular, it should be noted that the specific acreage of lands to be acquired for any projects is not fixed by the comprehensive plan but is left to future determination when the specific project is authorized to be undertaken. Meanwhile, tentative taking lines have been indicated so as to allow adequate lands for recreation, watershed protection, conservation and other water resources purposes beyond the needs of flood control or water supply alone.

Financial arrangements for the various projects are also omitted from Phase I. Neither this phase of the plan nor any other part will mandate any expenditure by any public or private agency, or require any contribution to the cost of a particular project. All financial arrangements are left to be worked out in the future, project by project, in accordance with such proper cost sharing arrangements as may be found to be fair and reasonable at the time.

Section II Sources:

The Corps of Engineers, U. S. Army, with the assistance of other Federal and State agencies, has prepared and published a "Report On The Comprehensive Survey Of The Water Resources Of The Delaware River Basin" dated December 1960 and revised May 1961 (hereinafter referred to as Survey Report). Findings and recommendations of the Survey Report have been available to the public since May 29, 1961, and were the subject of four public hearings held by the Corps of Engineers during April and May 1960.

In addition to the Corps of Engineers' Survey Report, other studies of tributaries of the Delaware River have been completed by State and Federal agencies. Except where these other studies are referred to, the statistical and descriptive information set out in the following Phase I of Comprehensive Plan, has been incorporated from the Survey Report.

Maps of watershed projects have come from watershed work plans and have been prepared by the U. S. Department of Agriculture. Maps of the Tohickon and Locust Creek projects (plates 9 and 12-A) have been prepared by the Pennsylvania Department of Forests and Waters. All other maps have been incorporated from the Survey Report.

Section III Basin Characteristics:

The physical description of the Delaware River Basin as set forth in Chapter II of the Survey Report, and Appendix N thereof, and as summarized below, is hereby referred to and incorporated as background for Phase I of the Comprehensive Plan.

Stretching approximately 326 miles from head-waters to mouth, the Delaware River and its tributaries drain a 12,765 square-mile land area in the northeastern United States. Encompassed within the drainage basin are 2,363 square miles in southeastern New York, 6,422 square miles in eastern Pennsylvania, 2,969 square miles in western New Jersey, 1004 square miles in Delaware, and 8 square miles in Maryland. The area of Delaware Bay adds 782 square miles of water surface to the Delaware River system. On the basis of its physical characteristics, the Basin divides naturally into three general physiographic definitions, namely, the Upper, Central and Lower Regions.

The highlands of the southern Catskill and Pocono Mountains are the dominating characteristics of the Upper Region. Here is found the Basin's maximum elevation of 4,200 feet. Geologically the region is part of the "hard" rock area where bedrock is resistant to erosion. It is almost completely forested, with mixed hardwoods predominating, and almost totally glaciated. The region exhibits the characteristics of a plateau of flat-lying rocks cut by narrow valleys that have been deeply carved by the river and its tributaries. Mean annual temperature is 47 degrees. Mean annual rainfall varies from 60 inches in the mountains to 42 inches in the lower lying areas. Mean annual snow accumulation is 60 inches.

The Central Region extends from an upper limit generally marked by the Valley and Ridge physiographic province, with its pattern of parallel ridges running northeast to southwest, to a lower limit marked by the Fall Line, where there is a sharp drop of 250 to 350 feet in elevation to the Atlantic Coastal Plain.
The Fall Line forms an irregular south-facing escarpment between the undulating plateau and the Coastal Plain: it lies along a line passing through Trenton, New Jersey and Wilmington, Delaware. Within the Central Region important physiographic features include the Blue Mountain—Kittatinny Mountain Ridge, and the Great Valley extending northeast—southwest across the Basin. The region also lies in the "hard" rock area. Only its northeast portion has been glaciated. About a third of the region

is forested, and rich soils support important agricultural activities in many areas of the region. Mean annual temperature is 50 degrees. Mean annual rainfall ranges from 50 inches in the upper reaches of the Schuylkill River to 42 inches along the lower reaches of the Lehigh River. Mean annual snow accumulation is 25 inches.

The Lower Region covers the area from the Fall Line to the Capes of Delaware Bay. Physiographically the region is the emerged part of the Coastal Plain, a gently sloping surface extending 125 to 175 miles southeasterly from the Fall Line to the Continental Shelf. Geologically, the region is a "soft" rock area composed of overlapping beds of unconsolidated or semi-consolidated clay, silt, sand and gravel. Delaware Bay is the region's most marked feature. About one-third of the region is wooded, with about equal division between soft and hard woods. The soil supports a variety of important agricultural activities. Mean annual temperature is 55 degrees; Mean annual rainfall is 43 inches, and mean annual accumulated snowfall is 20 inches.

Starting in the Upper Region, on the western slopes of the Catskill Mountains, the Delaware River first emerges as the southwesterly-flowing East Branch and West Branch which join at Hancock. From that point southeastward to Port Jervis the river divides Pennsylvania and New York. In this stretch it receives the flows from three important tributaries: the Lackawaxen, Mongaup and Neversink.

Turning southwestward at Port Jervis, the River enters the Central Region where it becomes the dividing line between New Jersey and Pennsylvania. Here it flows in a narrow valley between the Shawangunk Mountains on the east and the Appalachian Plateau on the west. Near Stroudsburg it cuts to the southeast through the Blue Mountain—Kittatinny Mountain Ridge at the Delaware Water Gap. Such important tributaries as the Bush Kill, Brodhead Creek and Flatbrook join the River just above the Water Gap, and the Lehigh, Paulins Kill, Beaver Brook, Pequest and Musconetcong join below.

At Trenton the River comes into the Lower Region and enters the tidal estuary. Turning southwest, its course parallels the Fall Line to Wilmington. In this reach it receives the flows of the Neshaminy, Schuylkill, Rancocas and Christina tributaries. Just below Wilmington the River turns seaward and flows to Liston Point where it enters Delaware Bay.

Section IV Projected Economy:

The economic and population projections for the Delaware River Water Service Area as defined and set forth in Chapter IV of the Survey Report and Appendices B, C and K thereof, and as summarized below, are hereby referred to and incorporated as substantiating data for Phase I of the Comprehensive Plan.

Population of the Delaware River Water Service Area (DRWSA) was 23 million in 1960. It is estimated to grow at an average yearly rate of 1.2 per cent, and reach 30 million by 1980 and 42 million by the year 2010.

The average number of persons per household is expected to show little change over the next 30 years and to decline somewhat thereafter. The number of households in the DRWSA was 6.5 million in 1955. The number is projected to increase to 9.1 million in 1980 and 13.5 million in 2010.

Total employment in the DRWSA is projected to rise from its 1955 level of 9 million, to 12 million in 1980 and 18 million by 2010: the corresponding data for manufacturing employment is 2.9 million in 1955 and 4.2 million by 1980 and 6.1 million by 2010. Employment in the five major water-using industries (food, chemicals, petroleum, primary metals and paper) is expected to be about 2½ times the 1955 level by the year 2010. The most rapid growth is expected in the chemical and paper industry.

Personal income in the DRWSA is projected to increase at an annual rate slightly greater than 2½ per cent. Total personal income (in constant 1957 dollars) is expected to increase from $57 billion in 1957 to $100 billion by 1980 and to $224 billion by 2010. Per capita personal income for the DRWSA was $2,600 in 1957 and is expected to increase to $3,300 in 1980 and $5,300 by the year 2010.

About 9 per cent of the land in the Delaware River Basin is presently in urban uses. Population projections, coupled with other planning assumptions, lead to the expectation that about 27 percent of the Basin's land will be in urban uses by the year 2010.

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Section V Water Demands:

The demands on the water resources of the Delaware Basin, as documented and projected in Chapter VI of the Survey Report and appendices thereto, and as summarized below, are hereby referred to and incorporated as substantiating data for Phase I of the Comprehensive Plan.

The amount of water withdrawn from all sources in the Delaware Basin is expected to grow to about four times the present rate over the next fifty years, amounting to a total basinwide withdrawal of about 13 billion gallons daily. Goss water needs(1) for sub-regions of the Basin are projected as follows:

	1965	1980	2010
	Millions of gallons per day		
Upper Delaware Area	54	74	128
Middle Delaware Area	58	80	156
Lehigh Area	591	861	1805
Upper Schuylkill Area	238	339	652
Trenton-Phila. Area	2420	3418	6634
Wilmington Area	1085	1771	3113
S. Basin—Coastal Area	165	257	494

(1) Defined as raw water withdrawals being made from Delaware River Basin streams, wells and springs, exclusive of water withdrawn for thermal-power cooling purposes.

Average annual flood damages along the main stem of the Delaware River and its principal tributaries are projected to increase from a total of approximately $5.9 million in 1958 to $6.8 million in 1980 and $8.0 million by the year 2010 unless adequate flood damage reduction measures are undertaken.

In 1955 the 21.6 million people living in the Delaware River Water Service Area engaged in outdoor recreation activities estimated at 137.7 million visitor-days of one-day outings, 75.8 million visitor-days of overnight or week-end outings, and 132 million visitor-days of vacations away from home. The demand for facilities designed to handle one-day outings is the most critical of all recreation requirements. Attendance in 1955 at state parks in the DRWSA ranged from 8 to 100 per cent above design capacity. There was a need in that year for facilities to accommodate 15.7 million visitors in addition to existing capacities. Demand for state park type recreation opportunities is projected to increase by the year 2010 to almost seven times the 1955 level.

Electric power requirements of the area that will be affected by Delaware Basin water resources development exceeded 55 billion kilowatt-hours in 1957, with a peak demand in that year of 11.1 million kilowatts. Peak demand for the area has been projected in increase to 34 million kilowatts by 1980 and 96 million kilowatts by the year 2010.

Section VI Projects and Facilities:

1. BELTZVILLE PROJECT

a. **Description.** The Beltzville Project as proposed by the Corps of Engineers is for multiple-purpose development to provide supplies of water, flood control and recreation. The Beltzville dam site is located in the Pohopoco Valley about 0.3 mile upstream from the confluence of Sawmill Run and Pohopoco Creek and approximately 4 miles east of Lehighton, Pennsylvania (See plate 1). The net contributing drainage area above this site is 75 square miles, excluding 22 square miles that contribute to the Wild Creek Reservoir, which supplies water to the City of Bethlehem, Pennsylvania. The earth and rock fill dam will extend for a length of 4,500 feet and rise 160 feet above the creek bed. Diversion flows and low level reservoir releases will pass through a conduit constructed on rock along the right side of the valley. A spillway will be constructed around the north end of the dam with the channel in bedrock. Flow from the spillway will discharge into Sawmill Run and thence back into Pohopoco Creek. Storage allocations for the Beltzville Project, as indicated by detailed planning studies by the Corps of Engineers, are 1,200 acre-feet of inactive long-term storage to elevation 525; 40,000 acre-feet of active long-term storage for supplies of water and recreation to elevation 615; and 27,000 acre-feet of short-term storage for flood control to elevation 641. The reservoir up to spillway crest elevation 641 will extend approximately 7 miles upstream. Relocation or improvement of about 4.7 miles of county road will be required. No railroads or communities are in the reservoir area and there are no workable mineral deposits. However, sections of two oil pipelines will require relocation, and power lines and water lines will require reinforcing where they cross the reservoir. During the planning studies for this project the Palmer Water Company submitted a report setting forth its needs for a continuous and permanent supply of water from Pohopoco Creek downstream from the dam site. The Company supplies municipal and industrial water in the vicinity of Palmerton, Pennsylvania, and in accordance with Act 365 of the Commonwealth of Pennsylvania the Company has filed with the Commonwealth a statement showing its water withdrawals to be about 13 mgd with future needs estimated at 20 mgd. Arrangements will be made during construction and thereafter to release water as required to fully satisfy downstream water rights. A total of 2,413 acres of land will be acquired for the complete development. In addition to the 1,030 acres required for construction of the project, 723 acres will be required for directly related recreation and 660 acres for indirectly related recreation. The total estimated project cost, excluding $1,190,000 for indirectly related recreation, is $13,800,000 which includes $1,290,000 of specific costs for directly related recreation. The directly and indirectly related recreation costs include the following:

	Estimated Specific Recreation Costs	
Item	**Directly Related**	**Indirectly Related**
Land	$ 411,000	$ 34,000
Facilities	876,000	1,153,000
Total	1,287,000	1,187,000

b. **Functions.**

(1) **Supplies of water.** Use of 40,000 acre-feet of active long-term storage at the Beltzville Project will provide a net yield of 80 cubic feet per second. This flow augmentation will contribute to the satisfaction of the needs of the Palmerton, Bethlehem and Trenton-Philadelphia areas.

(2) **Reduction of flood damage.** The flood control storage at the Beltzville Project will contribute to flood stage reductions at the principal damage centers on Lehigh River below the confluence of that river with Pohopoco Creek. These damage centers are located at Bowmanstown, Walnutport, Northampton, Hokendauqua, Catasauqua, Allentown, Bethlehem, Freemansburg and Easton, Pennsylvania. Combined operation of the three new major flood control projects in the Lehigh River Basin included in the comprehensive plan will result in a stage reduction of two feet at Bethlehem, Pennsylvania, for a flood similar to that experienced in 1955. This reduction is in addition to the effects of the Bear Creek Project.

(3) **Recreation.** The Beltzville reservoir will provide a recreation capacity for 500,000 visitors annually, of which 110,000 are credited to directly related recreation uses. The lands acquired specifically for recreation development will provide for public

ownership of the shore area and space for development of five recreation sites. Facilities will be provided for one-day outings as well as camping. Hunting will be permitted in appropriate season and under reasonable regulation to assure public safety. Operation of the project will consider the downstream flow requirements for stream fisheries and the management of lake fisheries as a coordinated element for full realization of the recreation potential of the project.

c. **Scheduling:** Beltzville is planned for immediate development and scheduled to be in operation no later than 1968.

2. BLUE MARSH PROJECT

a. **Description.** The Blue Marsh Project as proposed by the Corps of Engineers is for multiple-purpose development to provide supplies of water, flood control and recreation. The Blue Marsh dam site is located on the Tulpehocken Creek, 1½ miles upstream from the mouth of Plum Creek and about 6 miles northwest of Reading, Pa. (See plate 2). The drainage area above this site is 175 square miles. The dam would consist of a rock and earth fill embankment 1,100 feet long and 90 feet high. A conduit on rock along the right abutment would provide for low level reservoir releases and diversion during construction. The spillway will be located about 1,000 feet south of the dam where a 900-foot wide flat crested channel cut into the shale would conduct excess water from the reservoir to Tulpehocken Creek. Final storage allocations for the Blue Marsh Project, as indicated by detailed planning studies by the Corps of Engineers, are 1,500 acre-feet of inactive long-term storage to elevation 249; 14,500 acre-feet of active long-term storage for supplies of water and recreation to elevation 279; and 33,000 acre-feet of short-term storage for flood control to elevation 303. The reservoir will extend upstream from the dam about 10 miles on Tulpehocken and Northkill Creeks. The reservoir will require relocation of pipelines, roads, the community of Blue Marsh and a few buildings in the Bernville area. One commercially valuable mineral deposit is located in the reservoir, a shale pit about 1 mile north of Blue Marsh. A total of about 5,296 acres of land will be acquired for the complete development. In addition to the 1,520 acres required for construction of the project, 1,093 acres will be required for directly related recreation and 2,683 acres for indirectly related recreation. The total estimated project cost, excluding $3,280,000 for indirectly related recreation, is $12,500,000, which includes $1,500,000 of specific costs for directly related recreation. The directly and indirectly related recreation costs include the following:

	Estimated Specific Recreation Costs	
Item	Directly Related	Indirectly Related
Land	$ 664,000	$2,040,000
Facilities	832,000	1,240,000
Total	1,496,000	3,280,000

b. **Functions.**

(1) **Supplies of water.** Use of 14,500 acre-feet of active long-term storage at the Blue Marsh Project will provide a net yield of 65 cubic feet per second. This flow augmentation will contribute to the satisfaction of the needs of the Pottstown-Reading area as well as to the Philadelphia area.

(2) **Reduction of flood damage.** The flood control storage at the Blue Marsh Project will contribute to flood stage reductions at the principal damage centers on the Schuylkill River from Reading, Pennsylvania to Philadelphia, Pennsylvania. These damage centers are Reading, Birdsboro, Pottstown, Norristown, Conshohocken, Manayunk and Philadelphia, Pennsylvania. Combined operation of storage allocated to flood control at the Blue Marsh and Maiden Creek Projects in the Schuylkill River Basin will result in a flood stage reduction of about 4½ feet at Reading, Pennsylvania, and of about three feet at Pottstown, Pennsylvania for a flood similar to that experienced in 1955.

(3) **Recreation.** The Blue Marsh reservoir will provide a recreation capacity to accommodate a total of 437,500 visitors annually, of which 137,000 are credited to the directly related recreation uses. The lands to be acquired specifically for recreation development will provide public ownership of the shoreline and space for the development of six recreation sites. Facilities

will be provided for one-day outings as well as camping. Necessary access, sanitary and administrative facilities also will be provided. Hunting will be permitted in appropriate seasons and under reasonable regulations to assure public safety. Operation of the project will consider the downstream flow requirements for stream fisheries and the management of the impounded water for lake fisheries as a coordinated element for the full realization of the recreational potential of the project.

c. **Scheduling:** Blue Marsh is planned for immediate development and scheduled to be in operation no later than 1969.

3. TREXLER PROJECT

a. **Description.** The Trexler Project as proposed by the Corps of Engineers is for multiple-purpose development to provide supplies of water, flood control and recreation. The Trexler dam site is located on Jordan Creek in the Trexler Pennsylvania State Game Preserve about ½ mile downstream from the mouth of Mill Creek and about 8 miles northwest of Allentown, Pa. (See plate 3). The drainage area above this site is 51 square miles. The proposed dam will be a concrete gravity type structure 800 feet long, and rise 120 feet above the creek bed. Flood waters will pass over a spillway section of the dam 200 feet long with a crest about 104 feet above the creek. Conduits through the dam with regulating gates will permit low level releases. Diversion during construction will be made over concrete monoliths left low, temporarily, for that purpose. Storage allocations for the Trexler Project, as indicated by detailed planning studies by the Corps of Engineers, are 800 acre-feet of inactive long-term storage to elevation 416; 24,200 acre-feet of active long-term storage for supplies of water and recreation to elevation 479; and 14,000 acre-feet of short-term storage for flood control to elevation 492. The reservoir at elevation 492 will extend about 8 miles up Jordan Creek with bays or prongs extending about 3 miles up Lyon Creek and 2 miles up Mill Creek. Fills and bridges will be required to carry U. S. Route 309 across the reservoir. Relocation of other roads and the communities of Lyon Valley and Weidasville will also be necessary. A total of 3,587 acres of land will be acquired for the complete development. In addition to the 960 acres required for construction of the project, 1,776 acres will be required for directly related recreation and 851 acres for indirectly related recreation. The total estimated project cost, excluding $1,140,000 for indirectly related recreation, is $10,100,000 which includes $1,500,000 of specific costs for directly related recreation. The directly and indirectly related recreation costs include the following:

	Estimated Specific Recreation Costs	
Item	**Directly Related**	**Indirectly Related**
Land	$1,010,000	$ 141,000
Facilities	486,000	1,000,000
Total	1,496,000	1,141,000

b. **Functions**

(1) **Supplies of water.** Use of 24,200 acre-feet of active long-term storage at the Trexler Project will provide a net yield of 55 cubic feet per second. This flow augmentation will contribute to the satisfaction of the needs of the Bethlehem area and the Trenton-Philadelphia area.

(2) **Reduction of Flood Damage.** The short-term storage at the Trexler Project will contribute to flood stage reductions at the principal damage centers of Allentown, Bethlehem and Easton, Pennsylvania. Combined operations of the three new major flood control projects included in the Lehigh River Basin in the comprehensive plan will result in a stage reduction of two feet at Bethlehem, Pennsylvania, for a flood similar to that experienced in 1955. This reduction is in addition to the effects of the Bear Creek Project.

(3) **Recreation.** The Trexler reservoir will provide a recreation capacity to accommodate a total of 312,500 visitors annually of which 177,200 are credited to directly related recreation uses. The lands to be acquired specifically for recreation development will provide for public ownership of the shore area and space for the development of six recreation sites. Facilities will be provided for one-day outings as well as camping. Necessary

roads, trails, sanitary and administrative facilities, and potable water also will be provided. Hunting will be permitted in appropriate season and under reasonable regulations to assure public safety. Operation of the project will consider the downstream flow requirements for stream fisheries and the management of the impounded water for lake fisheries as a coordinated element for the full realization of the recreational potential of the project.

c. **Scheduling:** Trexler is scheduled to be in operation no later than 1972.

4. PROMPTON PROJECT

a. **Description.** The Prompton Project, a single-purpose flood control project (with incidental recreation use) completed in 1960, will be modified for multiple-purpose use to provide supplies of water and recreation benefits as well as the presently designed flood control function. The Prompton dam is located in the valley of Lackawaxen River about ½ mile upstream from the confluence of Waymart Branch with the river, and about 4 miles west of Honesdale, Pennsylvania (See plate 4). The present dam controls 60 square miles of drainage area, is 1,300 feet long and 140 feet high. The spillway, which is cut into the hill around the right (west) end of the dam, is 50 feet wide. A conduit has been built along the right bank to carry limited amounts of flow. This conduit has an uncontrolled inlet at elevation 1,125 in the reservoir pool and a stilling basin at the downstream end.

Storage allocations proposed by the Corps of Engineers for the modified Prompton Project, based on the most economical modification of the existing dam and reservoir, will be 3,400 acre-feet of inactive long-term storage to elevation 1,125; 28,000 acre-feet of active long-term storage for supplies of water and recreation use to elevation 1,180; and 20,300 acre-feet of short-term storage for flood control to elevation 1,205. Comparative data on the present and proposed modified project at this site are as follows:

	Present Project	Proposed Modified Project
Capacities, in acre-feet		
Flood Control	20,300	20,300
Water Supply	0	28,000
Inactive	3,400	3,400
Elevation Top of Pool, in feet, m.s.l.		
Flood Control	1,168.1	1,205[1]
Water Supply	—	1,180
Inactive	1,125	1,125

1. Spillway crest elevation

The long-term storage requirement and operation for multiple-purposes dictate the following additions or modifications to the existing structures:

(1) A control tower with gates and a service bridge to control releases from the reservoir.

(2) A blanket of impervious material on the valley wall and floor upstream from the dam.

(3) Widening of the spillway to 250 feet.

(4) Clearing of reservoir land and relocating roads subject to inundation.

The reservoir to be created by long-term storage up to elevation 1,180 will extend about 4 miles upstream. The reservoir for short-term storage will rise to about the same level as that for the existing structure and hence will require procurement of flowage easement on only 30 acres of land in addition to that already under easement. The modified Prompton development will include a total area of 2,055 acres. In addition to the 730 acres required for construction of the project, 925 acres will be required for directly related recreation and 400 acres for indirectly related recreation. The total estimated cost of the modified multiple-purpose project, excluding $387,000 for indirectly related recreation, is $8,550,000, which is made up of $4,200,000 as the cost of the existing flood control project and $4,350,000 estimated as the cost for the modifications previously discussed. Of this amount, $427,000 are included as the estimated

specific costs of directly related recreation. The directly and indirectly related recreation costs are composed of the following:

Item	Estimated Specific Recreation Costs	
	Directly Related	Indirectly Related
Land	$ 144,000	$ 62,000
Facilities	283,000	325,000
Total	427,000	387,000

The cost of land acquired by the Commonwealth of Pennsylvania for recreation purposes is included in these estimates of recreation costs.

b. **Functions.**

(1) **Supplies of water.** Use of 28,000 acre-feet of active long-term storage at the Prompton Project will result in a net yield of 57 cubic feet per second. This augmentation of flow will contribute to the satisfaction of the water needs of the Trenton-Philadelphia area.

