V. (ALVARESE



US Army Corps of Engineers Philadelphia District

# GENERAL DESIGN MEMORANDUM

# MODIFICATION OF THE FRANCIS E. WALTER DAM AND RESERVOIR

LEHIGH RIVER BASIN, PA.

# MAIN REPORT and ENVIRONMENTAL IMPACT STATEMENT

### PREPARED BY

U.S. ARMY CORPS OF ENGINEERS PHILADELPHIA DISTRICT CUSTOM HOUSE, 2nd & CHESTNUT STS. PHILADELPHIA, PENNSYLVANIA 19106

U.S. ARMY CORPS OF ENGINEERS BALTIMORE DISTRICT P.O. BOX 1715 BALTIMORE, MARYLAND 21203

BOOK 1 OF 6

FINAL/AUGUST 1985

# **SERIES OF BOOKS**

BOOK 1 OF 6 MAIN REPORT BOOK 2 OF 6 **APPENDIX A** APPENDIX B APPENDIX C APPENDIX D BOOK 3 OF 6 APPENDIX E APPENDIX F BOOK 4 OF 6 **APPENDIX G APPENDIX H APPENDIX I** BOOK 5 OF 6 **APPENDIX J** BOOK 6 OF 6 **APPENDIX K APPENDIX L** 

a file

STUDY AREA NATURAL RESOURCES PROBLEM IDENTIFICATION FORMULATION

ENVIRONMENTAL CULTURAL

ECONOMICS RELOCATION OF PENNSYLVANIA LR0041 OPERATIONS AND MAINTENANCE BUILDING

HYDROLOGY AND HYDRAULICS

WATER QUALITY GEOLOGY AND SOILS



DEPARTMENT OF THE ARMY BALTIMORE DISTRICT. CORPS OF ENGINEERS P.O. BOX 1715 BALTIMORE. MARYLAND 21203-1715

reply to attention of NABEN-RD

29 October 1985

SUBJECT: rodification of the Francis E. Walter Dam and Reservoir, Pennsylvania - General Design Memorandum

Commander, North Atlantic Division ATTN: NADEN-MG

1. Reference ER 1110-2-1150 > 1 October 1971.

2. Enclosed for review and approval are 20 copies of the subject final General Design Memorandum.

FOR THE COMMANDER:

Encl

P.E. Acting Chief, Engineering Division

× ji. 54 14

1993

Delaware River Basin Modification of The Francis E. Walter. Dam and Reservoir

### GENERAL DESIGN MEMORANDUM

Department of the Army Philadelphia District, Corps of Engineers U.S. Custom House - 2nd & Chestnut Streets Philadelphia, Pennsylvania 19106

Department of the Army Baltimore District, Corps of Engineers P.O. Box 1715 Baltimore, Maryland 21203

August 1985

X A

for the second s •

Contraction of the local distance of the loc

Contraction of the Contraction o

J

# MAIN REPORT ENVIRONMENTAL IMPACT STATEMENT PUBLIC INVOLVEMENT

44 L.

Modification of Francis E. Walter Dam and Reservoir

No non color a company of the color of the c

-

ſ

.

#### SYLLABUS

The Modification of the Francis E. Walter Dam adds water supply and recreation to an existing flood control project. The primary purpose of the modification is to provide a regional supply for water for the Delaware River Basin. This is to be used to maintain flows in the Lehigh River, lower Delaware **River** and the Delaware Estuary during droughts. Complementary recreation will also be developed.

The Modification of Walter Dam was authorized by the U. S. Congress in 1962 for construction as one component of a comprehensive plan for protection and timely development of water resources in the Delaware River Basin. This current investigation has affirmed the project as it was authorized in 1962. Approximately 70,000 acre-feet of water supply will be added to the existing 108,000 acre-feet of storage for flood control.

This increase in storage will require raising the dam 30 feet, the spillway 32 feet and the permanent pool 127 feet. The pool would be increased from 80 to 1,330 acres. This will require a new spillway, a new control tower and the relocation of 3-1/2 miles of Bear Creek Road.