(2) **Reduction of flood damage.** Flood heights on the Lackawaxen River will be substantially reduced by the Prompton Project and the Edgar Jadwin dam and reservoir on Dyberry Creek, above Honesdale, Pennsylvania. The towns of Honesdale, located at the confluence of Dyberry Creek with the Lackawaxen River, and Hawley, located between the junctions of Middle Creek and Wallenpaupack Creek with the Lackawaxen River, will obtain substantial relief from frequent and considerable flood damage. Several villages and seven townships located in the lower reaches of Lackawaxen River have residential, commercial, utility, highway and other developments on the flood plain, and experienced 1½ million dollars in flood damage in 1955. Conversion of the Promption Dam and Reservoir to a multiple-purpose development will preserve the flood control function of this project as originally authorized and flood reduction benefits will be unaffected by the proposed modification. Control of flood waters by the Prompton and Edgar Jadwin Projects will reduce the river stages at Hawley, Pa. by about four feet for a flood of the magnitude experienced in 1955. Additional limited reduction of flood damage will accrue on the main stem of the Delaware River from the Prompton and Edgar Jadwin Projects.

(3) **Recreation.** The Prompton Dam and Reservoir Project will provide a total recreation capacity to accommodate a total of 156,300 visitors annually. Of these, 81,900 visitors annually are credited to the directly related recreation developments. Due to the lack of suitable terrain, recreation potential at this project is limited. However, lands suitable for day-use recreation are included in the plan of improvement. Necessary roads, trails, sanitary and administrative facilities will be provided. Hunting will be permitted in appropriate season and under reasonable regulation to assure public safety. Operation of the project will consider the downstream flow requirements for stream fisheries and the management of the impoundment for lake fisheries as a coordinated element for full realization of the recreational potential of the project.

c. **Scheduling:** Modification of the Prompton project is scheduled to be completed no later than 1974.

5. TOCKS ISLAND PROJECT

(a) **Description.** The Tocks Island Project as proposed by the Corps of Engineers is for multiple-purpose development to provide supplies of water, flood control, production of hydroelectric power, and for recreation purposes. The Tocks Island dam site is located on Delaware River about 5 miles upstream from Delaware Water Gap and about 7 miles northeast of Stroudsburg, Pennsylvania (see plate 5). The site is at the upstream end of Tocks Island which is about 2½ miles upstream from Shawnee-on-Delaware, Pennsylvania. The contributing drainage area is 2,912 square miles, exclusive of 915 square miles which contribute to the Neversink, Pepacton and Cannonsville Projects of the City of New York. The dam will contain about 3½ million cubic yards of earth and rock, be 3,200 feet long, and rise 160 feet above the river bed to elevation 456. It will have a central impervious earth core extending into the foundation to a maximum depth of 30 feet below the base of the dam. Two 22-foot

diameter conduits placed on rock along the left river bank will serve as diversion conduits during construction and later as penstocks for production of power. At the downstream end of the conduits will be a powerplant with two turbine-driven generators of 23,000-kilowatt capacity each. All low level water releases will pass through the turbines or through a bypass channel from each penstock built into the powerhouse substructure. The step-up substation will be located adjacent to the powerhouse on a raised section of the toe of the main enbankment. In addition to the conventional powerplant described above, a pumped-storage powerplant with provision for four reversible power turbine units of 91,500-kilowatt capacity each will be located upstream from the spillway and about 1,200 feet upstream from the centerline of the dam. The spillway cut into the left (New Jersey) abutment will have a concrete crest at elevation 395 surmounted by ten radial gates each 40 feet long and 35 feet high. The concrete lined spillway chute cut into rock will discharge water into a stilling basin downstream from the powerplant and from there into the river channel. An item has been included in the cost estimates for facilities for passing fish over the dam in the event preconstruction studies show the need for specific facilities for that purpose. Storage allocations for the Tocks Island Project, as determined from detailed planning studies by the Corps of Engineers, indicate 80,000 acre-feet of inactive long-term storage to elevation 356; 410,000 acre-feet of active long-term storage for supplies of water, power, recreation and other uses to elevation 410; and 275,000 acre-feet of short-term storage for flood control to elevation 428. The reservoir formed by this dam, up to elevation 428, will extend approximately 9 miles up Flat Brook and 37 miles up the Delaware River to Port Jervis, New York. It will necessitate the relocation of 27 miles of Federal Highway 209 as well as county roads, local roads, the community of Bushkill, Pennsylvania, parts of Dingmans Ferry, Pennsylvania, and a few buildings at Milford, Pennsylvania. The town of Matamoras, Pennsylvania, at the upper end of the reservoir will be protected by a dike about 12,000 feet long and appurtenant outlet pipes, drains and pumping plants. The bridge on U. S. Route 6 to Tri-State, New York, will be replaced. No railroad relocations will be required and there are no commercially valuable mineral deposits in the reservoir area. A total of 62,370 acres of land will be acquired for the complete development. In addition to the 14,800 acres required for construction of the project, 9,500 acres would be required for directly related recreation and 38,070 acres for indirectly related recreation. The total estimated cost of the Tocks Island Project, excluding $31,600,000 for indirectly related recreation, is $146,000,000 which includes specific costs for power and recreation of $66,200,000 and $18,300,000 respectively. The estimated specific costs for power include $12,300,000 for conventional power at the dam and $53,800,000 for pumped-storage type power facilities to be included in the overall development. The estimated specific costs for directly and indirectly related recreation include the following:

	Estimated Specific Recreation Costs	
Item	**Directly Related**	**Indirectly Related**
Land	$ 8,080,000	$13,400,000
Facilities	10,200,000	18,200,000
Total	18,280,000	31,600,000

b. **Functions.**

(1) **Supplies of water.** Use of 410,000 acre-feet of active long-term storage at Tocks Island Project will provide a net yield of 980 cubic feet per second. This augmentation of flow will contribute to the satisfaction of the water requirements of the Trenton-Philadelphia area.

(2) **Reduction of flood damage.** The 1955 flood damages in the reach from Tocks Island to Burlington, New Jersey, exceeded 85 percent of the total damages for the main stem of the Delaware River, and occurred principally at the damage centers of Easton, Riegelsville, New Hope, and Yardley, Pennsylvania; and Belvidere, Phillipsburg, Trenton and Burlington, New Jersey. The flood control storage provided at Tocks Island and other projects in the comprehensive plan, will reduce, by system operation, the stage of the 1955 flood at Trenton by about 6 feet, based on the modified stage reflecting the regulation capacities of the Bear Creek, Edgar Jadwin and Prompton Projects. For the 1942 flood, the system flood control storage, including that at the Tocks Island Project, would result in a stage reduction of about 3.7 feet.

(3) **Power.** Operation of the Tocks Island Project for multiple-purpose use will support a conventional hydropower installation of 46,000 kilowatts, a dependable capacity of 20,000 kilowatts, and the average annual production of 281.5 million kilowatt-hours. In addition to the conventional power plant, advantageous physical conditions at the site permit the construction of a pumped storage power scheme with an installed capacity of about 366,000 kilowatts, a dependable capacity of 342,000 kilowatts and the average annual production of 732.0 million kilowatt-hours.

(4) **Recreation.** The Tocks Island reservoir area will provide recreation capacity to accommodate 6,750,000 visitors annually of which 2,470,000 are credited to the directly related recreation use. Studies by the National Park Service demonstrate that recreation benefits at the project will be of widespread regional and national significance. Accordingly, project lands are planned for development as a National Recreation Area by the National Park Service. The lands to be acquired for recreation will provide for public ownership of the shore area and will provide space for development of 10 major recreation areas. The outstanding scenic and recreation resources of the project will thus be preserved in public ownership. Various facilities will be provided for one-day outings as well as camping. Operation of the project will consider the fishing requirements of the impoundments; the flow requirements for the stream fisheries downstream from the dam; and, should facilities be provided for moving anadromous fish above the dam, consideration would be given to augmenting flows in the month of October for the purpose of moving young fish populations through the polluted zone of the river in the vicinity of Marcus Hook. Special studies will be pursued during later planning stages in order to determine this specific requirement. Hunting will be permitted during appropriate season and in accordance with reasonable regulation to assure public safety.

c. **Schedule:** The Tocks Island project is scheduled to be in operation no later than 1975.

6. AQUASHICOLA PROJECT

a. **Description.** The Aquashicola Project as proposed by the Corps of Engineers is for multiple-purpose development to provide supplies of water, flood control and recreation. The Aquashicola dam site is located on Aquashicola Creek about 4½ miles upstream from its confluence with the Lehigh River and about 3 miles east of Palmerton, Pennsylvania (See plate 6). The site is about one mile downstream from the confluence of Buckwha Creek with Aquashicola Creek. The drainage area above this site is 66 square miles. The compacted earth fill dam will stretch approximately 2,000 feet across the valley with a concrete section and spillway 160 feet long founded on rock at the south end. The dam would rise 110 feet above a cutoff with maximum depth at 30 feet to control passage of water through the foundation. The top of dam would be 20 feet above the spillway crest. Outlet sluices through the spillway would provide for water releases. Diversion during construction would be made through low blocks in the spillway section. Storage allocations for the Aquashicola Project as indicated by detailed planning studies by the Corps of Engineers, are 1,000 acre-feet of inactive long-term storage to elevation 435; 24,000 acre-feet of active long-term storage for supplies of water and recreation to elevation 483; and 20,000 acre-feet of short-term storage for flood control to elevation 503. The reservoir at spillway crest elevation 503 will be 90 feet deep at the dam and extend five miles up Aquashicola Creek from the dam and six miles up Buckwha Creek. Relocation of an oil pipeline, a waterline, roads, 7.3 miles of the Chestnut Ridge Railroad, quarry equipment, rural residences and the community of Little Gap, Pennsylvania, would be required. The only commercial mineral deposit near the reservoir area is a sandstone quarry southeast of Little Gap, Pennsylvania. The reservoir does not inundate this quarry but some relocation of crushing and processing equipment will be required. Sand from this quarry is shipped by rail cars at the approximate rate of five cars per day. This constitutes the principal traffic on the Chestnut Ridge Railroad in the vicinity of the reservoir. A total of 2,150 acres of land will be acquired for the complete development. In addition to the 900 acres required for construction of the project, 770 acres will be required for directly related recreation and 480

acres for indirectly related recreation. The total estimated project cost, excluding $488,000 for indirectly related recreation, is $19,000,000, which includes $878,000 of specific costs for directly related recreation. The directly and indirectly related recreation costs include the following:

Item	Estimated Specific Recreation Costs	
	Directly Related	Indirectly Related
Land	$ 549,000	$ 103,000
Facilities	329,000	385,000
Total	878,000	488,000

b. **Functions.**

(1) **Supplies of water.** Use of 24,000 acre-feet of active long-term storage at the Aquashicola Project will provide a net yield of 63 cubic feet per second. This flow augmentation will contribute to the satisfaction of the needs of the Allentown-Bethlehem area and the Trenton-Philadelphia area.

(2) **Reduction of flood damage.** The short-term storage provided at the Aquashicola Project will contribute to flood stage reductions at Palmerton, just downstream from the dam, and at principal damage centers on Lehigh River below the Lehigh Gap. These damage centers include Walnutport, Northampton, Hokendauqua, Catasauqua, Allentown, Bethlehem, Freemansburg, and Easton, Pennsylvania. Combined operation of the three new major flood control projects in the Lehigh River Basin included in the comprehensive plan will result in a stage reduction of two feet at Bethlehem, Pennsylvania for a flood similar to that experienced in 1955. This reduction is in addition to the effects of the Bear Creek Project.

(3) **Recreation.** The Aquashicola reservoir will provide a recreation capacity to accommodate 156,300 visitors annually, of which 100,500 are credited to directly related recreation uses. The lands to be acquired specifically for recreation development provide for public ownership of the principal part of the shoreline and space for the development of four recreation sites. Facilities will be provided for one-day outings and camping. Hunting will be permitted in appropriate season under reasonable regulation to assure public safety. Operation of the project will consider the downstream flow requirements for stream fisheries and the management of the impounded water for lake fisheries as a coordinated element for the full realization of the recreation potential of the project.

c. **Schedule:** The Aquashicola Project is scheduled to go into operation no later than 1981.

7. MAIDEN CREEK PROJECT

a. **Description.** The Maiden Creek Project as proposed by the Corps of Engineers is for multiple-purpose development to provide supplies of water, flood control and recreation. The Maiden Creek dam site is located on Maiden Creek about ⅓ mile upstream from the mouth of Moselem Creek and about 12 miles north of Reading, Pa., (See plate 7). The drainage area above this site is 161 square miles. The dam, 2,600 feet long and rising 110 feet above the bed of Maiden Creek, would be of earth and rock fill construction. A conduit founded on rock along the left side of the valley would be designed to carry diversions during construction and low level reservoir releases. The spillway, 750 feet wide, would be cut through a rock ridge about 400 feet east of the dam. Storage allocations for the Maiden Creek Project, as indicated by detailed planning studies by the Corps of Engineers, are 2,000 acre-feet of inactive long-term storage to elevation 323; 74,000 acre-feet of active long-term storage for supplies of water and recreation to elevation 381; and 38,000 acre-feet of short-term storage for flood control to elevation 394. The reservoir would extend about 10 miles up Maiden Creek. Relocation of a railroad line, numerous roads, and the communities of Lenhartsville, Virginville and a part of Moselem will be required. There are no commercially developed mineral resources in the reservoir area. A total of 8,450 acres of land will be acquired for the complete development. In addition to the 2,850 acres required for the construction of the project, 2,255 acres will be required for directly related recreation and 3,345 for indirectly related recreation. The total estimated project cost, excluding $3,250,000 for indirectly related recreation is $27,600,000 which includes

$2,440,000 of specific costs for directly related recreation. The directly and indirectly related recreation costs include the following:

Item	Estimated Specific Recreation Costs Directly Related	Indirectly Related
Land	$1,280,000	$1,420,000
Facilities	1,160,000	1,830,000
Total	2,440,000	3,250,000

b. **Functions.**

(1) **Supplies of water.** Use of 74,000 acre-feet of active long-term storage at Maiden Creek Project will provide a net yield of 134 cubic feet per second. This flow augmentation will contribute to the satisfaction of the needs of the Pottstown-Reading area as well as to the Philadelphia area.

(2) **Reduction of flood damage.** The flood control storage at Maiden Creek Project will contribute to flood stage reductions at the principal damage centers on the Schuylkill River from Reading, Pennsylvania to Philadelphia, Pennsylvania. These damage centers are Reading, Birdsboro, Pottstown, Norristown, Conshohocken, Manayunk and Philadelphia, Pennsylvania. The floodway at these centers is occupied mostly by commercial and industrial interests which suffered about 70% of the total flood damages in these areas in August 1955. Combined operation of storage allocated to flood control at the Maiden Creek and Blue Marsh Projects in the Schuylkill River Basin would result in a flood stage reduction of about 4½ feet at Reading, Pennsylvania, and of about three feet at Pottstown, Pennsylvania for a flood similar to that experienced in 1955.

(3) **Recreation.** The Maiden Creek reservoir would provide a recreation capacity to accommodate a total of 625,000 visitors annually of which 267,400 are credited to the directly related recreation uses. The lands to be acquired specifically for recreation development will provide for public ownership of the shore area and space for development of five recreation sites. Facilities will be provided for one-day outings and camping. Necessary access, and sanitary and administrative facilities also will be provided. Hunting will be permitted in appropriate season and under reasonable regulation to assure public safety. Operation of the project will consider the downstream flow requirements for stream fisheries and the management of the impounded water for lake fisheries as a coordinated element for the full realization of the recreation potential of the project.

c. **Schedule:** The Maiden Creek project is planned to go into operation no later than 1982.

8. BEAR CREEK PROJECT

a. **Description.** The Bear Creek Project, completed in 1961 as a single-purpose flood control project (with incidental recreation use), will be modified for multiple-purpose development to provide supplies of water and recreational use as well as the presently authorized flood control. The earth and rock fill dam is located on Lehigh River 75 miles above its confluence with Delaware River and about 5 miles north of White Haven, Pennsylvania (See plate 8). At this location the dam controls 288 square miles of drainage area. Comparative data on the present and proposed modified project at this site are as follows:

	Present Project	Proposed Modified Project
Capacities, in acre-feet		
Flood Control	108,000	108,000
Water Supply	0	70,000
Inactive	2,000	2,000
Elevation Top of Pool, in feet m.s.l.		
Flood Control	1,450[1]	1,481[1]
Water Supply	—	1,425
Inactive	1,300	1,300

1. Spillway crest elevation

The modifications to the existing dam, as proposed by the Corps of Engineers, to make it serviceable for long-term storage in addition to the present flood control storage will involve:

(1) Moving and raising the spillway crest 31 feet to elevation 1,481.

(2) Raising the dam to elevation 1,503.

(3) Adding 70 feet of concrete conduit to the downstream end of the outlet tunnel.

(4) Constructing new dikes and raising existing dikes north of the dam.

The modified dam will rise 263 feet above the stream bed and have a length of 3,500 feet. The spillway would be cut through rock to the north of the dam, and farther north a dike 4,600 feet long will fill a swale in the reservoir rim. Operation of three gates controls the flow through the outlet tunnel. The reservoir for long-term storage would have a maximum depth of 185 feet and would extend 7.0 miles up the Lehigh River and 4.0 miles up Bear Creek from the dam. This reservoir will necessitate the purchase of land to be inundated on which flood easements have already been taken and would require the acquisition of additional flood easements at higher elevations. No economically valuable mineral deposits would be flooded and only one road along Bear Creek would require relocation in addition to those required for the existing project. A total of 3,950 acres of land will be acquired for the complete development. In addition to the 1,950 acres that will be required for construction of the project, 1,300 acres will be required for directly related recreation and 700 acres for indirectly related recreation. The total estimated cost of the modifications to the Bear Creek Project, excluding $875,000 for indirectly related recreation, is $8,990,000 which includes specific recreation costs of $595,000. The estimated specific costs of directly and indirectly related recreation include the following:

	Estimated Specific Recreation Costs	
Item	**Directly Related**	**Indirectly Related**
Land	$ 190,000	$ 102,000
Facilities	405,000	773,000
Total	595,000	875,000

The total cost of the project modified as proposed herein would be $20,100,000 which includes an estimated cost of $11,100,000 for the existing project. Costs for indirectly related recreation are excluded from this estimated total cost.

b. **Functions.**

(1) **Supplies of water.** Use of 70,000 acre-feet of active long-term storage at the Bear Creek Project will provide a net yield of 196 cubic feet per second. This flow augmentation will contribute to the satisfaction of the water requirements of the Allentown-Bethlehem area and the Trenton-Philadelphia area.

(2) **Reduction of flood damages.** The 108,000 acre-feet of existing short-term storage will be included as the initial stage in the multiple-purpose development. This storage is effective in alleviating flooding in the upper reach of the Lehigh River where damage is confined, primarily, to the towns of Jim Thorpe, Lehighton, Weissport, Parryville, Palmerton, and Bowmanstown, Pennsylvania. Below Lehigh Gap both the river and flood plain widen. Railroad alignments located in the flood plain together with 44 railroad and highway bridges spanning the Lehigh River are subject to recurring flood damage. The inundation of the Lehigh Navigation Canal, in the reach from Jim Thorpe to Easton, Pennsylvania, is accompanied by extensive flood damage. Damage centers in the reach from Lehigh Gap to Allentown, Pennsylvania, include industrial and residential areas located in the vicinity of the towns of Northampton, Hokendauqua, Catasauqua, Allentown, Bethlehem, Freemansburg and Easton, Pennsylvania. Considerable flood stage reduction is provided in these damage areas by operation of the short-term storage at the Bear Creek Project. The flood control storage has been preserved as previously authorized, and flood reduction benefits will be unaffected by the proposed modification.

(3) **Recreation.** The Bear Creek Reservoir will provide recreation capacity for 250,000 visitors annually of which 101,200 are credited to the directly related recreation uses. The lands acquired for recreation will provide for public ownership of the desirable shore area and provide space for development of three recreation sites. Necessary facilities for one-day outings as well as camping would be provided. Operation of the project would consider the downstream flow requirements for stream fisheries and the management of the impoundment for lake fisheries as a coordinated element for the full realization of the recreation potential of the project. Hunting would be permitted during appropriate season and in accordance with reasonable regulation to assure public safety.

c. **Schedule.** Modification of the existing Bear Creek project is scheduled to be completed no later than 1989.

9. TOHICKON PROJECT

a. **Description.** The Tohickon Project, fully developed in two stages, will be a multiple-purpose project to provide supplies of water and recreation. The initial development to satisfy existing recreation needs is economically feasible and has been proposed by the Corps of Engineers for the immediate future. Land will be acquired for the initial stage of development as it becomes available. Such an arrangement will assure preservation of the potential reservoir which is considered essential to water supply development in the basin after the year 2010 when full development of the site is indicated. The project site is located on Tohickon Creek about one mile southwest of Ottsville, Pennsylvania. (See plate 9). The drainage area above the dam site is 75 square miles. Storage allocations for ultimate development as suggested by the Corps of Engineers are 1,500 acre-feet of inactive long-term storage to elevation 335 and 30,000 acre-feet of active long-term storage for supplies of water and recreation to elevation 388. The reservoir at elevation 388 would extend about 6½ miles upstream. Total lands, including the eventual reservoir area, indicated as desirable for development at this project would include about 4500 acres.

b. **Functions.**

(1) **Supplies of Water and Recreation.** It has been estimated that flow augmentation from this project will not be required for the satisfaction of water needs until after the year 2010. Accordingly, the Pennsylvania Department of Forests and Waters plans initial development of the site for recreation only. The original structure will provide a storage pool for that purpose to approximately elevation 375′ m.s.l., but will be so designed as to permit raising or adaption at a later date to provide a storage pool to approximately elevation 388′ m.s.l. when needed for water supply.

The recreation area will be primarily developed for day-use activities, and it is estimated that over 1 million visitors annually will be accommodated.

c. **Schedule:** The Department of Forests and Waters, Commonwealth of Pennsylvania, is currently proceeding with the Tohickon project for recreational development as the first unit of a series of regional parks in the metropolitan area of southeastern Pennsylvania. At the present time land acquisition for the project is underway by the General State Authority and tentative plans for the recreation facilities are being prepared. The Department of Forests and Waters has on file a request from the Bucks County Commissioners for the use of the reservoir for water supplies.

10. EVANSBURG PROJECT

a. **Description.** The Evansburg Project, fully developed in two stages, will be a multiple-purpose project to provide supplies of water and recreation. The initial development to satisfy existing recreation needs is economically feasible and has been proposed by the Corps of Engineers for the immediate future. Land will be acquired for the initial stage of development as it becomes available. Such an arrangement will assure preservation of the potential reservoir which is considered essential to water supply development in the basin after the year 2010 when full development of the site is indicated. The project site is located on Skippack Creek about a mile above its confluence with Perkiomen Creek and about two miles southeast of Collegeville, Pennsylvania (See plate 10). The drainage area above the dam site is 54 square miles. Storage allocations for ultimate development as suggested by the Corps of Engineers, are 1,500 acre-feet of inactive long-term storage to elevation 125 and 23,500 acre-feet of active long-term storage for supplies of water and recreation to elevation 166. The reservoir at elevation 166 will extend about eight miles

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upstream from the dam and provide a reservoir area of 1,120 acres. The total lands, including the eventual reservoir area, indicated as desirable for the initial stage of development at this project include 4,654 acres at an estimated cost of about 11.0 million dollars. The estimated cost of the initial stage of development is 16.3 million dollars which includes an estimated 4.3 million dollars to acquire the reservoir area to assure its preservation for future use and 12.0 million dollars of specific recreation costs. Included in the latter are 6.7 million dollars for recreation lands and 5.3 million dollars for recreation facilities. The estimated cost of the complete two-stage development is 23.8 million dollars, of which 7.5 million dollars is the estimated cost of the dam and appurtenant works, relocations and reservoir clearing.

b. **Functions.**

(1) **Supplies of water.** When fully developed, use of 23,500 acre-feet of active long-term storage in the Evansburg Project will provide a net yield of 36 cubic feet per second. This flow augmentation will contribute to the satisfaction of the water needs after the year 2010.

(2) **Recreation.** Evansburg Project would provide a recreation capacity to accommodate 936,000 visitors annually during the initial stage of development and 1,560,000 visitors annually when fully developed. The topography of the land surrounding the reservoir varies from steep near the dam site, to rolling with an exceptional amount of usable area. This area would be particularly adaptable for such activities as swimming, boating, fishing, picnicking, hiking, field sports, nature study, and group camping.

c. **Schedule:** The Commonwealth of Pennsylvania contemplates early action toward acquiring land at this site. Evansburg will become a unit in the series of regional parks in the metropolitan area of southeastern Pennsylvania.

11. BRANDYWINE PROJECT

a. **Reference.** The Brandywine Watershed Plan has been developed by the U. S. Soil Conservation Service and the Commonwealth of Pennsylvania, Department of Forests and Waters, at the request of, and in cooperation with the local people of the Brandywine watershed. The 330 square mile drainage area is located in the southeastern corner of Pennsylvania and the most northern part of Delaware (see plate 11). Details about the watershed and the plan of improvement are contained in the Commonwealth of Pennsylvania, Department of Forests and Waters, "Report on Water Resources Study of the Brandywine Creek Basin in Pennsylvania", dated December 1958, and in a supplement to that report dated November 1959, and in the "Watershed Work Plan for the Brandywine Creek Basin," prepared by local sponsoring organizations with assistance from the U. S. Soil Conservation Service, and dated March 1959.

b. **Water problems and plan of improvement.** The major water problems of the area are flood damages and municipal and industrial water supply. New water-based recreation areas and facilities are also an important need in the area. Direct average annual flood damages have been estimated at $203,000. Direct damages from the flood of August 1955 were approximately $643,000. The plan of improvement provides for the construction of 12 reservoirs: five for flood control, water supply and recreation, and seven smaller reservoirs for flood control and limited recreation. Channel improvement in the vicinity of Coatesville is also included. Land treatment measures include cover cropping, contour farming, strip cropping, establishment of perennial hay, pasture improvement, grassed waterways, diversion terraces, tree planting, improvement cuttings and fencing farm woodlots. Total estimated cost of the 12 reservoirs and channel improvement project is $14,143,500 (November 1959 price level). The plan is designed to improve the low flow and quality characteristics of the Brandywine in the State of Delaware.

c. **Schedule.** Assistance to local sponsoring organizations by the U. S. Soil Conservation Service has been provided in accordance with Public Law 566. The Soil Conservation Service expects to submit the watershed work plan for the Brandywine to the appropriate committees of Congress during the current session

to obtain the federal share of total project costs. Meanwhile the Commonwealth of Pennsylvania has available $2.4 million to begin construction of the first multi-purpose reservoir (DO-8A on Marsh Creek) on the East Branch of the Brandywine above Downingtown, and is now in process of flying the area to obtain detailed topographic data. The overall Brandywine Plan is designed to meet the water needs of that sub-basin to the year 2010, and construction of the structural measures in the plan will be phased over the period from now until that date.

12. LITTLE SCHUYLKILL PROJECT

a. **Reference.** The Little Schuylkill Watershed Plan is sponsored by the Schuylkill, Carbon and Berks County Soil Conservation Districts, Schuylkill County Commissioners, Tamaqua Borough Council, the Pennsylvania Fish Commission and the Pennsylvania Department of Forests and Waters. The Watershed is a 136 square mile area, the principal portion of which lies in the eastern part of Schuylkill County, Pennsylvania, (see plate 12). Details of the watershed plan are contained in the report, "Watershed Work Plan For Watershed Protection And Flood Prevention, Little Schuylkill River Watershed," dated April 1958, prepared by the local sponsoring organizations with assistance from the U. S. Soil Conservation Service and U. S. Forest Service.

b. **Water problems and plan of improvement.** Floodwater and sediment damage to industrial, business and residential areas constitute the major water problems. These damages averaged about $120,000 annually prior to the initiation of the project. Direct damages from the flood of August 1955 have been estimated at $1,662,000. Sediment from culm banks and waste material from coal mining operations contribute materially to the sedimentation problem. Water-based recreation facilities are needed in the area. Work plans for the watershed provide for three floodwater retarding structures above Tamaqua (PA-422, 423 and 424) and one above New Ringgold (PA-425) on Koenig's Creek. A channel improvement project (PA-426) in the vicinity of Reynolds is also part of the plan. Total storage capacity of the four floodwater retarding structures is approximately 8,800 acre-feet. One of the floodwater retarding structures (PA-423 on Locust Creek) will be a multi-purpose unit for flood control, fish and wildlife and recreation. Land treatment measures in the watershed plan are 22 miles of diversion terraces, 60,000 feet of grassed waterways, 95,000 feet of closed drains, 43,000 feet of open drains, 700 feet of channel improvement, 452 acres of pasture planting, tree planting on 1,000 acres, and, timber stand improvement on 250 acres. Estimated total cost of the plan, including both structures and land treatment measures, but excluding recreation features at Locust Creek, is $2,400,000.

The Locust Creek project of the Little Schuylkill watershed plan (shown as PA-423 on plate 12 and separately on plate 12-A) is a cooperative enterprise of the Pennsylvania Department of Forests and Waters, the U. S. Department of Agriculture Soil Conservation Service, and the Schuylkill County Commissioners. The Department of Forests and Waters considers the site suitable for recreation development due to the fact that it is one of the few non-acid streams in the vicinity. The Department plans to design and construct the dam and develop State Park facilities. The Soil Conservation Service will pay all of project costs allocated to flood control. The Schuylkill County Commissioners are committed to pay for the necessary lands, easements and rights-of-way for the area to be flooded by the reservoir. Maximum pool elevation for Locust Creek will be 1,037.5 feet; recreation pool elevation will be 1,008 feet; recreation pool area will be 100 acres, and; total land to be acquired for the reservoir and recreation land is 1,475 acres.

c. **Schedule.** The Little Schuylkill watershed was authorized for federal planning assistance under Public Law 566 in November 1956, and the plan was approved for operations by the U. S. Department of Agriculture in July 1958. One of the floodwater retarding structures (PA-424) is now complete and another (PA-425) is almost complete. The Department of Forests and Waters is presently proceeding with design of the Locust Creek unit (PA-423), and the local people are in process of obtaining the necessary lands. Treatment measures on crop and pasture lands are approximately 45 per cent complete. The plan is scheduled for completion in fiscal year 1963.

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13. LACKAWAXEN TRIBUTARIES PROJECT

a. **Reference.** The Lackawaxen Tributaries Watershed Plan is sponsored by the Wayne County Soil Conservation District and the Wayne County Commissioners. The watershed area encompassed by the plan is 41.6 square miles, and lies in the southeastern portion of Wayne County, Pennsylvania, (see plate 13). It consists of that portion of the Lackawaxen River watershed lying between the towns of Honesdale and Hawley, Pennsylvania. The plan concentrates on four tributaries on the east side of the Lackawaxen River—Carley Brook, Laurella Brook, Indian Orchard Creek, and Lollipop Creek. Details of the watershed plan are contained in the report "Watershed Work Plan for Watershed Protection and Flood Prevention Lackawaxen Tributaries Watershed," dated March 1958, prepared by the sponsoring organizations with assistance from the U. S. Soil Conservation Service and U. S. Forest Service.

b. **Water problems and plan of improvement.** Principal water problems are flood water, erosion and sediment damage to residential, agricultural and industrial properties. These damages averaged about $30,000 annually prior to the initiation of the project. Damage from the flood of August 1955 has been estimated at $218,000. The watershed plan provides for the installation of seven single-purpose flood water retarding structures: three on Laurella Brook; two on Indian Orchard Creek, and; one each on Carley Brook and Lollipop Creek. Total storage capacity of these reservoirs is 1,193 acre-feet, of which 1,112 acre-feet are for floodwater detention. Major land treatment measures in the plan are 150 acres of strip cropping, establishment of perennial hay on 450 acres, 200 acres of pasture planting, 300 acres of pasture improvement, 8,000 feet of grassed waterways, 75,000 feet of diversion terraces, 1,100 feet of open drains, 700 acres of tree planting, timber stand improvement on 500 acres, and fencing of 1,200 acres of forest land. Estimated total cost of the watershed plan, including both structures and land treatment measures, is $432,000.

c. **Schedule.** The Lackawaxen Tributaries watershed was authorized for federal planning assistance under Public Law 566 in June of 1956, and the work plan was approved for operation by the U. S. Department of Agriculture in May 1958. Five of the floodwater detention structures (PA - 415, 416, 418, 419 and 421) have been completed, and a sixth (PA - 420) is scheduled for completion in the summer of 1962. Treatment measures on crop and pasture land are approximately 90 per cent complete. The plan is scheduled to be completed in the fiscal year 1963.

14. BRODHEAD CREEK PROJECT

a. **Reference.** The Brodhead Creek Watershed Plan is sponsored by the Monroe and Pike County Soil Conservation Districts, and the Monroe and Pike County Commissioners. The watershed is 29.1 square miles in area. Its downstream boundary lies just above the Spruce Cabin Run — Brodhead confluence at Canadensis, Pennsylvania (see plate 14). Details about the watershed plan are set out in a report "Watershed Work Plan, Brodhead Creek Watershed," dated March 1961, prepared by the sponsoring organizations with assistance from the U. S. Soil Conservation Service and U. S. Forest Service.

b. **Water problems and plan of improvement.** The major water problem is floodwater and sediment damage to business, residential, highway, bridge, railroad, farm and resort areas. These damages average $44,000 annually. The flood of August 1955, produced direct damages of $1,115,000 and a loss of nine lives. The watershed plan provides for the construction of three single purpose flood retarding structures; on Goose Pond Run (PA - 464); on Griscom Creek (PA - 465); and on Buck Hill Creek (PA - 466). One multi-purpose flood prevention and recreation unit is planned on Leavitt Branch (PA - 463). Total storage capacity of these four reservoirs is about 4,554 acre-feet, of which 4,107 acre-feet are floodwater detention capacity. Major land treatment measures provided in the watershed plan are 2,000 feet of grassed waterways, 5,000 feet of diversion terraces, 2,000 feet of open drains, 2,000 feet of closed drains, 30 acres of pasture planting and 40 acres of pasture improvement, 240 acres established in perennial hay, 40 acres of strip cropping, 100 acres of tree planting, 500 acres of hydrologic cultural operations, and

forest management assistance as required on 7,000 acres. Estimated total cost of the watershed plan, including both structures and land treatment measures, is $1,575,000.

c. **Schedule.** The Brodhead Creek watershed was authorized for federal planning assistance under Public Law 566 in April 1959, and the work plan was approved for operations by the U. S. Department of Agriculture in September of 1961. Inauguration of this plan is too recent for any appreciable progress to have yet been made. The plan is scheduled to be completed in 1966.

15. GREENE-DREHER PROJECT

a. **Reference.** The Greene-Dreher Watershed Plan is sponsored by the Wayne, Pike and Monroe County Boards of Commissioners and the Wayne, Pike and Monroe County Soil Conservation Districts. The watershed is part of the larger watershed of Wallenpaupack Creek upstream from its junction with the West Branch and Lake Wallenpaupack in Pennsylvania. It is a 74.7 square mile area (see plate 15). Details of the watershed plan are contained in a report "Watershed Work Plan for Watershed Protection and Flood Prevention, Greene-Dreher Watershed," dated May 1959, prepared by the sponsoring organizations with assistance from the U. S. Soil Conservation Service and U. S. Forest Service.

b. **Water problems and plan of improvement.** Major water problems in the watershed are flood-water and sediment damage to business, residential and resort areas, and to agricultural lands, roads and bridges. Principal flood damage areas are the towns of South Sterling, Newfoundland and Greentown. Average annual flood damages have been estimated at $188,000. Runoff from the flood of August 1955 caused direct damage of $1,435,000, and a loss of eleven lives. Work plans for the watershed provide for the construction of sixteen floodwater detention structures (PA - 438 through PA - 453) with a total storage capacity of 7,257 acre feet, and a total floodwater storage capacity of 6,946 acre feet. One of these structures (PA - 443) will include additional storage for recreation. Major land treatment measures in the plan are 120 acres of strip cropping, establishment of perennial hay on 336 acres, 129 acres of pasture planting, 193 acres of pasture improvement, 690 feet of grassed waterways, 23,000 feet of diversion terraces, 2,000 feet of open drains, 2,000 feet of closed drains, 250 acres of tree planting, 650 acres of timber stand improvement, and 900 acres of hydrologic cultural operations. Estimated total cost of the watershed plan, including both structural and land treatment measures, is $2,697,000.

c. **Schedule.** The Greene-Dreher watershed project was authorized for federal planning assistance under Public Law 566 in August 1958, and the work plan was approved for operations by the U. S. Department of Agriculture, in August 1959. Two of the flood retarding structures are now complete and a third is under contract. Treatment measures on crop and pasture lands are 40 per cent complete. The plan is scheduled to be completed during fiscal year 1965.

16. HACKETTSTOWN PROJECT

a. **Description.** The Hackettstown Project has been proposed by the Corps of Engineers as a two stage, multiple-purpose project to provide supplies of water and recreation. The initial development to satisfy existing recreation needs is economically feasible and is proposed for the immediate future. Land will be acquired for the initial stage of development as it becomes available. Such an arrangement will assure preservation of the potential reservoir which is considered essential to water supply development in the basin after the year 2010 when full develop- of the site is indicated. The project site is located on Musconetcong River about three miles upstream from Hackettstown, New Jersey (See plate 16). The drainage area upstream from the dam site is 70 square miles. Storage allocations for ultimate development as suggested by the Corps of Engineers, are 1,000 acre-feet of inactive long-term storage to elevation 630 and 22,000 acre-feet of active long-term storage for supplies of water

and recreation to elevation 665. The reservoir at elevation 665 would extend about five miles upstream and provide a reservoir area of 1,200 acres. Total lands, including the eventual reservoir area, desirable for the initial stage of development would comprise 10,362 acres at an estimated cost of 8.6 million dollars. The estimated cost of the initial stage of development is 17.1 million dollars, including an estimated 3.5 million dollars to acquire the reservoir area to assure its preservation for future use and 13.6 million dollars of specific recreation costs. Included in the latter are 5.1 million dollars for recreation lands and 8.5 million dollars for recreation facilities. The estimated cost of the complete two-stage development is 28.0 million dollars of which 10.9 million dollars is the estimated cost of the dam and appurtenant works, relocations and reservoir clearing.

b. **Functions.**

(1) **Supplies of water.** When fully developed, use of 22,000 acre-feet of active long-term storage in the Hackettstown Project will provide a net yield of 53 cubic feet per second. This flow augmentation will contribute to the satisfaction of the water needs after the year 2010.

(2) **Recreation.** The Hackettstown Project will provide a recreation capacity to accommodate 1,500,000 visitors annually during the initial stage of development and 2,500,000 visitors annually when fully developed. The total recreation resources available will provide outstanding nonurban recreation opportunities. The character of the area is such that facilities for every conceivable type of nonurban recreation could be included in the development plan.

c. **Schedule.** With funds from its "Green Acres" program, New Jersey contemplates early action toward acquisition of land at the Hackettstown site.

17. SILVER LAKE—LOCUST ISLAND PROJECT

a. **Reference.** The Silver Lake-Locust Island Watershed Plan is sponsored by the Salem-Cumberland Soil Conservation District, the Locust Island and Thorofare Meadow Companies, and the Township Committee of Lower Alloways Creek Township. The watershed covers approximately 8.6 square miles in the southern tip of Salem County, New Jersey (see plate 17). Details about the watershed and the plan of improvement are contained in a report, "Watershed Work Plan For Watershed Protection, Flood Prevention and Water Management, Silver Lake-Locust Island Watershed," dated January 1957, prepared by the local sponsoring organizations with assistance from the U. S. Soil Conservation Service.

b. **Water problems and plan of improvement.** The major water problem is one of inundation occurring when destroyed or overtopped dikes permit both fresh water and tidal flooding of a considerable portion of the watershed. This flooding destroys crops such as corn, tomatoes, asparagus and hay, and drives out large numbers of muskrats which are a valuable source of income to the local people. Average annual direct damages from flooding have been estimated at $6,464. Structural measures provided for in the watershed work plan are: (1) the repairing and reconstruction of 7,300 feet of the Locust Island dike and construction in the dike of pipe sluiceways with tide gates, and (2) the repairing and reconstruction of 5,100 feet of the Silver Lake dike and construction in the dike of pipe sluiceways with tide gates. Land treatment measures provided for in the plan are application of contour farming on 50 acres, cover cropping on 200 acres, installation of one mile of field diversion measures to guide and control water, pasture planting on 100 acres, conservation crop rotation on 200 acres, application of waterway development on 5 acres, establishment of 5 acres of wildlife borders and general wildlife area improvement on 400 acres, and, inauguration of crop residue management practices on 400 acres. Estimated total cost of the watershed plan, including both structural and land treatment measures is $350,000.

c. **Schedule.** The Silver Lake-Locust Island watershed project was authorized for federal planning assistance under Public Law 566 in April 1956, and the work plan was approved for operations

by the U. S. Department of Agriculture in May 1957. Structural measures are presently about 99 per cent complete and land treatment measures are fully completed. The plan is scheduled to be completed by about June 1962.

18. PAULINS KILL PROJECT

a. **Reference.** The Paulins Kill Watershed Plan is sponsored by the Warren and Sussex County Soil Conservation Districts, and the towns of Blairstown and Newton. The 171 square mile watershed is drained by the Paulins Kill which meanders 42 miles from the headwaters above Newton, New Jersey, to the mouth at Columbia on the Delaware River (See plate 18). Details about the watershed and the plan of improvement are contained in a report "Watershed Work Plan For The Paulins Kill Watershed," dated October 1958, prepared by the local sponsoring organizations with assistance from the U. S. Soil Conservation Service and U. S. Forest Service.

b. **Water problems and plan of improvement.** The principal water problem is floodwater damage to urban property in Blairstown and Newton. Average annual direct flood damages have been estimated at $18,429. Damages to the towns of Blairstown and Newton from the flood of August 1955 totaled $508,000. Structural measures provided in the work plan are: (1) deepening, widening and realigning approximately 2 miles of the main channel; (2) construction of approximately 1,075 feet of dike; (3) construction of a grade control structure below the Route #94 bridge on Blair Creek, and; (4) construction of three floodwater retarding structures on the tributaries above Newton. The three floodwater retarding structures will provide a total of approximately 162 acre-feet of storage capacity of which about 134 acre-feet will be for floodwater detention. Major land treatment measures provided for in the plan are 1,033 acres of contour farming, 595 acres of cover cropping, 1,025 acres of strip cropping, 1,240 acres of conservation crop rotation, 1,590 acres of pasture planting, application of waterway development on 8.3 acres, installation of 13.5 miles of field diversion measures to guide and control water, construction of 25 farm ponds, 200 acres of tree planting, hydrologic cultural operations on 850 acres, 5 miles of woodland grazing control, and, preparation of 200 timber management plans. Estimated total cost of the watershed plan, including both structural and land treatment measures, is $674,000.

c. **Schedule.** The Paulins Kill watershed project was authorized for federal planning assistance under Public Law 566 in November 1956, and the work plan was approved for operations by the U. S. Department of Agriculture in November 1958. Structural measures are presently about 30 per cent complete, and land treatment measures about 40 per cent complete. The plan is scheduled to be completed by about June 1964.

19. MAURICE RIVER COVE PROJECT

a. **Reference.** The Maurice River Cove Watershed Plan is sponsored by the Townships of Maurice River and Commercial, the Salem-Cumberland Soil Conservation District, and the Division of Fish and Game of the New Jersey Department of Conservation and Economic Development. The 10.6 square mile watershed lies in the southern end of Cumberland County, New Jersey, at the point where the Maurice River enters Delaware Bay (see plate 19). About 65 per cent of the area is marshland. Details about the watershed and the plan of improvement are contained in a report, "Watershed Work Plan For The Tributaries Of Maurice River Cove Watershed," dated October 1960, prepared by the local sponsoring organizations with assistance from the U. S. Soil Conservation Service.

b. **Water problems and plan of improvement.** The major water problem is poor drainage and floodwater damage on about 439 acres of agricultural land in the Dickeys Ditch and New England Creek tributary subbasins. Average annual damages

from flooding and inadequate agricultural drainage have been estimated at $11,400. Structural measures provided for in the watershed work plan are: (1) about six miles of stream channel improvement and construction of two tidegate structures to alleviate flooding and improve drainage and: (2) construction of about 2.4 miles of dike and two tidegates for the improvement of wildlife habitat. Land treatment measures include 200 acres of cover cropping; 100 acres of conservation crop rotation, and; installation of approximately 9 miles of tile drains. Estimated total cost of the plan, including both structural and land treatment measures, is $251,000.

c. **Schedule.** The Maurice River Cove watershed project was authorized for federal planning assistance under Public Law 566 in December 1959, and was approved for operations by the U. S. Department of Agriculture in January 1961. Work on structural measures has not yet begun. Land treatment measures are currently about 10 per cent complete. Some easements and rights-of-way for the wildlife improvement dike have been acquired. The plan is scheduled to be completed by about June 1963.