The recreation plan reflects a compromise among regional needs; specialized interests; the environmental carrying capacity of the site; concerns of impacted local municipalities and counties; and the desires of the Commonwealth of Pennsylvania.

The total cost of the Modification is presented estimated at \$100,163,000 with \$10,637,000 being apportioned to the Federal Government and \$96,615,000 to the non-Federal sponsor, the Delaware River Basin Commission, (DRBC). Annual operating, maintenance and replacement costs are presently estimated to be \$350,000 for the Federal Government and \$190,000 for the DRBC. The total annual costs are estimated to be \$4,350,000 and the total annual benefits to be \$6,130,000 for a benefit-to-cost ratio of 1.4 to 1. These were computed at October 1984 price levels and conditions.

J

×

Page

1.	Introduction	1-1
	Purpose	1-1
	Study Area	1-3
	Project Authorization	1-9
	Pertinent Data	1-10
	Scope of Study	1-15
	History of Water Resources Development	1-15
	Institution of Water Resources	1-21
	Existing Project	1-22
2.	Problem Identification	2-1
	Water Supply	2-1
	Groundwater	2-2
	Water Quality	2-5
	Flow Maintenance	2-7
	Recreation	2-8
	Floodwater and Floodplain Management	2-12
	Energy	2-13
	Project Objectives	2-15
3.	Project Formulation	3-1
	General Methodology	3-1
	Comprehensive Planning	3-2
	Affirmation of the Modification	3-8
	Affirmation of the Authorized Plan	3-8
	Hydropower Considerations	3-12
	Scheme Selection	3-13

i

# TABLE OF CONTENTS (Cont'd)

# Page

4.	Recommended Plan	4-1
	Description of Proposed Structures and Improvements	4-1
	Access Roads	4-9
	Project Accomplishments	4-10
	Hydrology and Hydraulics	4-13
	Water Quality	4-15
	Geology and Soils	4-19
	Sources of Construction Materials	4-21
	Relocations	4-24
	Construction Procedures	4-34
	Recreational Areas	4-39
	Real Estate Requirements	4-44
	Cultural Resources Investigations	4-48
	Cost Estimate	4-49
	Schedules for Design and Construction	4-55
	Operation and Maintenance	4-59
	Initial Reservoir Filling and Surveillance Plan	4-64
	Flood Emergency Plans	4-65
5.	Plan Implementation	5-1
	Interest Rates	5-1
	Cost Allocation	5-3
	Cost Apportionment	5-4
	Reimbursement	5-5
	Summary and Comparison	5-6
	Implementation Arrangements	5-8
6.	Environmental Impact Statement	i
7.	Public Involvement	7-1
	Utilization of DRBC Public Involvement	
	Public Issues	
8.	Recommendations	8-1

# Supplement a

General Issues and Public Comment

## Supplement b

List of Appendices and their Contents

Supplement c Draft Contract

### TABLES

Number	Title	Page
1-1	Pertinent Data	1-11
2-1	Average Annual Consumptive Use of Water	2-10
3-1	Major Projects Authorized by Federal Flood Control Act of 1962	3-4
3-2	"Good Faith Negotiations" Recommendations	3-7
4-1	Reservoir Physical Characteristics for Different Pool Levels	4-16
4-2	Selective Withdrawal System for Modified Project	4-19
5-1	Allocation and Apportionment Project Costs, Walter Modification	5-7
5-2	Comparison, Allocation, and Apportionment Project Costs of Walter Modification	5-9
7-1	Selected Items of Coordination	7-2