20. NEWARK PROJECT

a. **Description.** The Newark Project has been proposed by the Corps of Engineers for multiple-purpose development to provide supplies of water and recreation. The dam site is located on White Clay Creek about 1½ miles north of Newark, Delaware (See plate 20). The drainage area above this site is 67 square miles. A concrete gravity type dam 1,200 feet long, including a spillway section 400 feet long, is proposed for this site. The non-overflow section of the dam will be 97 feet above the creek bed and the spillway crest 81 feet above that datum. Gated sluices through the dam 7 feet above the creek bed and bypass pipes would be provided for low level reservoir releases. Stream diversion during construction would be over concrete monoliths left low, temporarily, for that purpose. Storage allocations for the Newark Project, as recommended by the Corps of Engineers, are 1,000 acre-feet of inactive long-term storage to elevation 98 and 30,000 acre-feet of active long-term storage for supplies of water and recreation to elevation 156. The reservoir will extend about six miles up White Clay Creek into Pennsylvania. Relocation of 2.7 miles of county road including a bridge across the reservoir, a stream gaging station, a pumping plant and a sewer line would be required. No railroads, communities, or commercially developed mineral deposits are located in the reservoir area. A total of 6,490 acres of land would be acquired for the complete development. In addition to the 1,090 acres required for the construction of the project, 4,000 acres would be required for directly related recreation and 1,400 acres for indirectly related recreation. The total estimated project cost, excluding $3,550,000 for indirectly related recreation, is $15,300,000, which includes specific costs for directly related recreation of $5,140,000. The directly and indirectly related recreation costs include the following:

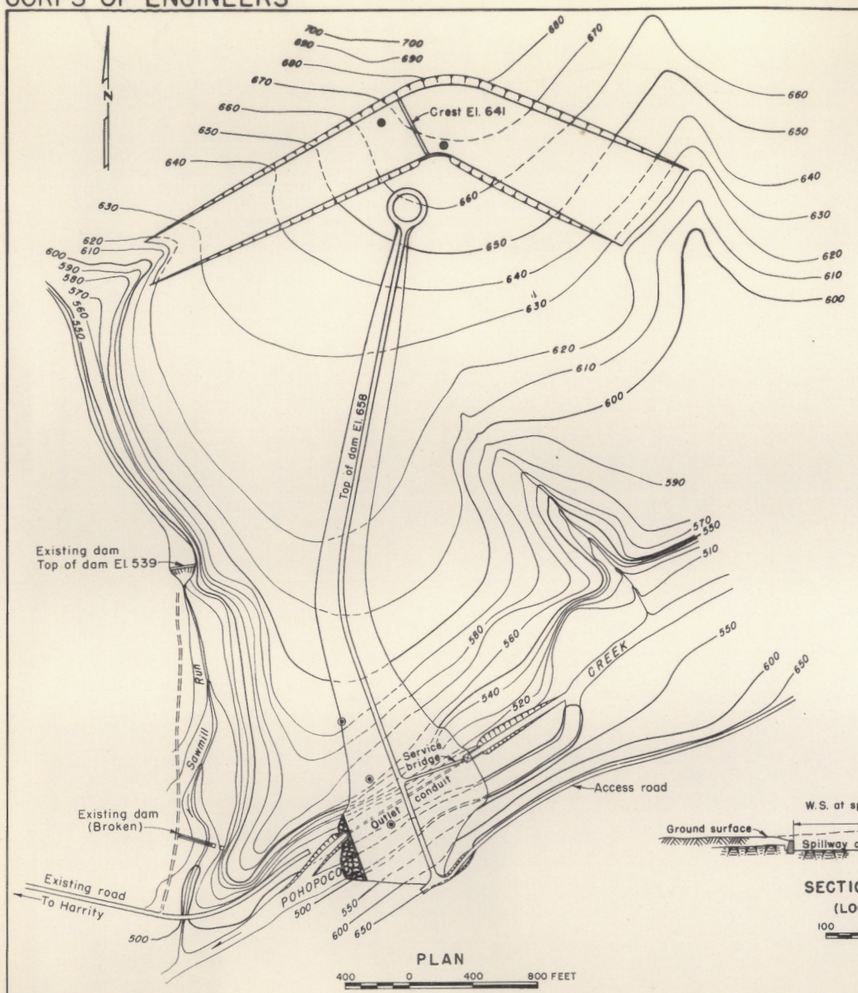
	Estimated Specific Recreation Costs	
	Directly Related	Indirectly Related
Land	$3,250,000	$1,400,000
Facilities	1,890,000	2,150,000
Total	5,140,000	3,550,000

b. **Functions.**

(1) **Supplies of Water.** Use of 30,000 acre-feet of active long-term storage at Newark Project will provide a net yield of 43 cubic feet per second.

(2) **Recreation.** The Newark Project including the recreation element defined as the Mason-Dixon Interstate Park Area will provide recreation capacity for 937,500 visitors annually, of which 554,000 are credited to directly related recreation. The lands to be acquired specifically for recreation development will provide public ownership of the shore area and space for the development of six major recreation sites. Facilities also will be provided for one-day outings and camping. Required roads, trails, sanitary and administrative facilities and potable water are included in the plan. Hunting will be permitted in appropriate season and under reasonable regulation to assure public safety. Operation of the project will consider the downstream flow requirements for stream fisheries and the management of the impounded water for lake fisheries as a coordinated element for full realization of the recreation potential of the project.

c. **Schedule.** More detailed studies have recently been made of the Newark site. State and local officials plan to review alternative arrangements for the development of the site as a water supply source for northern Delaware, and as to the feasibility of including flood control storage.



PLAN

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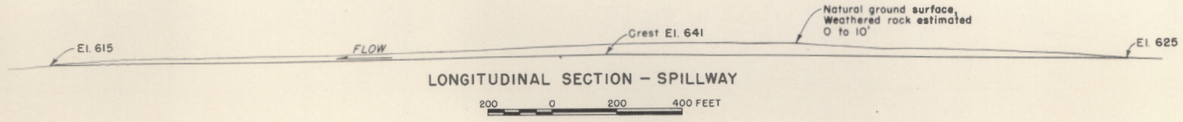

LONGITUDINAL SECTION – SPILLWAY

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SECTION – SPILLWAY CREST

(LOOKING DOWNSTREAM)

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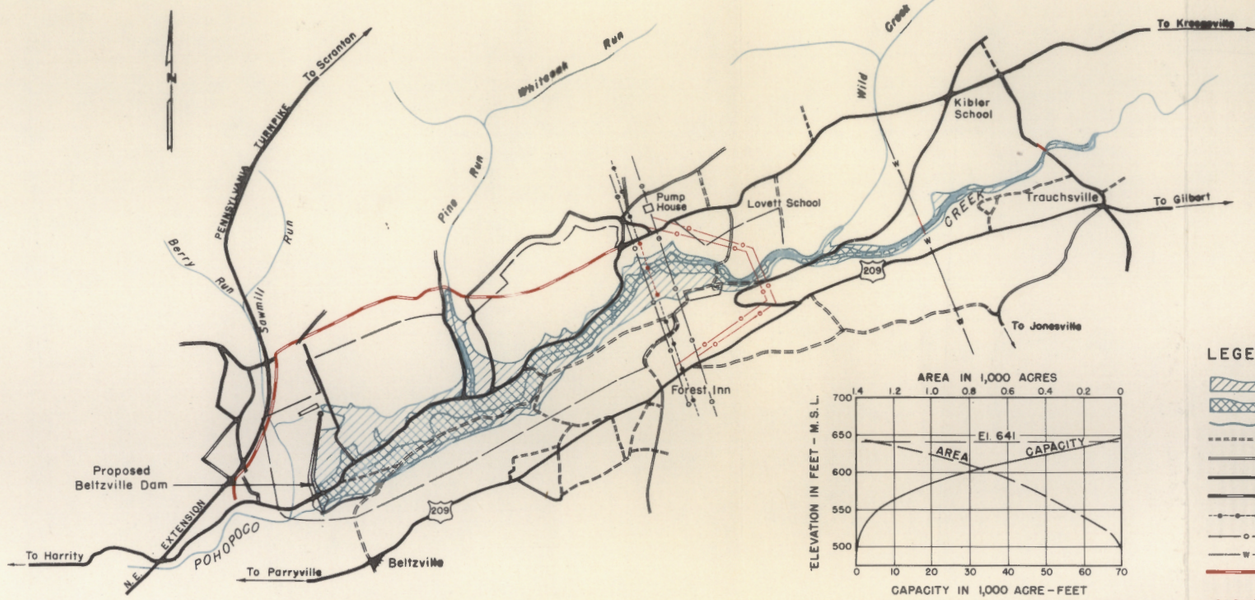
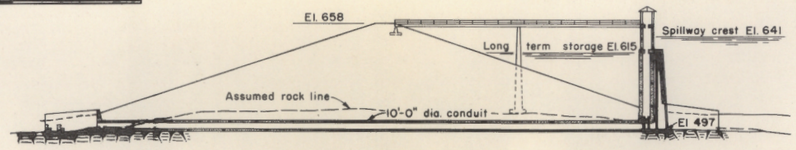


RESERVOIR MAP

0 1 MILE

RESERVOIR AREA AND CAPACITY CURVES



SECTION – OUTLET WORKS

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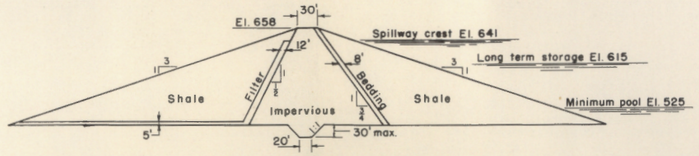

TYPICAL SECTION – DAM

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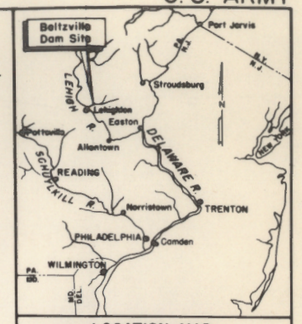


LOCATION MAP

SCALE

0 5 0 5 10 15 20 25 MI.

LEGEND

- Reservoir at El. 641
- Long Term Storage El. 615
- Existing Stream
- Dirt Road
- Graded Road
- Hard Surface, Heavy Duty Road
- Secondary Hard Surface Road
- Existing Power Line
- Existing Oil Line
- Existing Water Line
- Proposed Relocated Secondary Hard Surface Road
- Proposed Relocated Power Line
- Proposed Relocated Oil Line
- Land Acquisition for Recreation Development
- Drill Hole

Note: Topography at dam site taken from U.S. Geological Survey maps modified by cross sections obtained in field.

All taking lines shown on this map for land acquisition are preliminary and subject to change when the project reaches the detailed design stage.

REVIEW REPORT DELAWARE RIVER BASIN

BELTZVILLE PROJECT

In 1 Sheet

Corps of Engineers
Philadelphia, Pa.

Scale as Shown

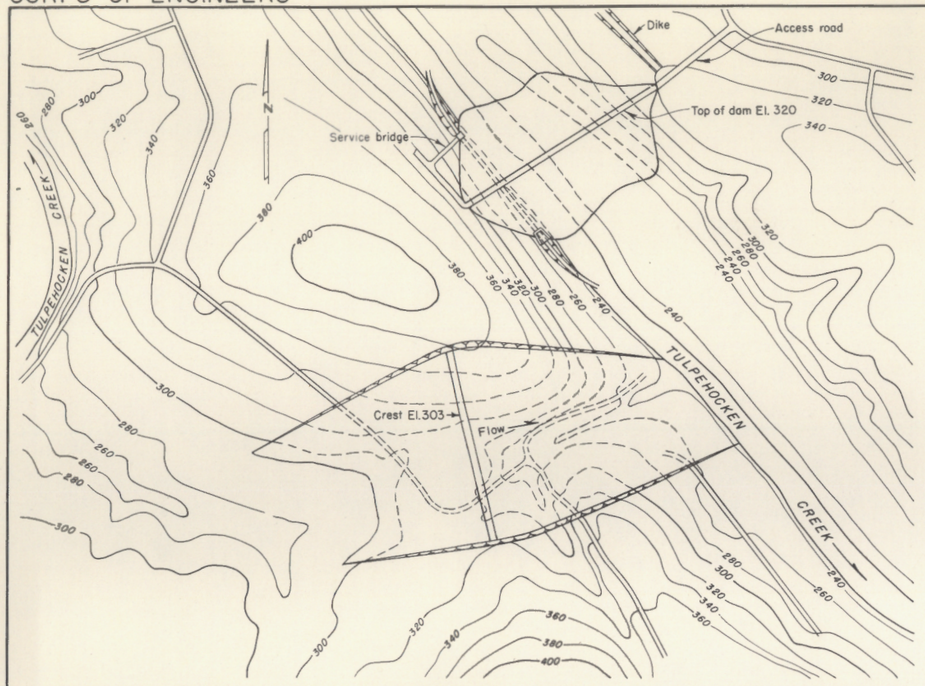
Philadelphia District
June 1960
Revised Nov. 1960

Drawer No. 228

File No. 29095

CORPS OF ENGINEERS

U. S. ARMY



PLAN

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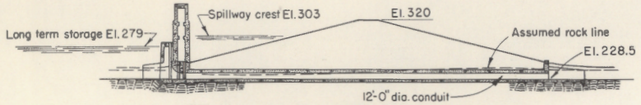

SECTION - OUTLET WORKS

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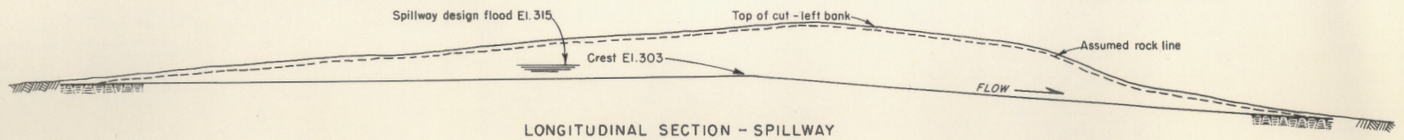

LONGITUDINAL SECTION - SPILLWAY

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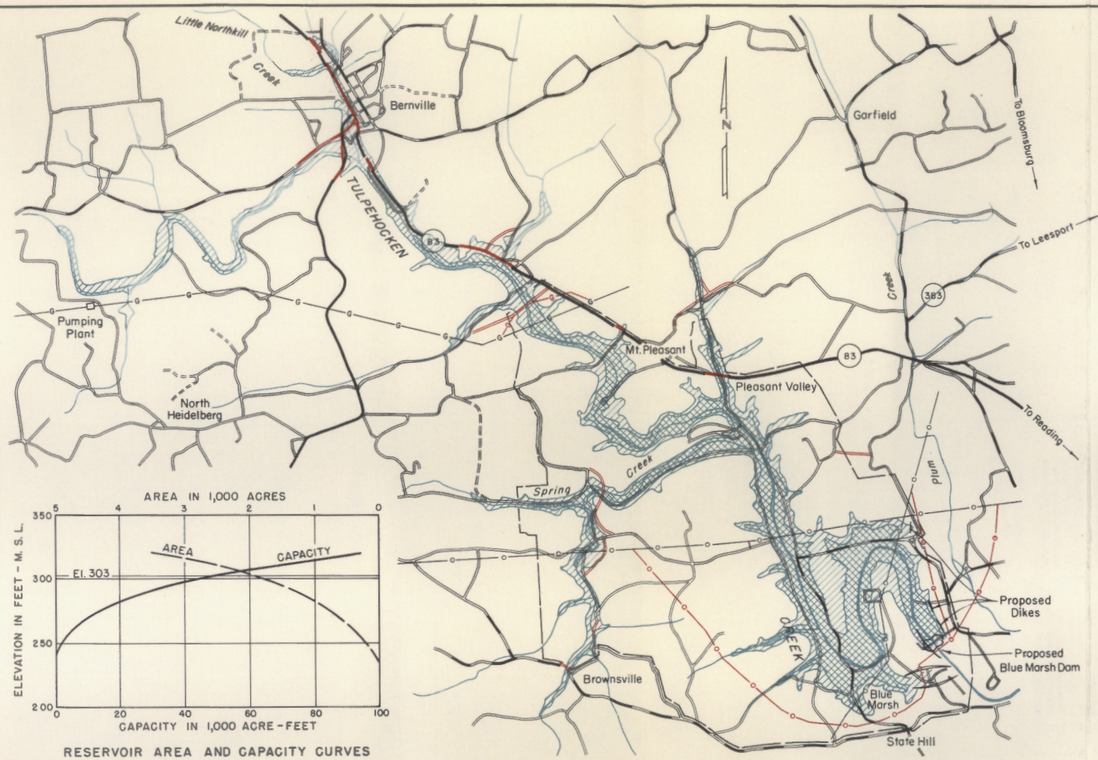
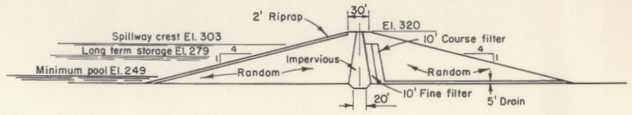


RESERVOIR MAP

1 0 1 MILE

RESERVOIR AREA AND CAPACITY CURVES



TYPICAL SECTION - DAM

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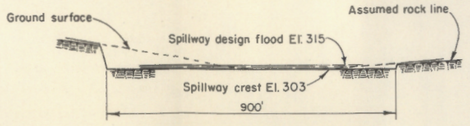

SECTION - SPILLWAY CREST
(LOOKING DOWNSTREAM)

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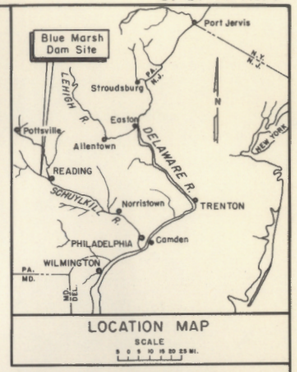


LEGEND

- Reservoir at El. 303
- Long Term Storage El. 279
- Existing Stream
- Dirt Road
- Graded Road
- Hard Surface, Heavy Duty Road
- Secondary Hard Surface Road
- Existing Gas Pipe Line
- Existing Oil Line
- Proposed Relocated Graded Road
- Proposed Relocated Hard Surface Heavy Duty Road
- Proposed Relocated Secondary Hard Surface Road
- Proposed Relocated Gas Pipe Line
- Proposed Relocated Oil Line
- Land Acquisition for Recreation Development

All taking lines shown on this map for land acquisition are preliminary and subject to change when the project reaches the detailed design stage.

REVIEW REPORT DELAWARE RIVER BASIN

BLUE MARSH PROJECT

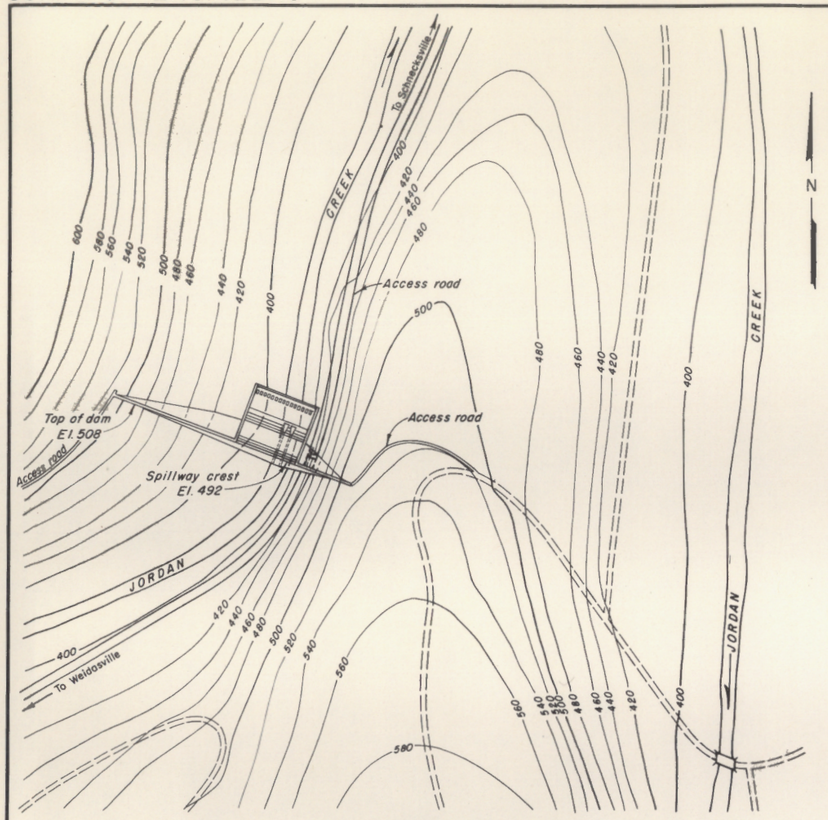
In 1 Sheet — Scale as Shown

Corps of Engineers
Philadelphia, Pa.

Philadelphia District
June 1960

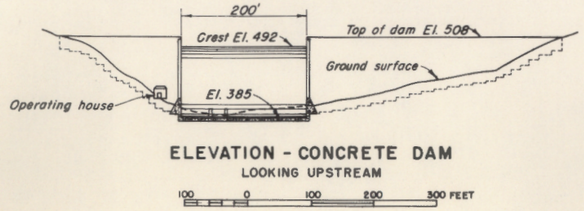
Drawer No. 228 — File No. 29096

PLATE 2



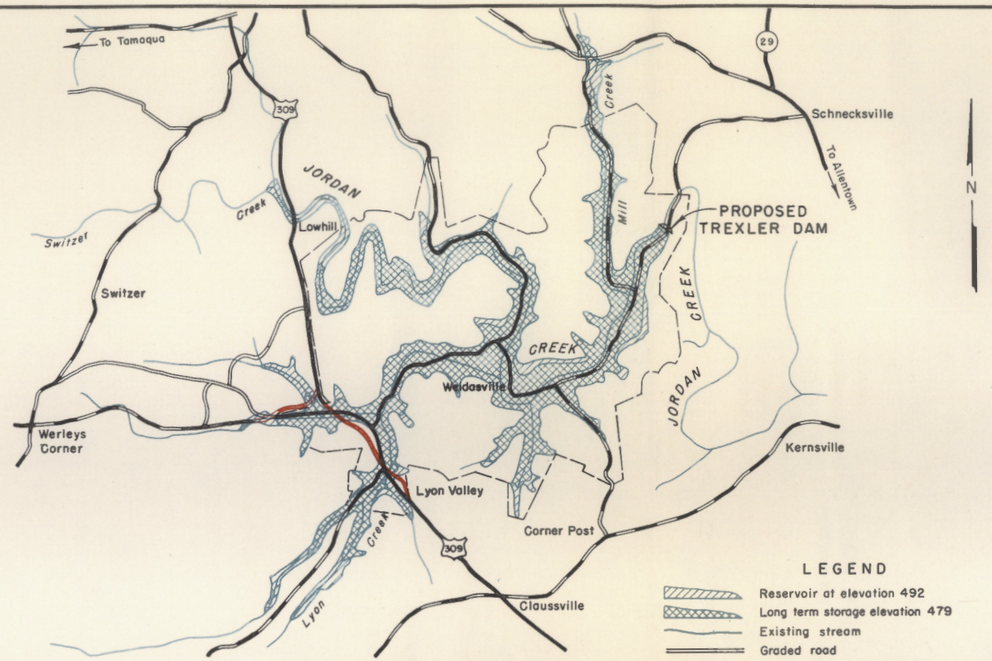
PLAN

200 0 200 400 FEET



ELEVATION - CONCRETE DAM
LOOKING UPSTREAM

100 0 100 200 300 FEET



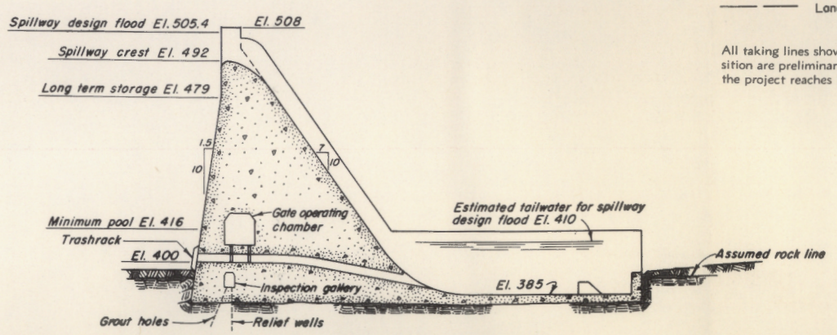
RESERVOIR MAP

1/2 0 1 MILE

LEGEND

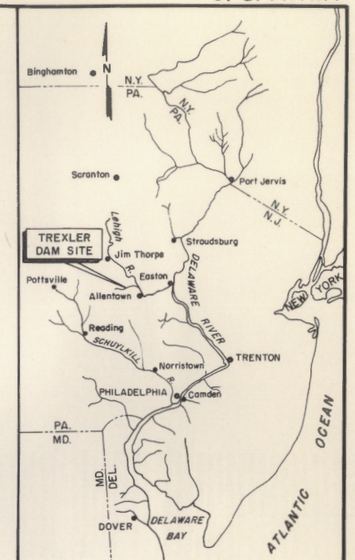
- Reservoir at elevation 492
- Long term storage elevation 479
- Existing stream
- Graded road
- Hard surface heavy duty road
- Secondary hard surface road
- Secondary hard surface road, relocated
- Hard surface heavy duty road, relocated
- Land acquisition for recreation development

All taking lines shown on this map for land acquisition are preliminary and subject to change when the project reaches the detailed design stage.



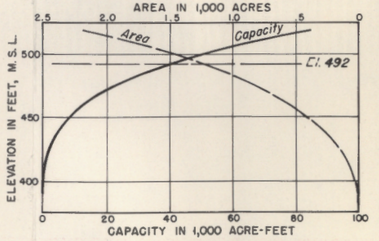
SECTION - CONCRETE DAM

30 0 30 60 FEET



LOCATION MAP

SCALE
10 0 10 20 30 40 MI.



AREA AND CAPACITY CURVES

REVIEW REPORT DELAWARE RIVER BASIN

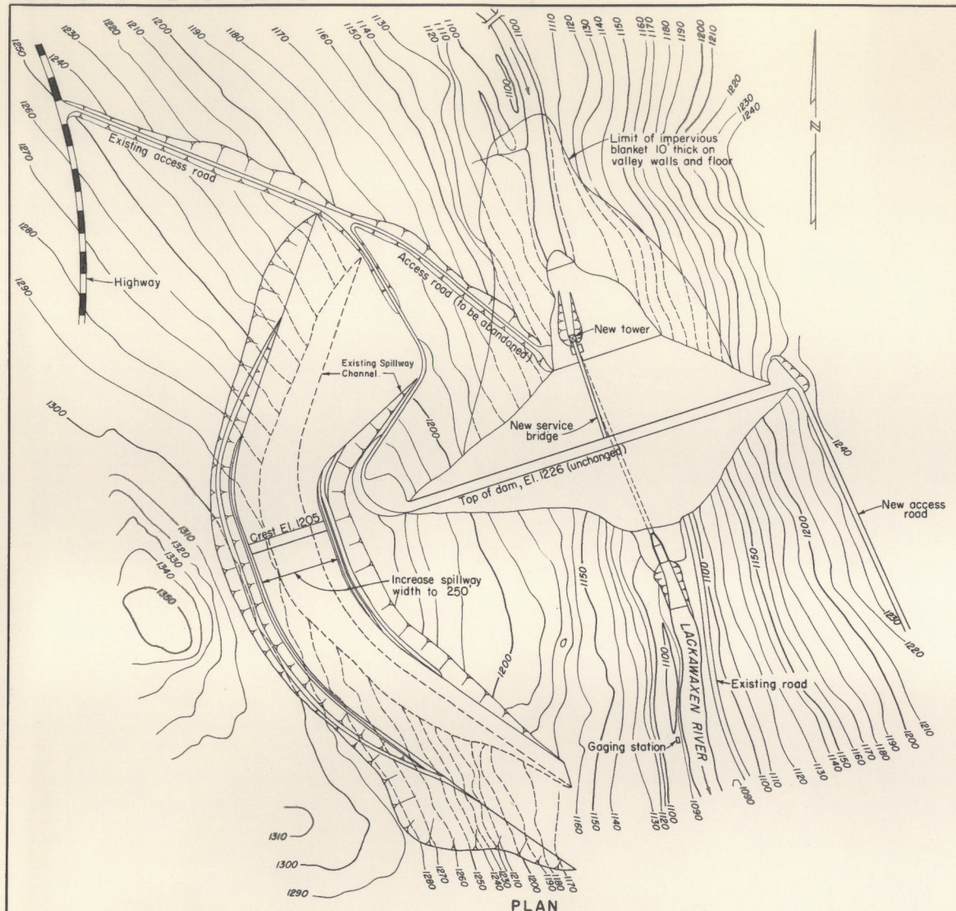
TREXLER PROJECT

In 1 sheet
Corps of Engineers

Scale as shown
Philadelphia District

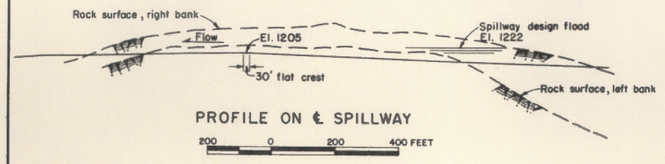
Drawer No. 228

File No. 29097



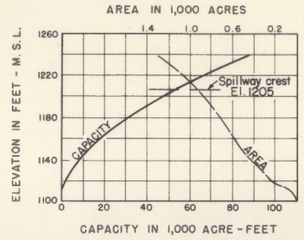
PLAN

200 0 200 400 FEET

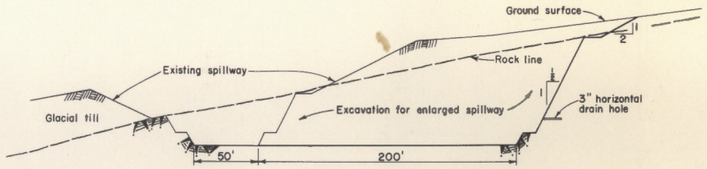


PROFILE ON ℄ SPILLWAY

200 0 200 400 FEET

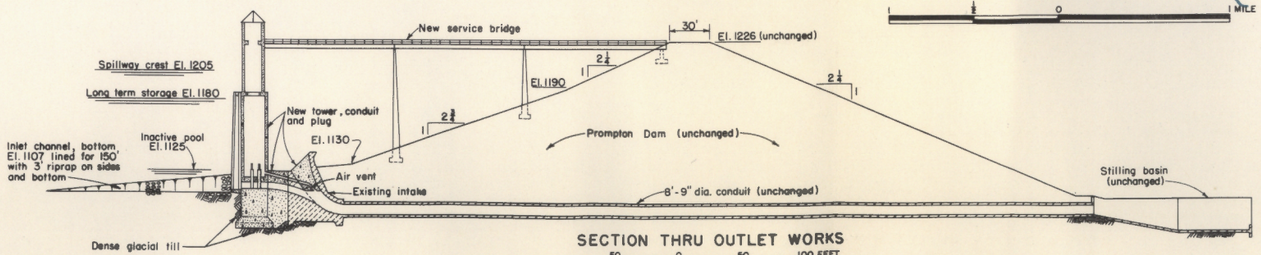


RESERVOIR AREA AND CAPACITY CURVES



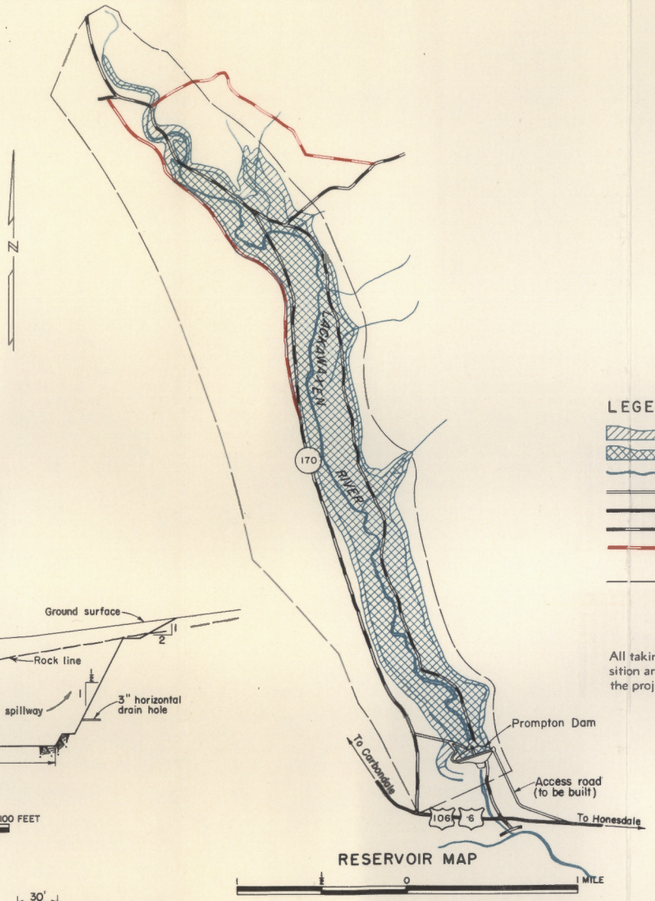
SPILLWAY SECTION
(Facing downstream)

50 0 50 100 FEET



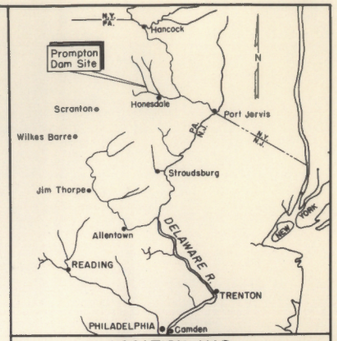
SECTION THRU OUTLET WORKS

50 0 50 100 FEET



RESERVOIR MAP

0 1 MILE



LOCATION MAP

SCALE

LEGEND

- Reservoir at El. 1205
- Long Term Storage El. 1180
- Existing Stream
- Graded Road
- Hard Surface, Heavy Duty Road
- Secondary Hard Surface Road
- Proposed Relocated Secondary Hard Surface Road
- Land Acqisition for Recreation Development

All taking lines shown on this map for land acquisition are preliminary and subject to change when the project reaches the detailed design stage.

REVIEW REPORT DELAWARE RIVER BASIN

PROMPTON PROJECT, MODIFIED

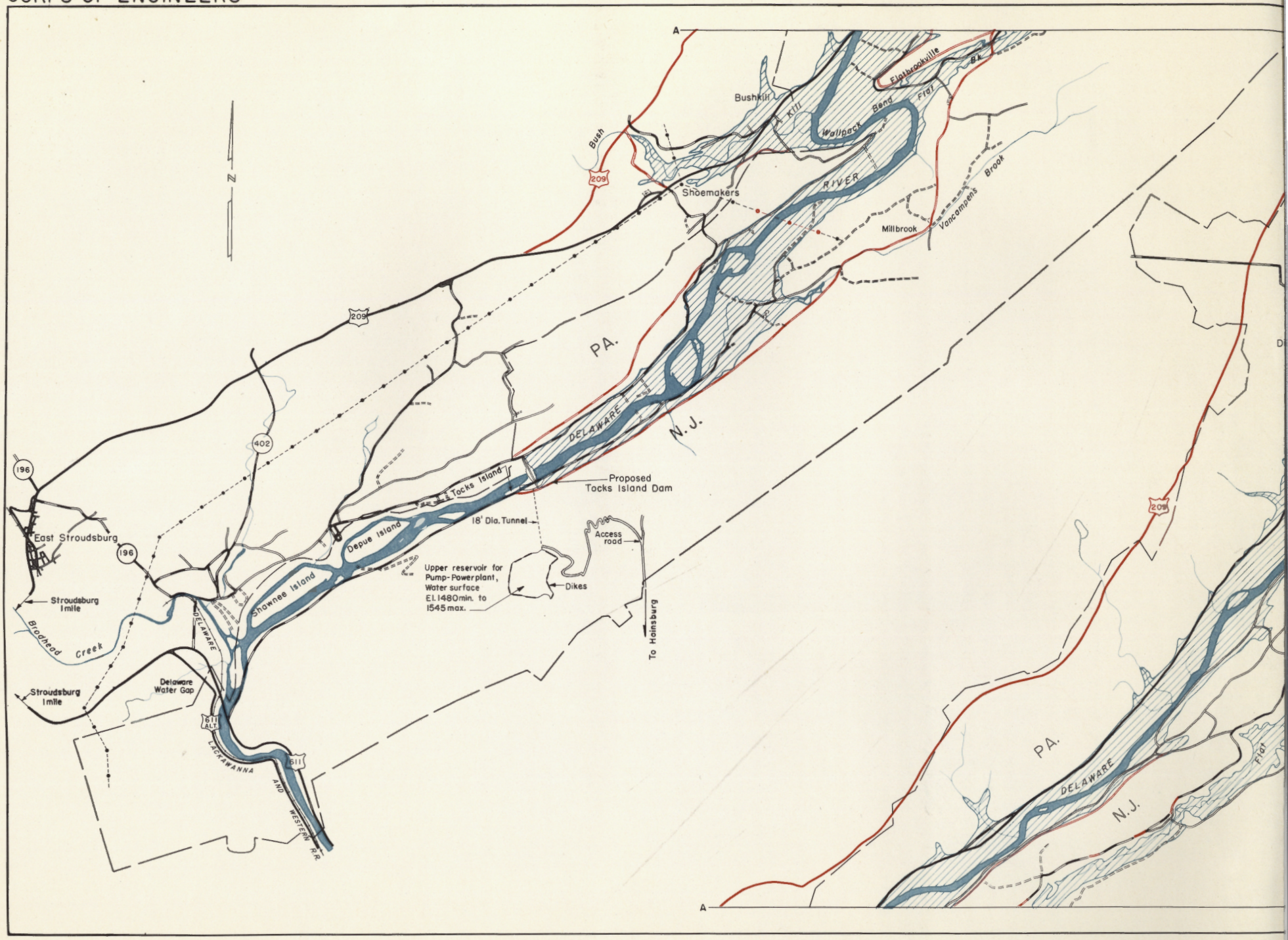
In 1 Sheet
Corps of Engineers
Philadelphia, Pa.

Scale as Shown
Philadelphia District
June 1960
Revised Oct. 1960

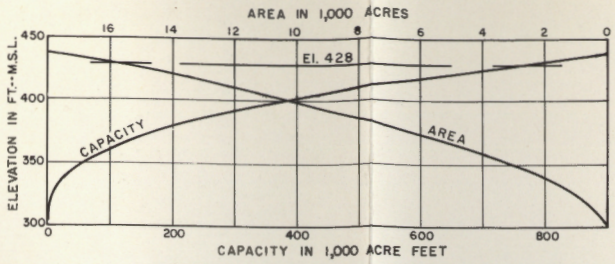
Drawer No. 228

File No. 29101

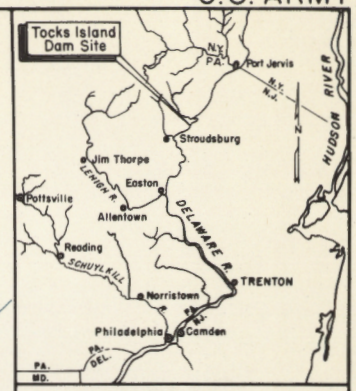
CORPS OF ENGINEERS



U.S. ARMY



RESERVOIR AREA AND CAPACITY CURVES



LOCATION MAP

SCALE:

RESERVOIR MAP

1 0 1 MILE

LEGEND

- Multiple-Purpose Pool El. 428
- Existing Stream
- Dirt Road
- Graded Road
- Hard Surface, Heavy Duty Road
- Secondary Hard Surface Road
- Existing Railroad
- Existing Power Line
- Proposed Relocated Graded Road
- Proposed Relocated Hard Surface Heavy Duty Road
- Proposed Relocated Secondary Hard Surface Road
- Proposed Rebuilt Power Line
- Land Acquisition for Recreation Development

All taking lines shown on this map for land acquisition are preliminary and subject to change when the project reaches the detailed design stage.

REVIEW REPORT DELAWARE RIVER BASIN

TOCKS ISLAND RESERVOIR

In 1 Sheet

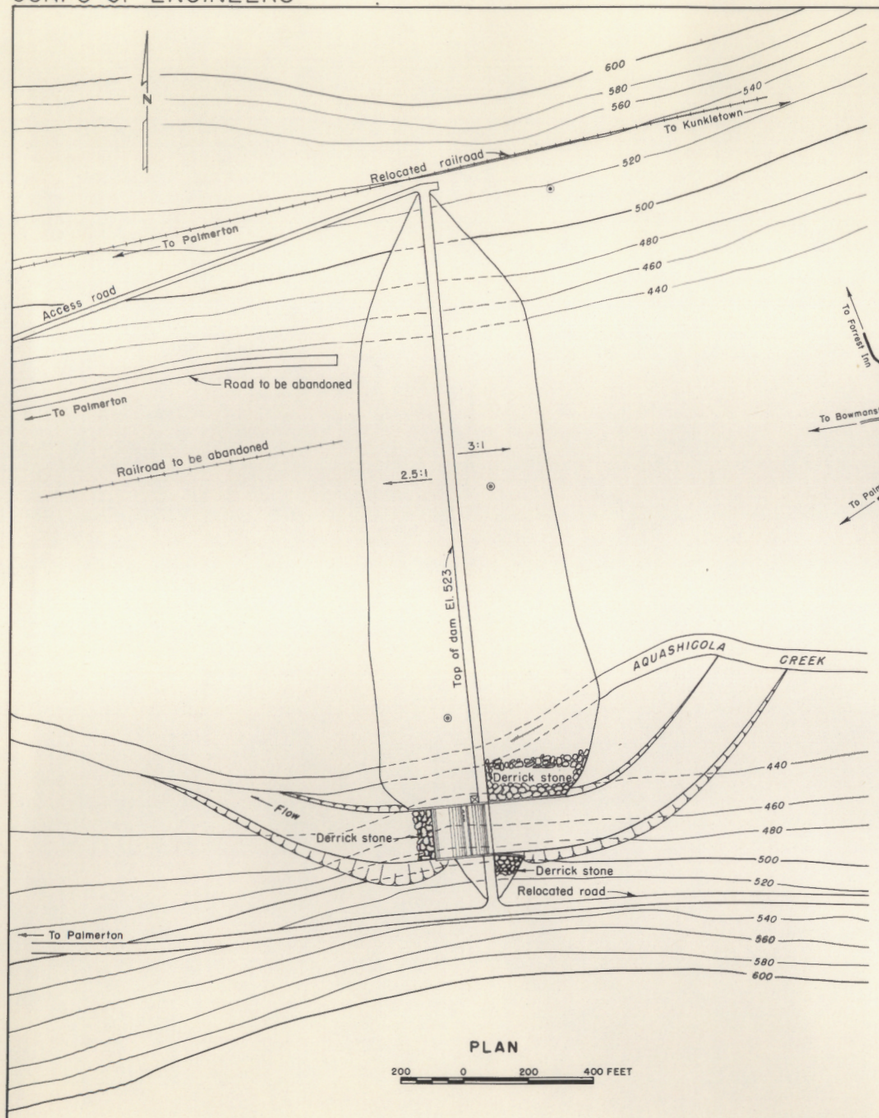
Scale as Shown

Corps of Engineers
Philadelphia, Pa.

Philadelphia District
June 1960

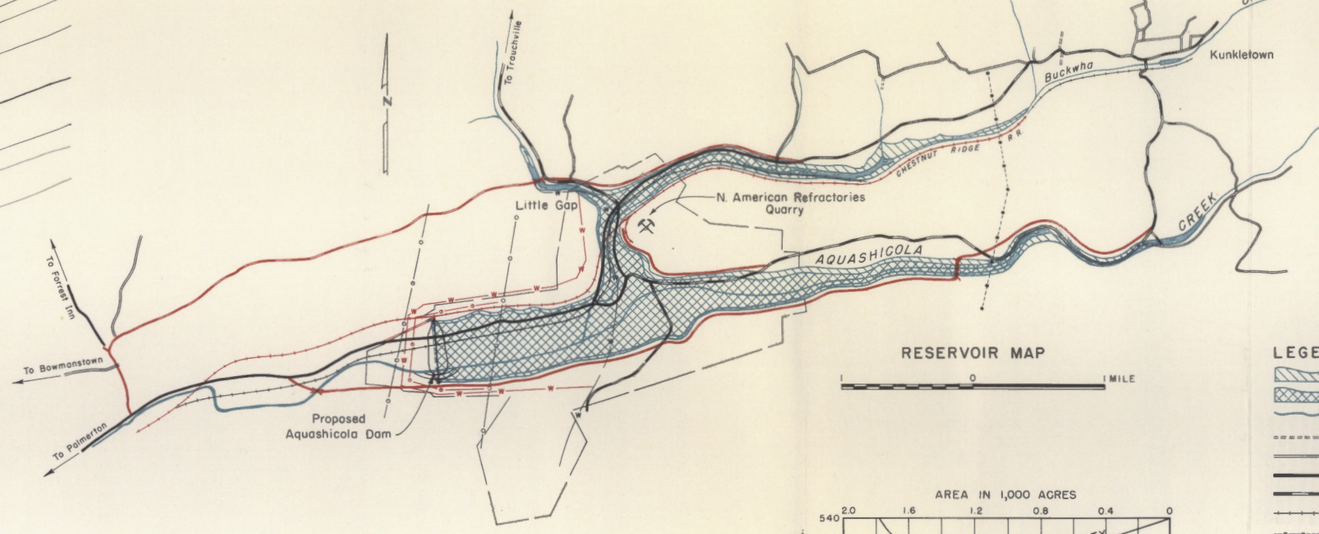
Drawer No. 228

File No. 29099



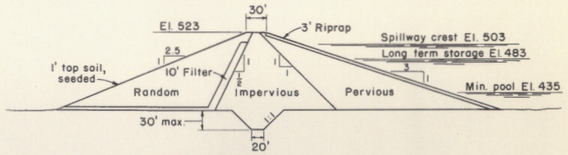
PLAN

200 0 200 400 FEET



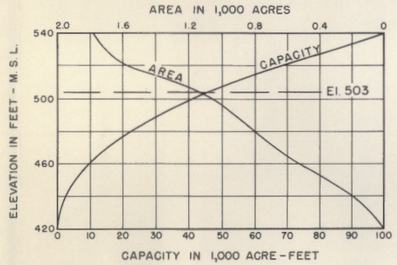
RESERVOIR MAP

1 0 1 MILE

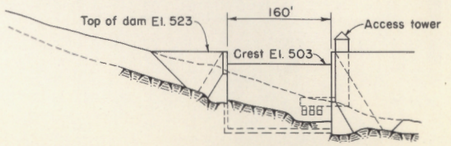


TYPICAL SECTION - DAM

100 0 100 200 FEET



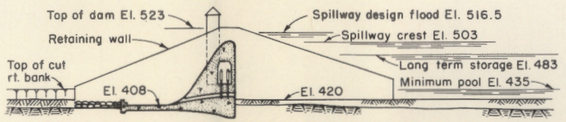
RESERVOIR AREA AND CAPACITY CURVES



SPILLWAY

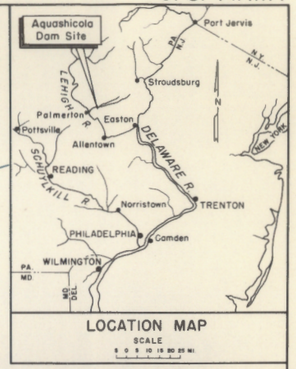
(LOOKING DOWNSTREAM)

100 0 100 200 FEET



SPILLWAY SECTION

100 0 100 200 FEET



LOCATION MAP

SCALE

0 5 10 15 20 25 MI

LEGEND

- Reservoir at El. 503
- Long Term Storage El. 483
- Existing Stream
- Dirt Road
- Graded Road
- Hard Surface, Heavy Duty Road
- Secondary Hard Surface Road
- Existing Railroad
- Existing Power Line
- Existing Petroleum Line
- Existing Water Line
- Proposed Relocated Hard Surface Heavy Duty Road
- Proposed Relocated Secondary Hard Surface Road
- Proposed Relocated Railroad
- Proposed Relocated Petroleum Line
- Proposed Relocated Water Line
- Land Acquisition for Recreation Development
- Quarry
- Drill Hole

All taking lines shown on this map for land acquisition are preliminary and subject to change when the project reaches the detailed design stage.

REVIEW REPORT DELAWARE RIVER BASIN

AQUASHICOLA PROJECT

In 1 Sheet

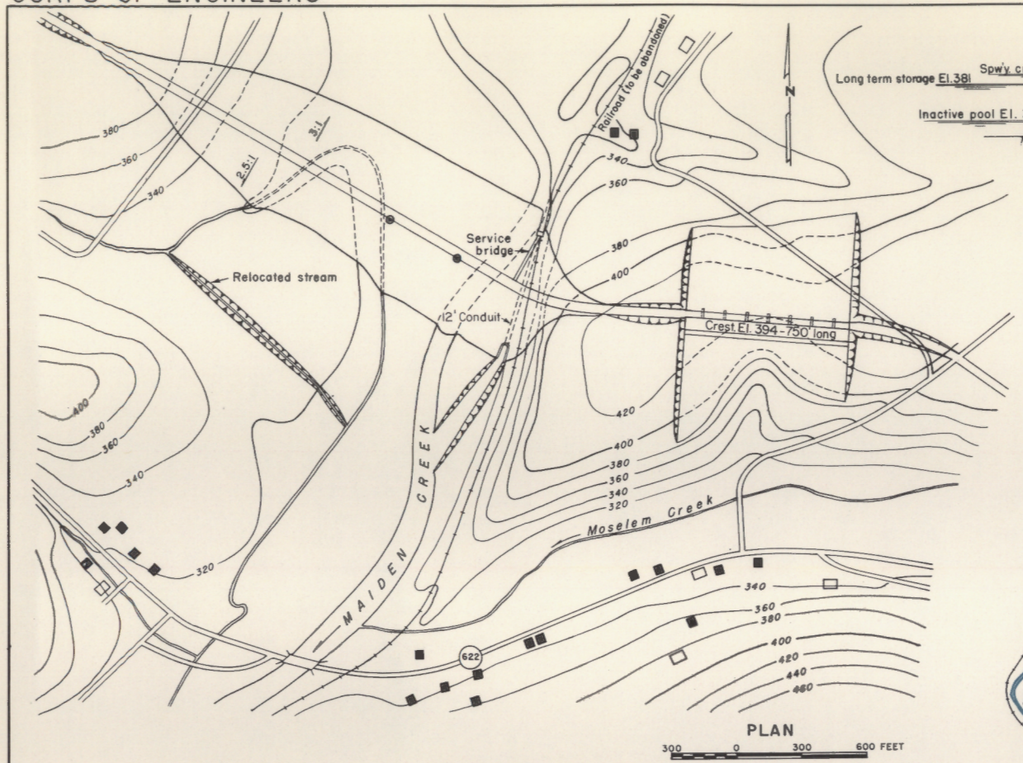
Corps of Engineers
Philadelphia, Pa.

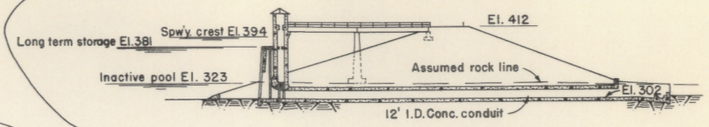
Scale as Shown

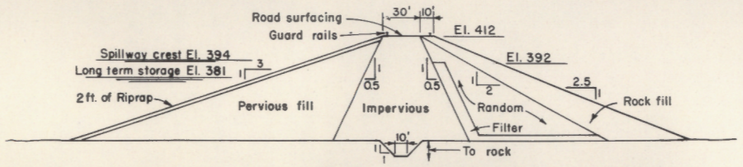
Philadelphia District
June 1960
Revised Oct. 1960

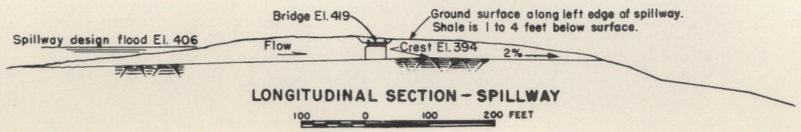
Drawer No. 228

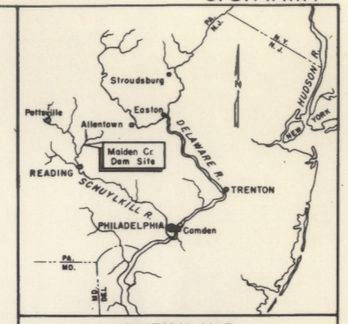
File No. 29093











LEGEND

- Reservoir at El. 394
- Long Term Storage El. 381
- Existing Stream
- Dirt Road
- Graded Road
- Hard Surface, Heavy Duty Road
- Secondary Hard Surface Road
- Existing Railroad
- Existing Power Line
- Existing Petroleum Line
- Proposed Relocated Graded Road
- Proposed Relocated Secondary Hard Surface Road
- Proposed Relocated Hard Surface Heavy Duty Road
- Proposed Relocated Railroad
- Proposed Relocated Petroleum Line
- Land Acquisition for Recreation Development
- Drill Hole

All taking lines shown on this map for land acquisition are preliminary and subject to change when the project reaches the detailed design stage.

REVIEW REPORT DELAWARE RIVER BASIN

MAIDEN CREEK PROJECT

In 1 Sheet

Corps of Engineers
Philadelphia, Pa.

Scale as Shown

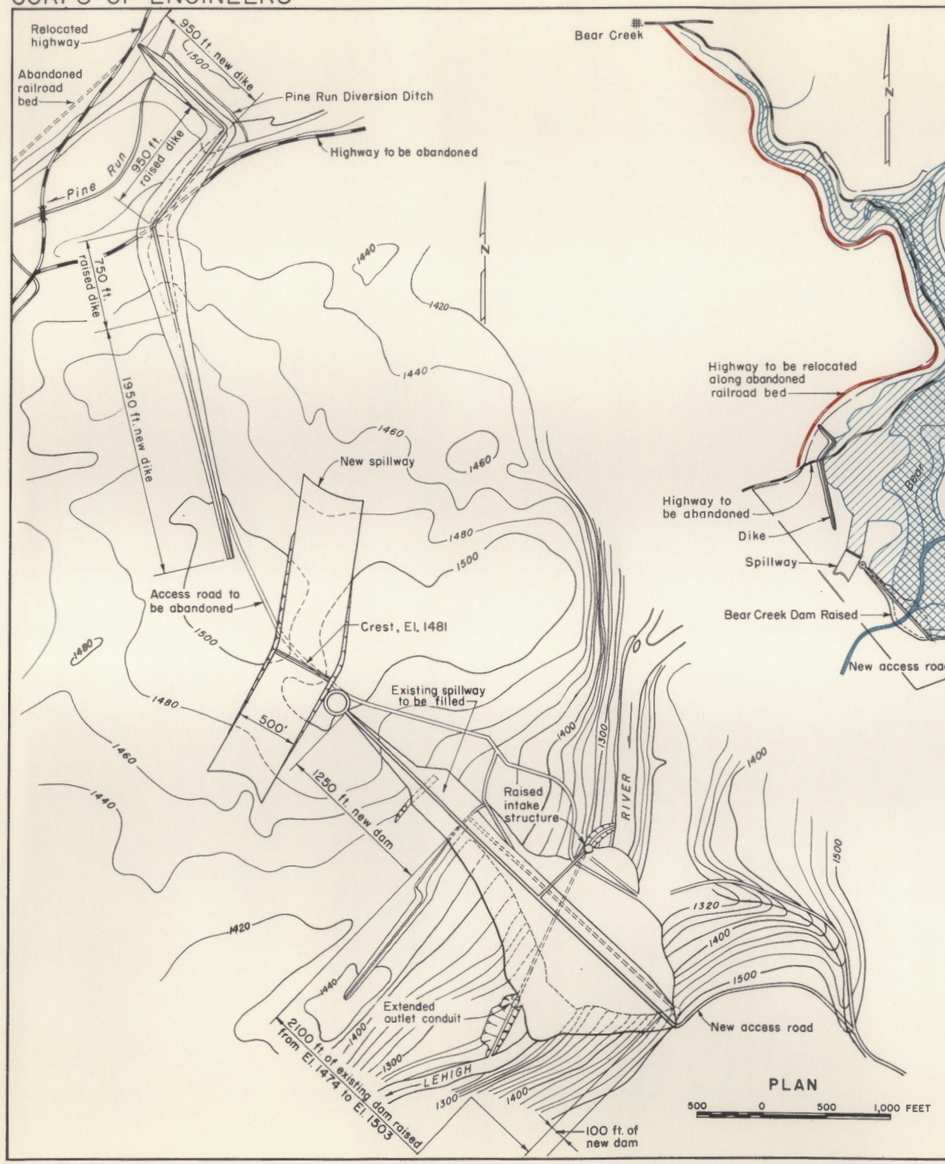
Philadelphia District
June 1960
Revised Oct. 1960

Drawer No. 228

File No. 29094

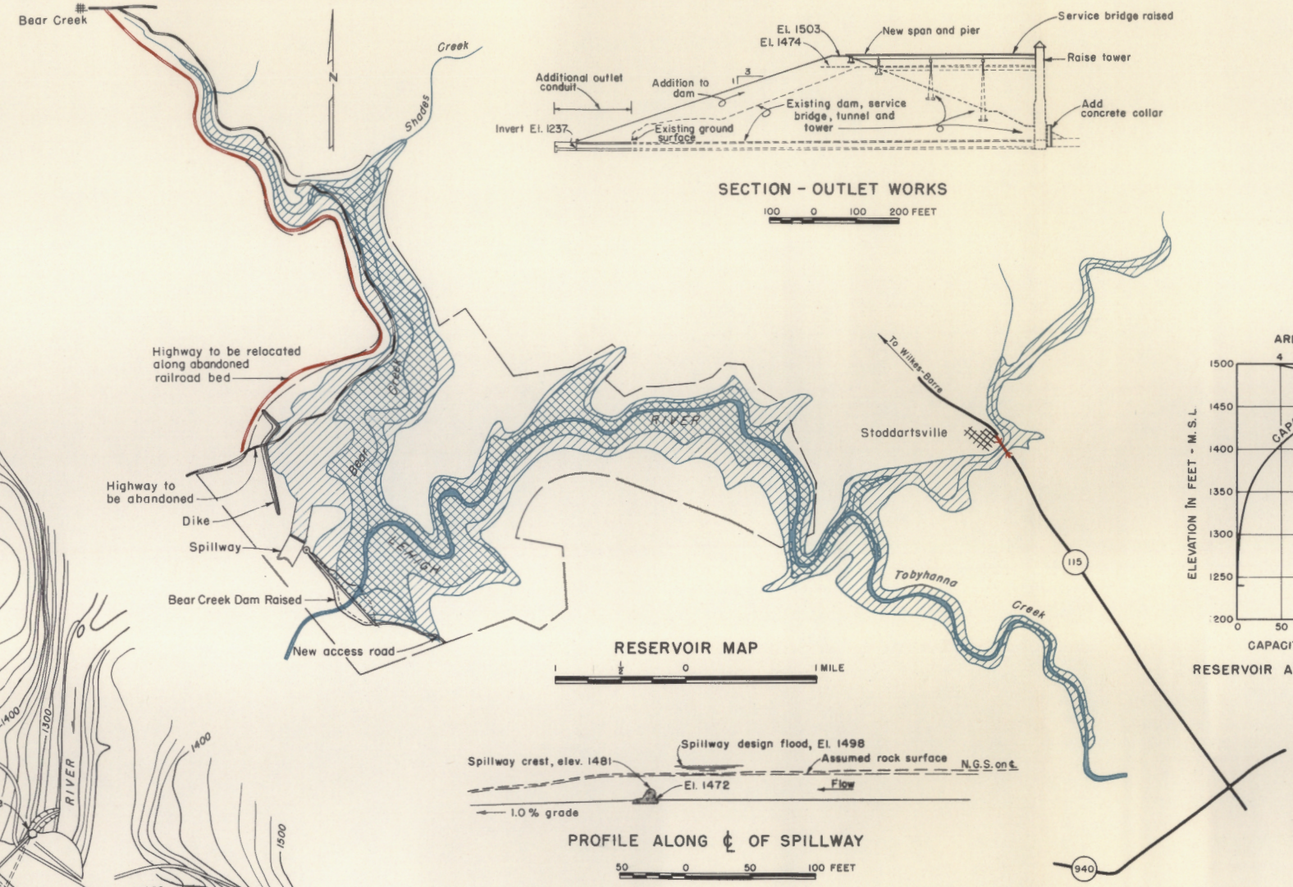
CORPS OF ENGINEERS

U.S. ARMY



PLAN

500 0 500 1,000 FEET



RESERVOIR MAP

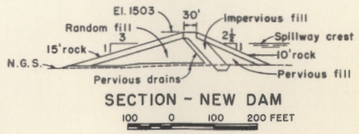
1 ½ 0 1 MILE

PROFILE ALONG ℄ OF SPILLWAY

50 0 50 100 FEET

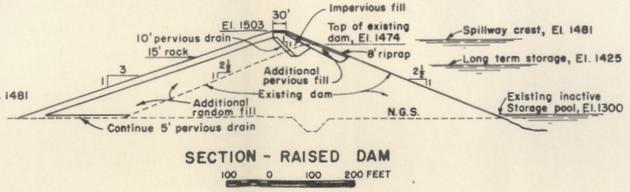
SECTION - OUTLET WORKS

100 0 100 200 FEET



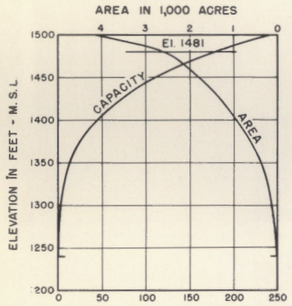
SECTION - NEW DAM

100 0 100 200 FEET

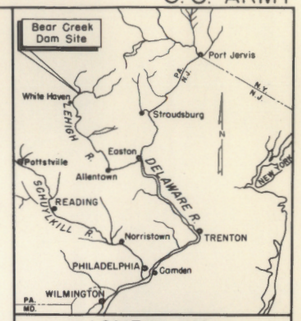


SECTION - RAISED DAM

100 0 100 200 FEET



RESERVOIR AREA AND CAPACITY CURVES



LOCATION MAP

SCALE

LEGEND

- Reservoir at El. 1481
- Long Term Storage El. 1425
- Existing Stream
- Graded Road
- Hard Surface, Heavy Duty Road
- Secondary Hard Surface Road
- Proposed Relocated Hard Surface Heavy Duty Road
- Proposed Relocated Secondary Hard Surface Road
- Land Acquisition for Recreation Development
- Outline of Existing Structure

Note: Topographic data from field surveys by Philadelphia District in 1954.

All taking lines shown on this map for land acquisition are preliminary and subject to change when the project reaches the detailed design stage.

REVIEW REPORT DELAWARE RIVER BASIN

BEAR CREEK PROJECT WITH DAM RAISED TO EL. 1503

In 1 Sheet

Corps of Engineers
Philadelphia, Pa.

Scale as Shown

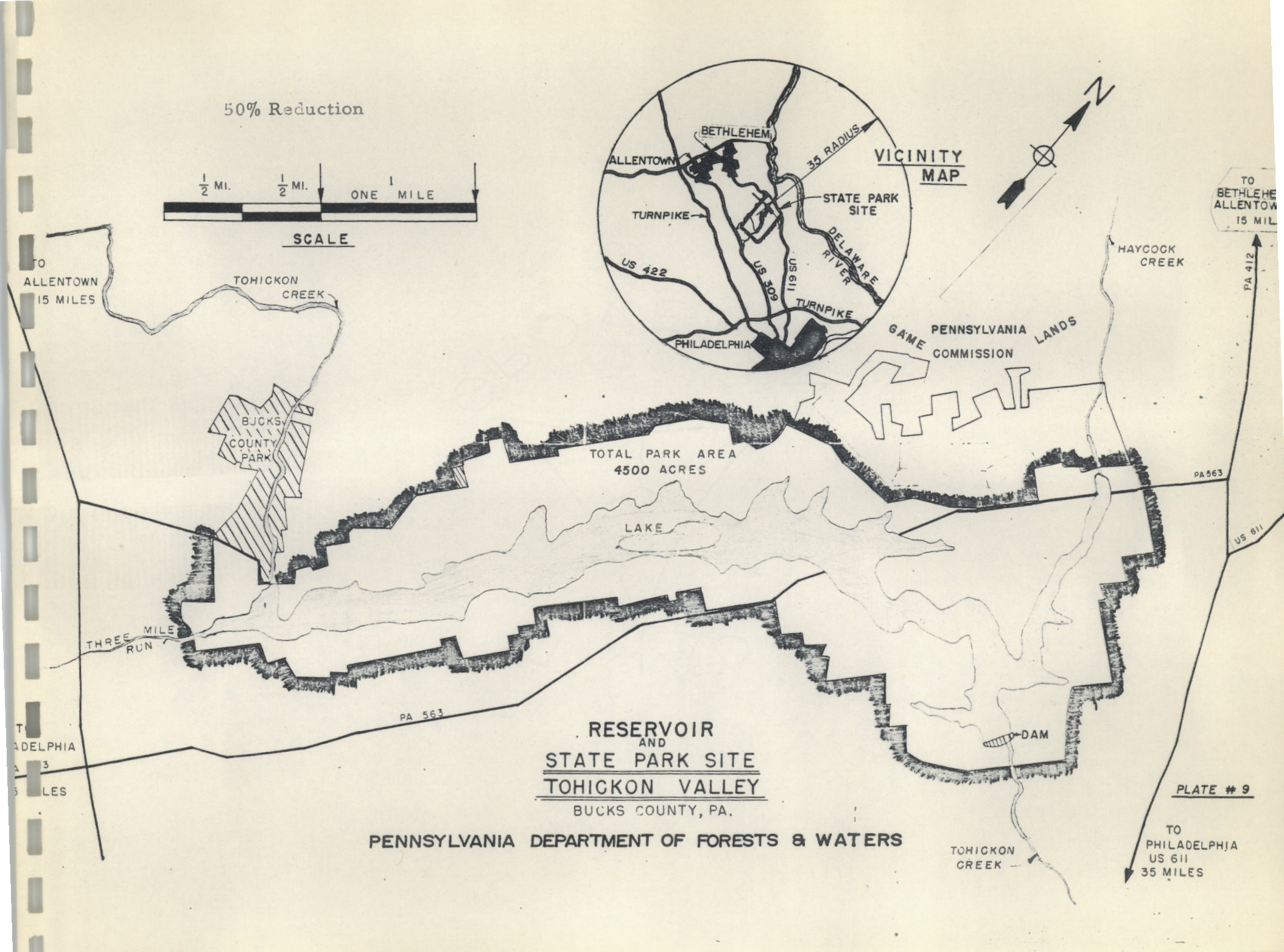
Philadelphia District
June 1960

Drawer No. 228

File No. 29100

PLATE 8

50% Reduction

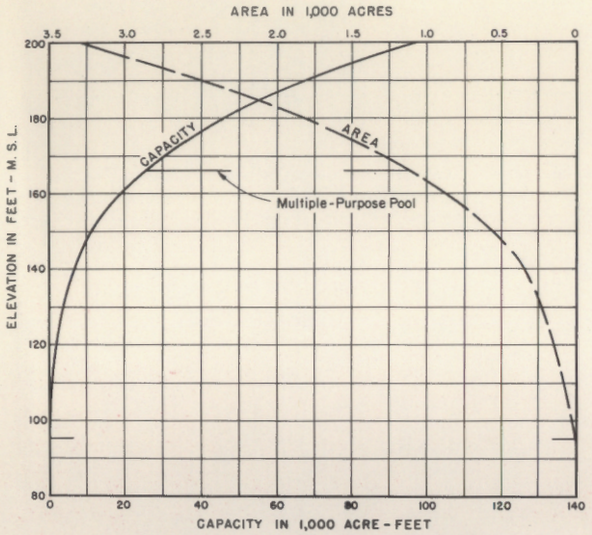


RESERVOIR AND STATE PARK SITE TOHICKON VALLEY

BUCKS COUNTY, PA.

PENNSYLVANIA DEPARTMENT OF FORESTS & WATERS

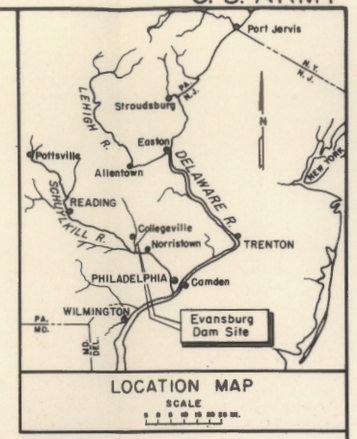
PLATE # 9



RESERVOIR AREA AND CAPACITY CURVES

SCHEME	Pool elevation	Capacity in acre-feet	Surface area in acres
Multiple-Purpose Pool	166	25,000	1,120





LOCATION MAP

SCALE

LEGEND

- Multiple-Purpose Pool El. 166
- Existing Stream
- Dirt Road
- Graded Road
- Hard Surface, Heavy Duty Road
- Secondary Hard Surface Road
- Existing Power Line
- Proposed Relocated Graded Road
- Proposed Relocated Hard Surface Heavy Duty Road
- Proposed Relocated Secondary Hard Surface Road
- Proposed Reinforced Power Line
- Land Acquisition for Recreation Development

All taking lines shown on this map for land acquisition are preliminary and subject to change when the project reaches the detailed design stage.

REVIEW REPORT DELAWARE RIVER BASIN

EVANSBURG PROJECT

In 1 Sheet — Scale as Shown

Corps of Engineers
Philadelphia, Pa.

Philadelphia District
June 1960

Drawer No. 228 — File No. 29116

BRANDYWINE
WATER SUPPLY AND
FLOOD CONTROL
PROJECT

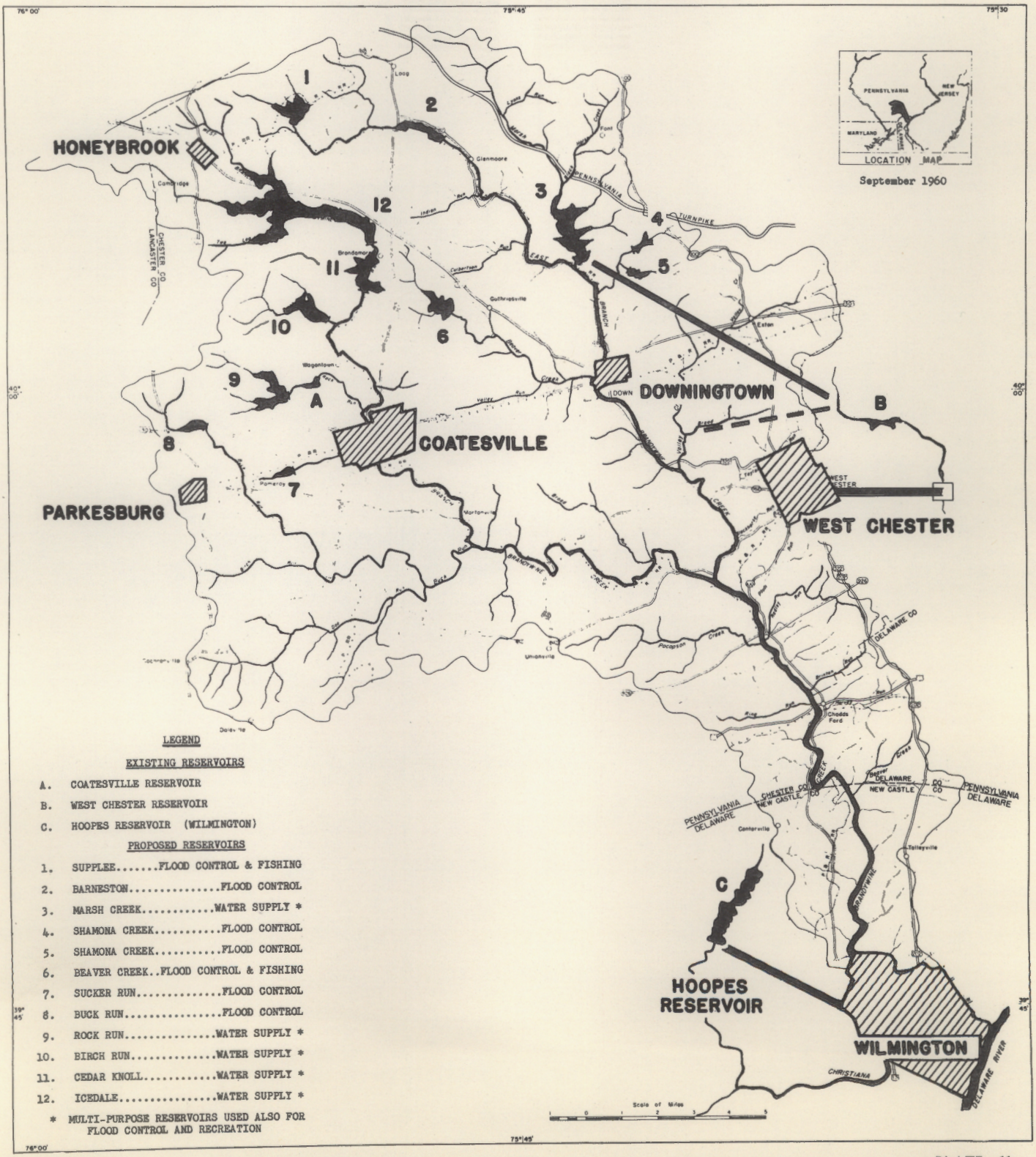
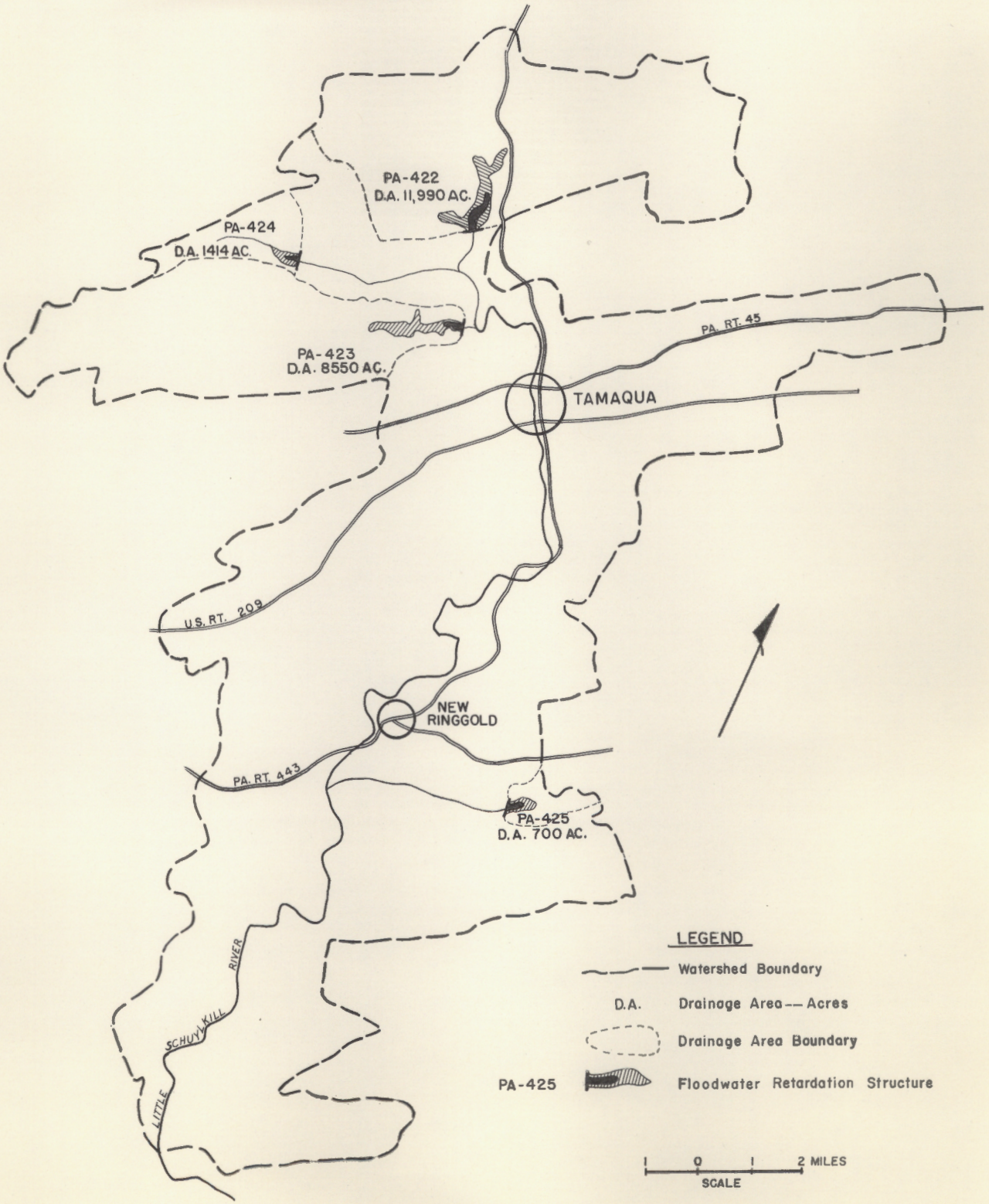
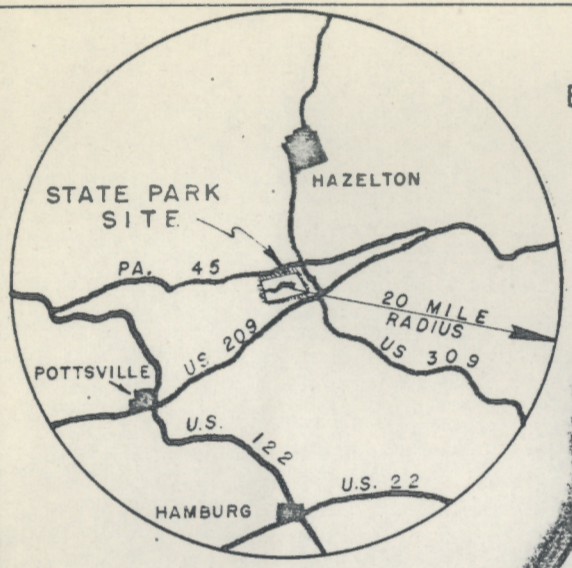


PLATE 11

PROJECT MAP
LITTLE SCHUYLKILL RIVER WATERSHED
BERKS, CARBON AND SCHUYLKILL COUNTIES, PENNSYLVANIA



40% Reduction



EAST MAHANOY JUNCTION

1/4 1/4 1/2
ONE MILE
SCALE

N

HAZELTON
12 MILES

PA. ROUTE 45

PA. 45

BARNESVILLE

TAMAQUA
3 MILES

LR 53036

RUSH TOWNSHIP
RYAN TOWNSHIP

LR 53097

LITTLE SCHUYLKILL RIVER

TOTAL PARK AREA
1500 ACRES

L A K E

FLOOD POOL
MAXIMUM ELEVATION

LOCUST CREEK

DAM

TAMAQUA
3 MILES

RYAN TOWNSHIP
SCHUYLKILL

RUSH TOWNSHIP

TUSCARORA
2 MILES

POTTSVILLE
15 MILES

LOCUST MOUNTAIN

STATE PARK SITE

SCHUYLKILL COUNTY

PENNSYLVANIA DEPARTMENT OF FORESTS & WATERS

LOCUST CREEK
PLATE #12A

PROJECT MAP
LACKAWAXEN TRIBUTARIES WATERSHED

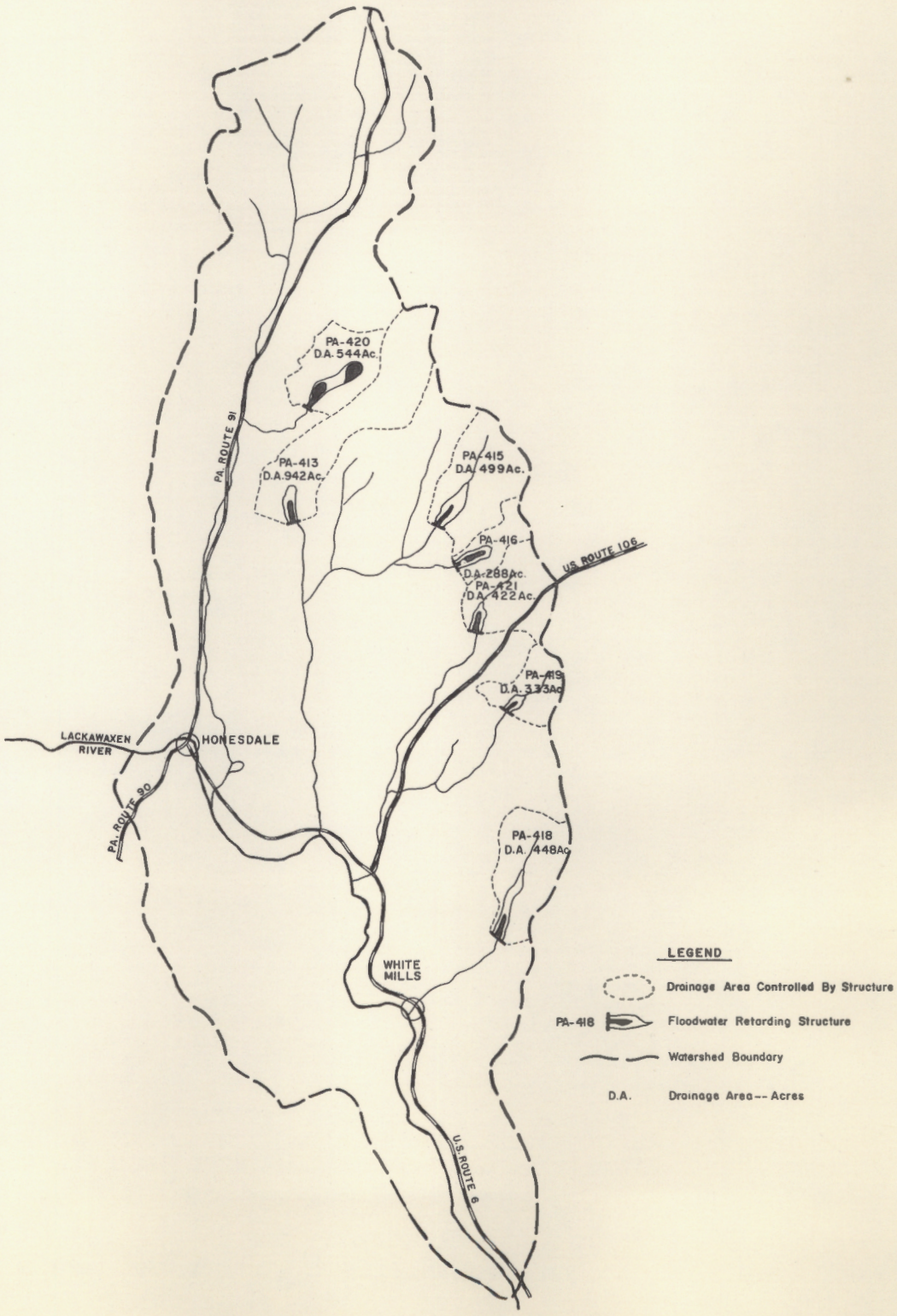


PLATE 13

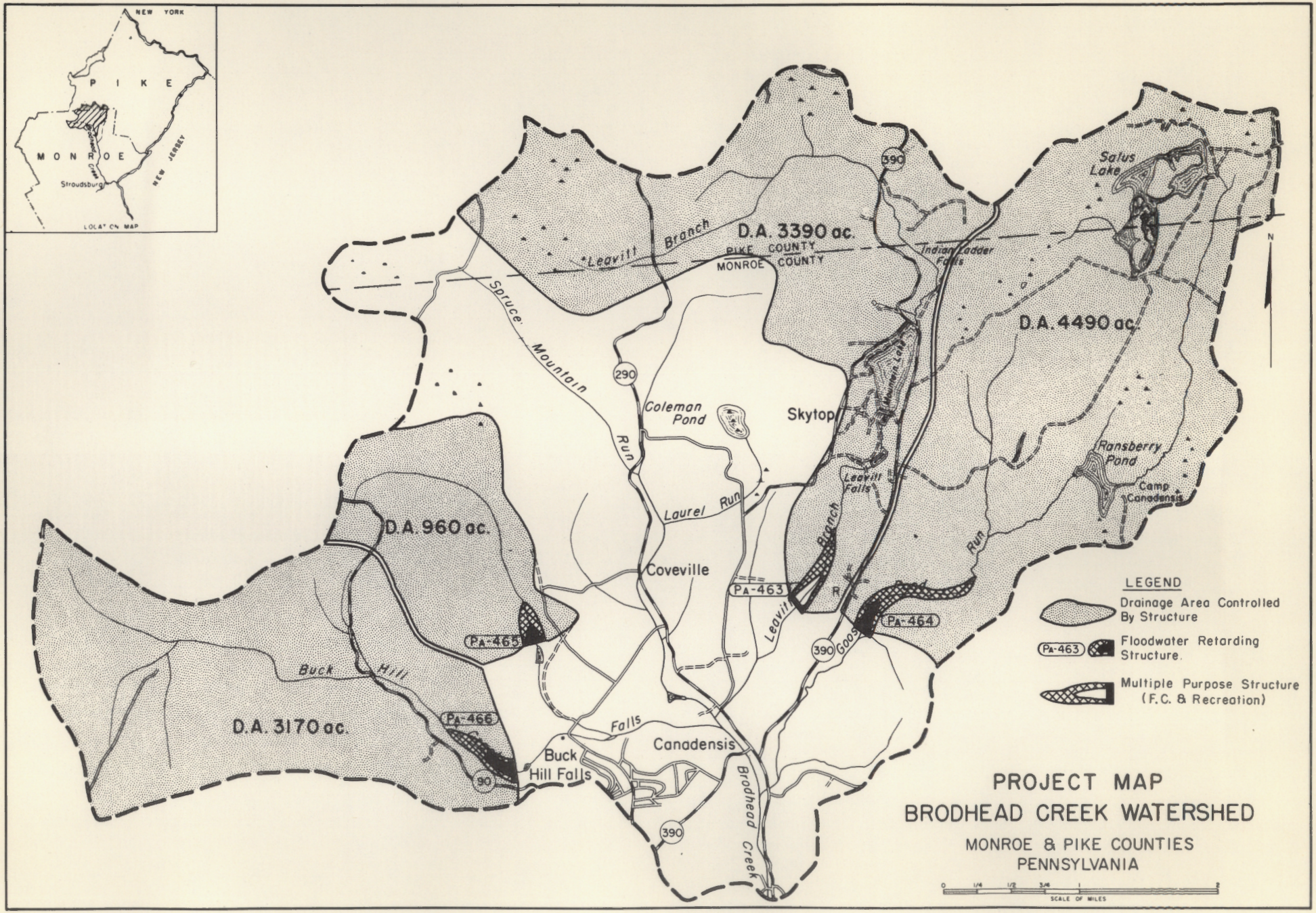

NEW YORK
PIKE
MONROE
Stroudsburg
NEW JERSEY
LOCATION MAP
D.A. 3390 ac.
PIKE COUNTY
MONROE COUNTY
Leavitt Branch
Spruce Mountain Run
Coleman Pond
Skytop
Indian Ladder Falls
Salus Lake
D.A. 4490 ac.
Ransberry Pond
Camp Canadensis
Leavitt Falls
Laurel Run
Coveville
D.A. 960 ac.
PA-463
PA-464
PA-465
PA-466
Goose Run
Buck Hill Falls
Buck Hill Falls
Canadensis
Brodhead Creek
D.A. 3170 ac.
290
390
90
N
LEGEND
Drainage Area Controlled By Structure
Floodwater Retarding Structure.
Multiple Purpose Structure (F.C. & Recreation)
PROJECT MAP
BRODHEAD CREEK WATERSHED
MONROE & PIKE COUNTIES
PENNSYLVANIA
SCALE OF MILES

PLATE 14

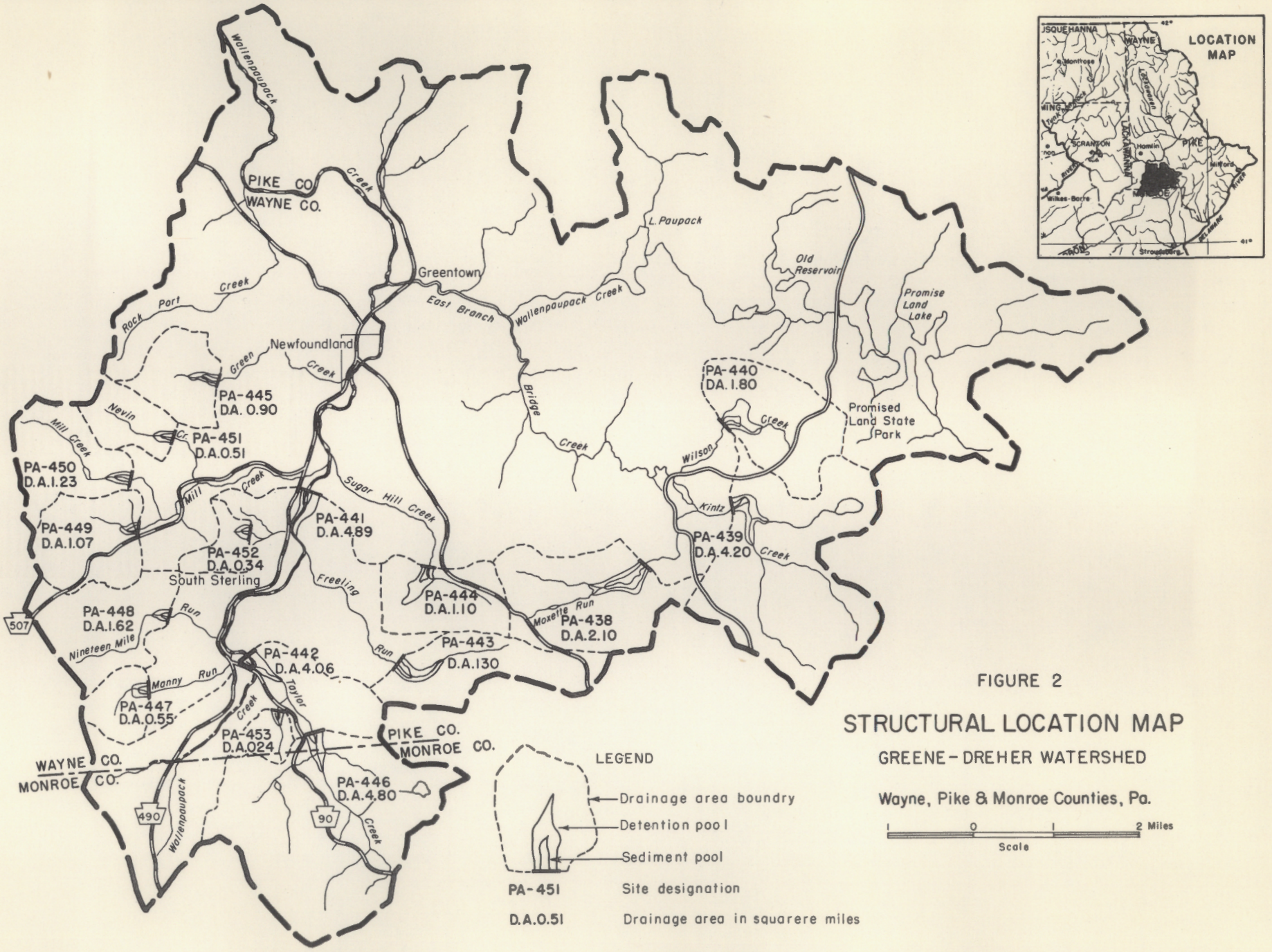
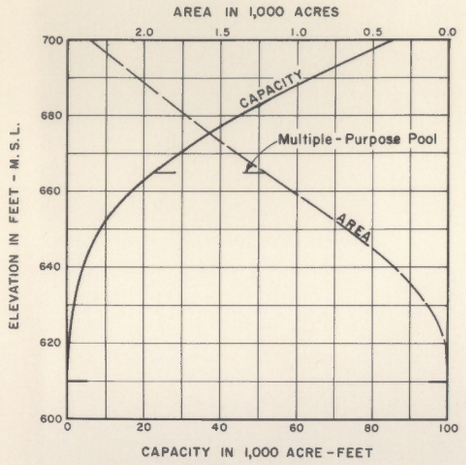
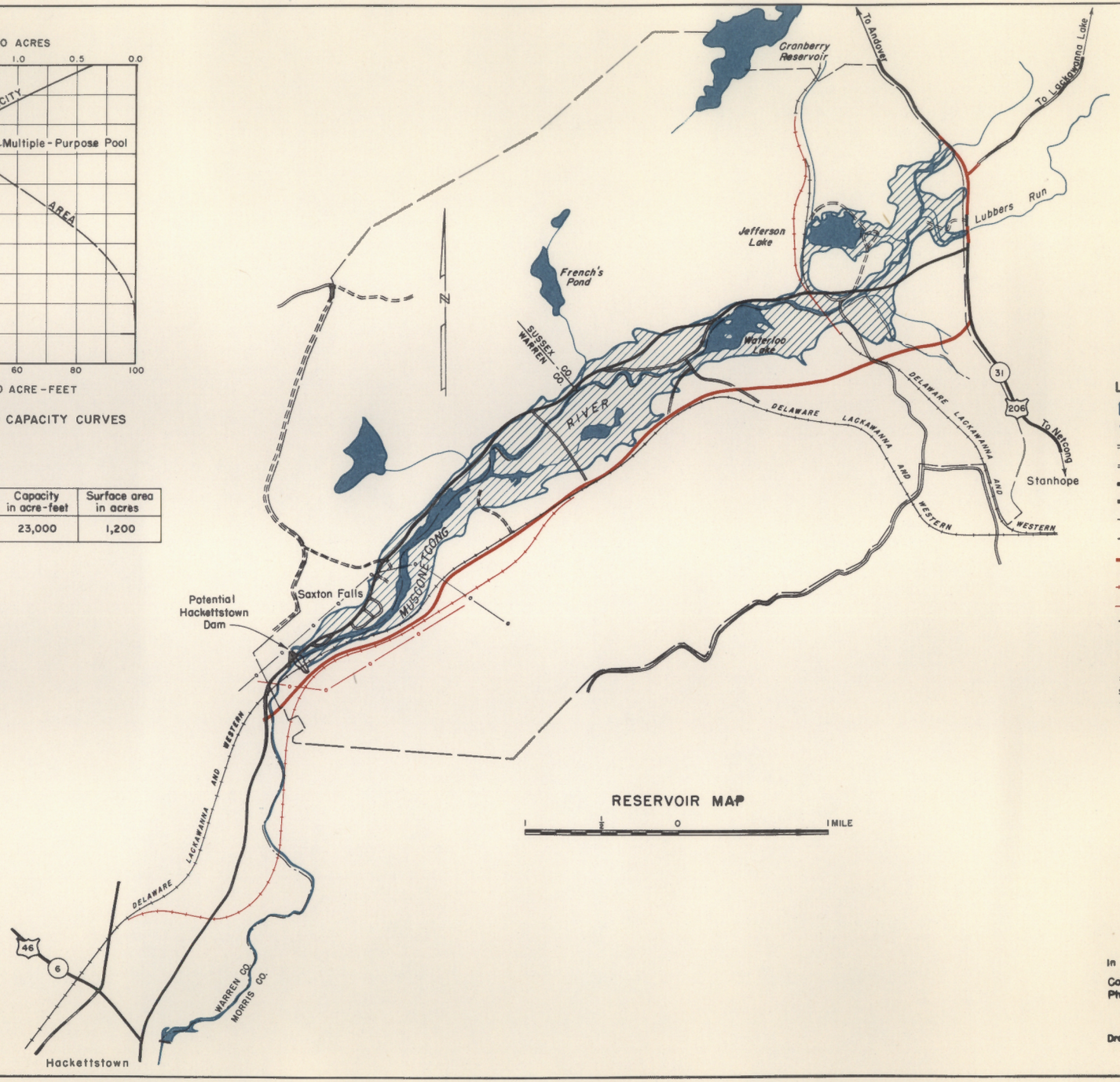

LOCATION MAP
JSQUEHANNA
WAYNE
PIKE
SCRANTON
Wilkes-Barre
Stroudsburg
Wallenpaupack Creek
PIKE CO.
WAYNE CO.
Rock Port Creek
Greentown
L. Paupack
Old Reservoir
Promise Land Lake
East Branch Wallenpaupack Creek
Newfoundland
Green Creek
PA-445 D.A. 0.90
Nevin Cr.
PA-451 D.A.0.51
Mill Creek
PA-450 D.A.1.23
Mill Creek
Sugar Hill Creek
PA-441 D.A.4.89
PA-449 D.A.1.07
PA-452 D.A.0.34
South Sterling
Freeling Run
PA-444 D.A.1.10
PA-448 D.A.1.62
Nineteen Mile Run
PA-443 D.A.130
PA-442 D.A.4.06
Taylor Creek
Manny Run
PA-447 D.A.0.55
PA-453 D.A.024
PIKE CO.
MONROE CO.
WAYNE CO.
MONROE CO.
PA-446 D.A.4.80
Wallenpaupack Creek
Bridge Creek
PA-440 DA. 1.80
Wilson Creek
Promised Land State Park
Kintz Creek
PA-439 D.A.4.20
Moxelle Run
PA-438 D.A.2.10
507
490
90
LEGEND
Drainage area boundry
Detention pool
Sediment pool
PA-451 Site designation
D.A.0.51 Drainage area in squarere miles
FIGURE 2
STRUCTURAL LOCATION MAP
GREENE-DREHER WATERSHED
Wayne, Pike & Monroe Counties, Pa.
1 0 1 2 Miles
Scale

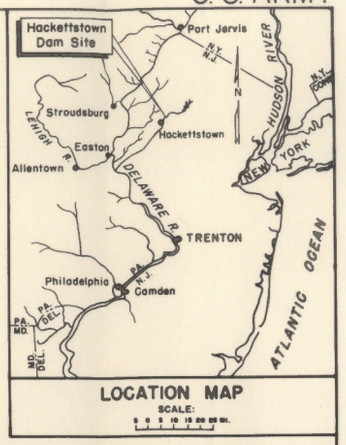
PLATE 15



RESERVOIR AREA AND CAPACITY CURVES

SCHEME	Pool elevation	Capacity in acre-feet	Surface area in acres
Multiple-Purpose Pool	665	23,000	1,200





LEGEND

- Multiple-Purpose Pool El. 665
- Existing Stream
- Dirt Road
- Graded Road
- Hard Surface, Heavy Duty Road
- Secondary Hard Surface Road
- Existing Railroad
- Existing Oil Line
- Proposed Relocated Hard Surface Heavy Duty Road
- Proposed Relocated Railroad
- Proposed Relocated Oil-Line
- Land Acquisition for Recreation Development

All taking lines shown on this map for land acquisition are preliminary and subject to change when the project reaches the detailed design stage.

REVIEW REPORT DELAWARE RIVER BASIN

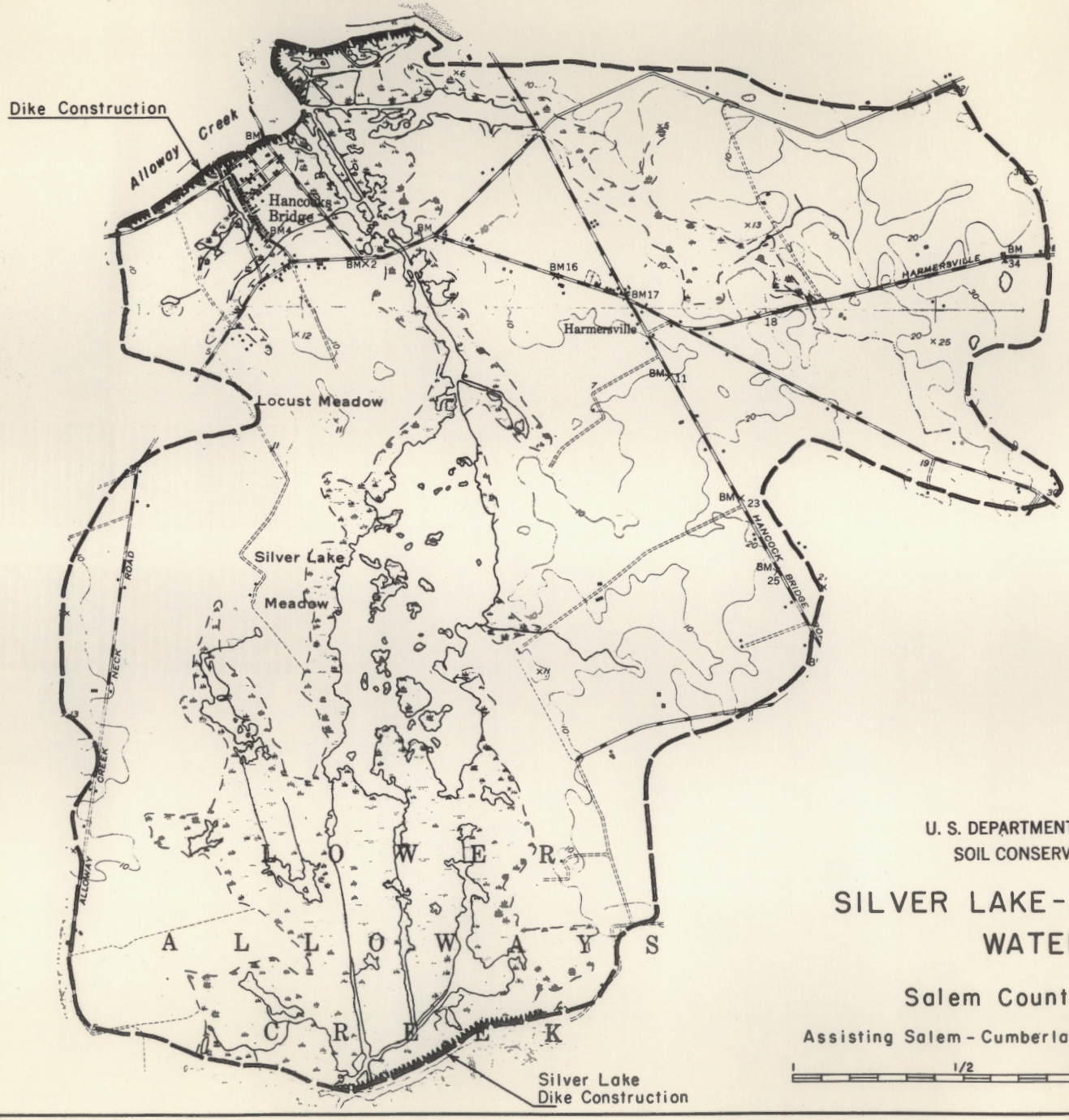
HACKETTSTOWN PROJECT

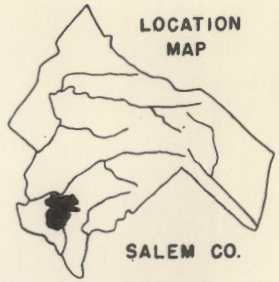
In 1 Sheet — Scale as Shown

Corps of Engineers
Philadelphia, Pa.

Philadelphia District
June 1960

Drawer No. 226 — File No. 29105





U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

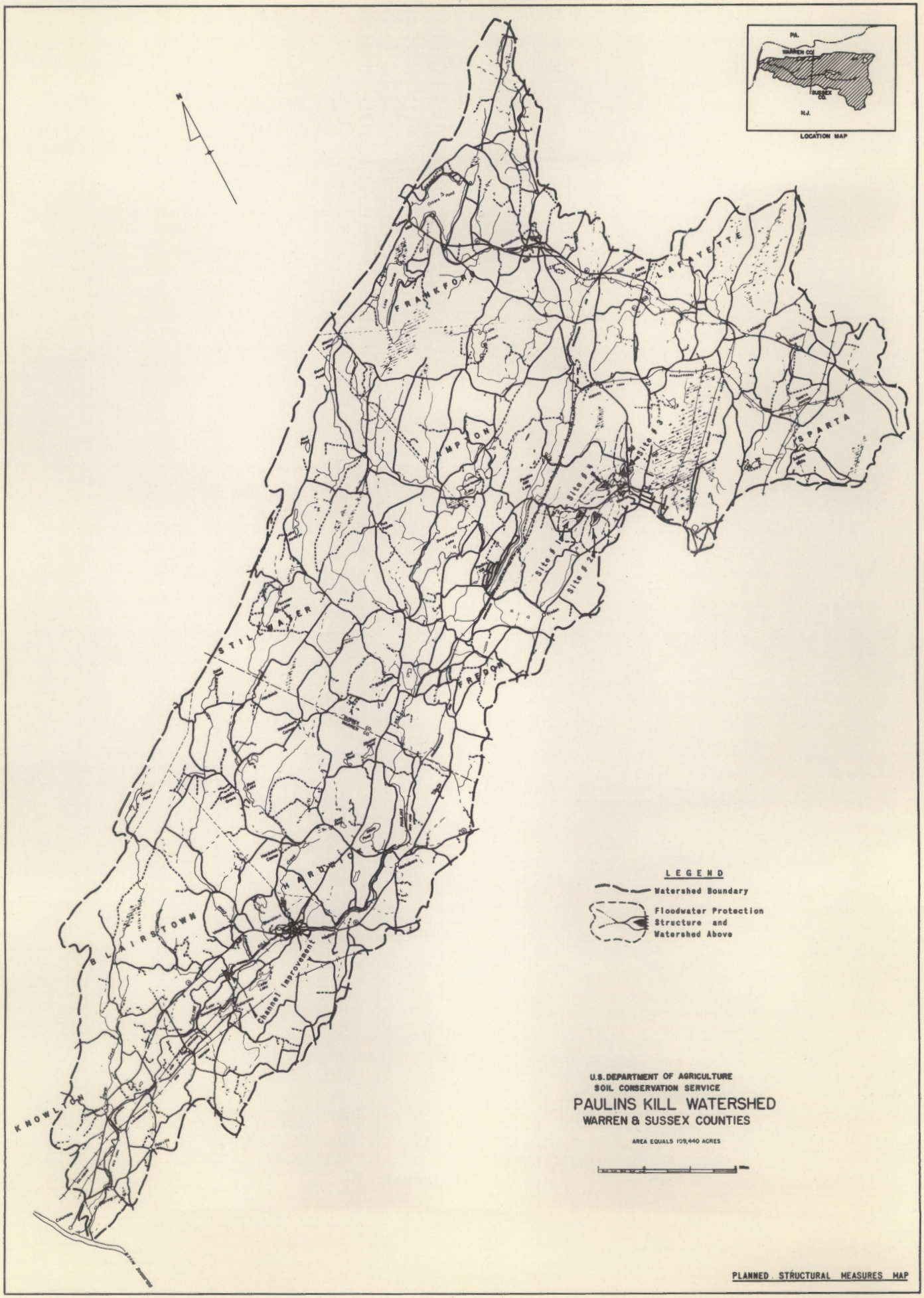
SILVER LAKE - LOCUST ISLAND WATERSHED

Salem County, New Jersey

Assisting Salem - Cumberland Soil Conservation District

1 1/2 0 1 MILE

PLATE 17


N
PA.
WARREN CO.
SUSSEX CO.
N.J.
LOCATION MAP
FRANKFORD
LAFAYETTE
SPARTA
HAMPTON
Site # 3
Site # 4
Site # 1
Site # 2
STILLWATER
FREDON
BLAIRSTOWN
Channel Improvement
KNOWLTON
LEGEND
Watershed Boundary
Floodwater Protection Structure and Watershed Above
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
PAULINS KILL WATERSHED
WARREN & SUSSEX COUNTIES
AREA EQUALS 109,440 ACRES
PLANNED STRUCTURAL MEASURES MAP

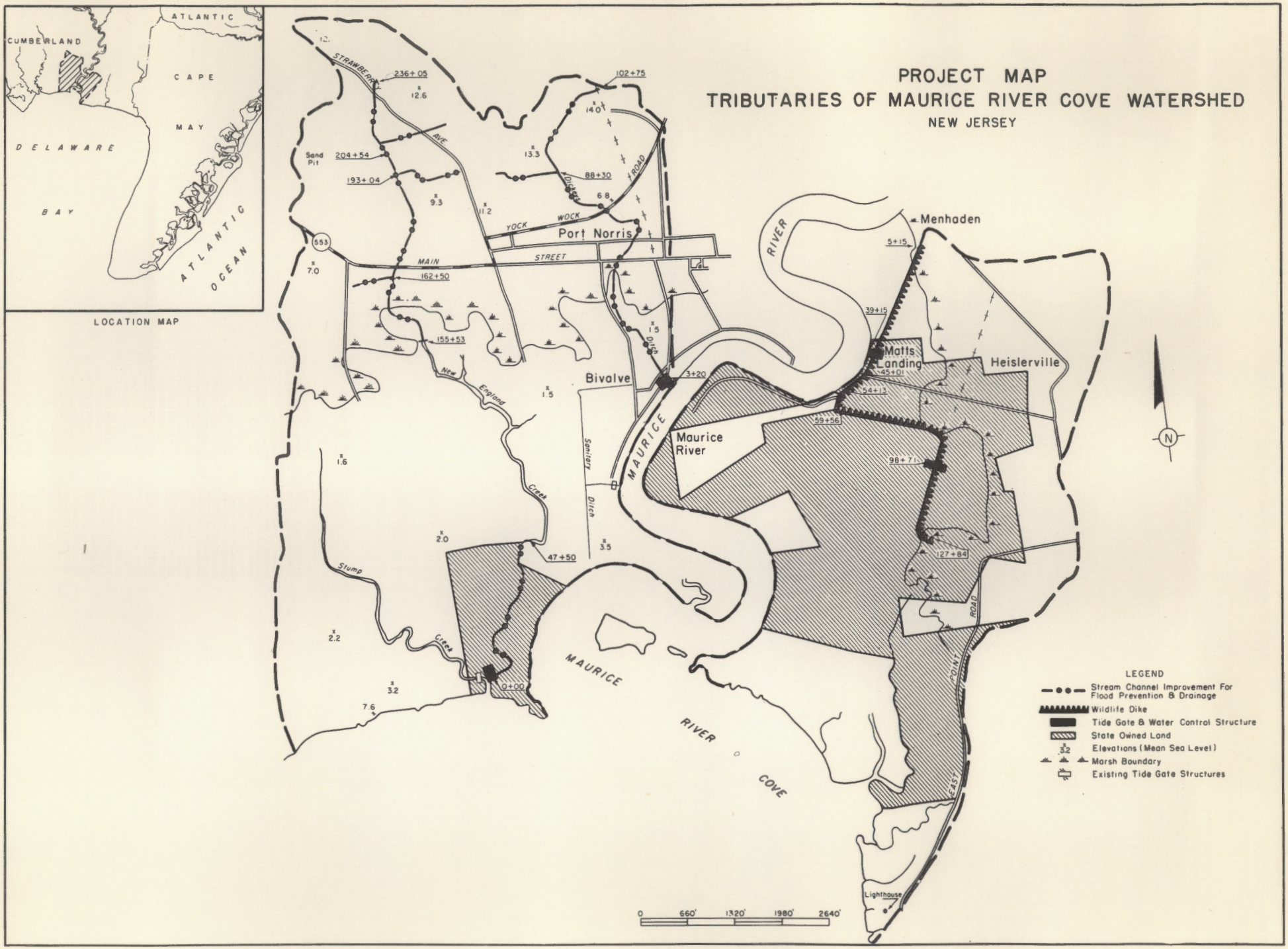
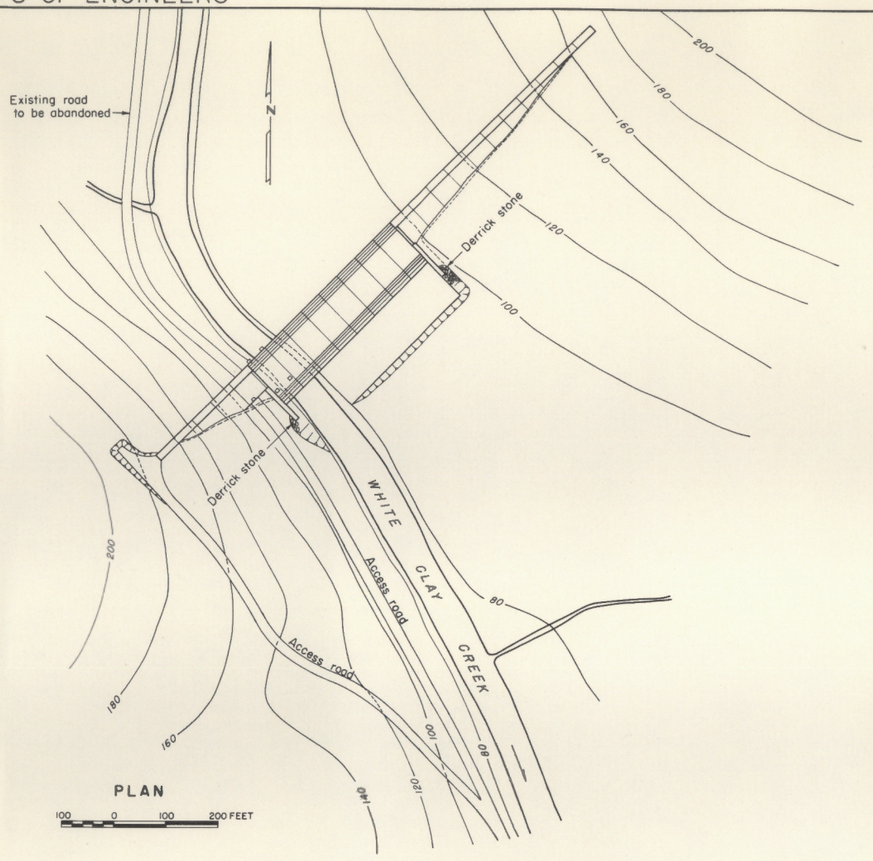
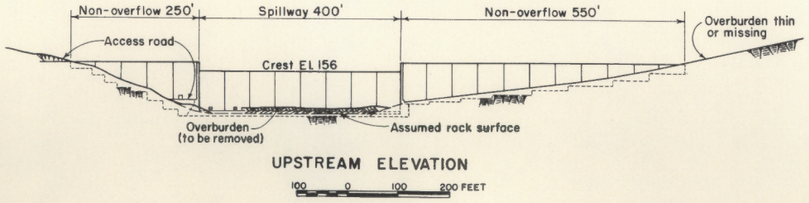

PROJECT MAP
TRIBUTARIES OF MAURICE RIVER COVE WATERSHED
NEW JERSEY
LOCATION MAP
CUMBERLAND
ATLANTIC
CAPE
MAY
DELAWARE
BAY
ATLANTIC
OCEAN
STRAWBERRY
AVE
YOCK
WOCK
ROAD
MAIN
STREET
Port Norris
Sand Pit
Menhaden
Matts Landing
Heislerville
Bivalve
Maurice River
MAURICE
RIVER
New England Creek
Stump Creek
Sanitary Ditch
Ditch
MAURICE RIVER COVE
EAST POINT ROAD
Lighthouse
236+05
204+54
193+04
162+50
155+53
102+75
88+30
5+15
39+15
45+01
54+13
59+56
98+71
127+84
3+20
47+50
0+00
553
12.6
14.0
13.3
9.3
11.2
6.8
7.0
1.5
1.6
2.0
3.5
2.2
3.2
7.6
N
LEGEND
Stream Channel Improvement For Flood Prevention & Drainage
Wildlife Dike
Tide Gate & Water Control Structure
State Owned Land
Elevations (Mean Sea Level)
Marsh Boundary
Existing Tide Gate Structures
0
660'
1320'
1980'
2640'

PLATE 19

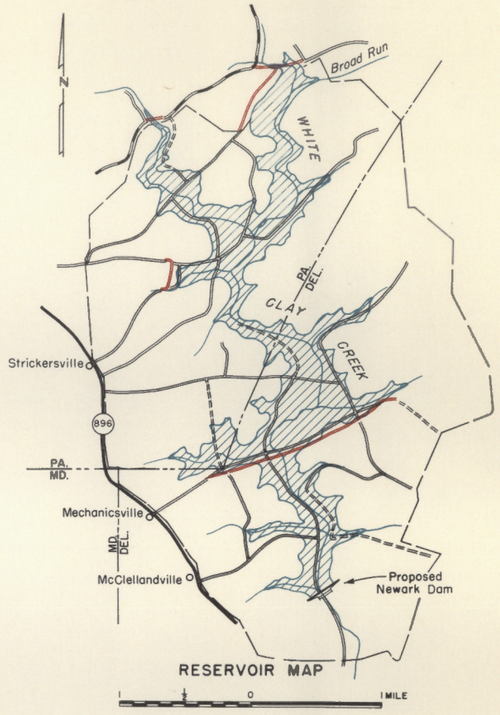


PLAN

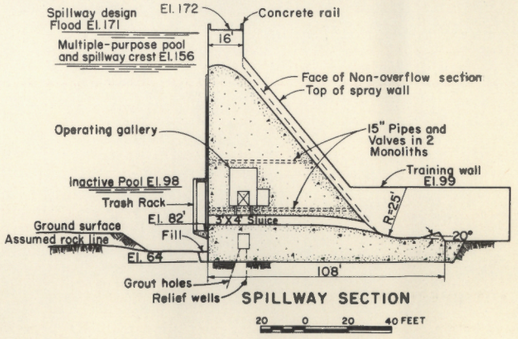


UPSTREAM ELEVATION

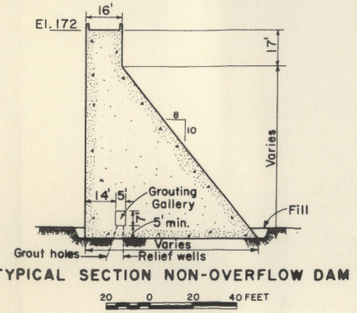
100 0 100 200 FEET



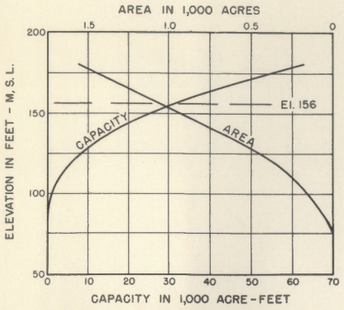
RESERVOIR MAP



SPILLWAY SECTION

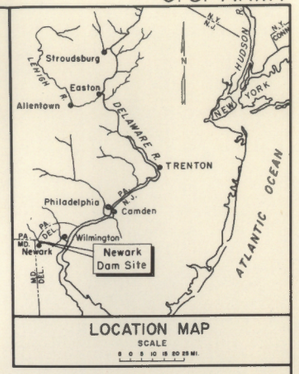


TYPICAL SECTION NON-OVERFLOW DAM



RESERVOIR AREA AND CAPACITY CURVES

SCHEME	Pool elevation	Capacity in acre-feet	Surface area in acres
Multiple - Purpose Pool	156	31,000	1,060



LOCATION MAP

SCALE

LEGEND

- Multiple-Purpose Pool El. 156
- Existing Stream
- Dirt Road
- Graded Road
- Hard Surface, Heavy Duty Road
- Secondary Hard Surface Road
- Proposed Relocated Graded Road
- Land Acquisition for Recreation Development

All taking lines shown on this map for land acquisition are preliminary and subject to change when the project reaches the detailed design stage.

REVIEW REPORT DELAWARE RIVER BASIN

NEWARK PROJECT

In 1 Sheet

Corps of Engineers
Philadelphia, Pa.

Scale as Shown

Philadelphia District
June 1960
Revised Oct. 1960

Drawer No. 228

File No. 29118

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