## FIGURES

Number	Title	Page
1-1	Delaware River Basin	1-5
1-2	Lehigh River Sub-Basin	1-7
1-3	Site Area Map	1-8
1-4	Milestones in Water Resources Development	1-17
1-5	Francis E. Walter Dam and Reservoir	1-23
2-1	Flow Interchange Delaware River and Raritan-Magothy	2-4
2-2	Modified Drought Emergency Operating Rules	2-9
2-3	Recreation Market Area Counties	2-11
2-4	Major Damage Centers - Lehigh River Basin	2-14
4-1	Buckeye Pipe Line Co. and Mobil Pipe Line Co. Lehigh River and Stony Creek Crossings	4-27
4-2	Transcontinental Gas Pipe Line Corp. Lehigh River Crossing	4-28
4-3	Transcontinental Gas Pipe Line Corp. Bear Creek Crossing	4-29
4-4	Pennsylvania Power & Light Co. and Bell Telephone Co. Vicinity of Dam	4-31
4-5	Pennsylvania Power & Light and Bell Telephone Co. Bear Creek Crossing	4-32
4-6	Commonwealth Telephone Co. and Tobyhanna Township Road T-553 at Staddartsville	4-33
4-7	Pennsylvania Power & Light Co. Tobyhanna Creek Crossing	4-35
4-8	Pennsylvania Power & Light Co. at Stoddartsville	4-36

### PLATES

NUMBER	TITLE
1-1	Site Plan
1-2	General Plan
1-3	Dam, Profile and Sections
1-4	Dike-Profile and Sections
1-5	Spillway-Profile and Sections
1-6	Spillway-Weir and Wall Details
1-7	Outlet Works, Service Bridge and Retaining Wall
1-8	Service Bridge-Plan, Elevation and Details
1-9	Intake Tower-Elevation and Section
1-10	Intake Tower-Floor Plans
1-11	Reservoir Clearing Plan
1-12	Reservoir Clearing Plan
1-13	Reservoir Clearing Plan
1-14	Reservoir Clearing Plan
1-15	Reservoir Clearing Plan
1-16	Reservoir Clearing Plan
1-17	Reservoir Clearing Plan
1-18	Potential Borrow Sources
1-19	Area Highway Map
1-20	Relocated LR 40041
1-21	Relocated T-553
1-22	Recreation Plan
1-22a	Abandoned Railroad Recreation Area
1-23	Future Recreation Plan
1-24	Recreation-Buildings
1-25	Recreation-Comfort Station
1-26	Real Estate Guide Taking Lines



#### PURPOSE OF STUDY

The Corps of Engineers report, <u>Comprehensive Survey of the Water Resources of</u> <u>the Delaware River Basin</u> adopted in 1962 as House Document 522-87-2, recommended improvements for flood control, water supply, and other purposes. Nineteen major control projects and 39 small control projects were recommended. These recommendations included the modification of F. E. Walter Dam. The Delaware River Basin Commission (DRBC), created in 1961 for managing the Basin's water resources, adopted a comprehensive plan which set forth the framework for the Commission's programs, proposed projects, policies, and standards. Although this Comprehensive Basin Plan still includes many components of the Corps 1962 plan, it reflects ever-changing and future needs of a dynamic-urban Basin.

The DRBC, in response to the deletion or deferral of several of the projects in its Comprehensive Plan and the 1960's and 1980's droughts (which required emergency water supply storage at Walter Dam), felt that it was necessary to update its Comprehensive Plan. This update is the 1981 Level B Study. In addition, the states of Pennsylvania, New York, New Jersey, laware, and the City of New York got together in a spirit of compromise to establish arrangements and criteria for managing the waters of the Delaware River Basin, known as the "Good Faith Negotiations". Those negotiations confirmed the need for the modification of Walter - placing a priority on its construction. The DRBC, therefore, asked the Federal Government to direct the Corps of Engineers to conduct the required post-authorization studies needed to construct the modification.

PURPOSE OF AUTHORIZED PROJECT. The purpose of the modification is to add water supply and additional recreation to the existing flood control project. In addition, the modification should neither conflict with nor preclude the development of hydropower in the future.

The water supply is to provide consumptive water use makeup for the Delaware River Basin during droughts. These supplies of water would augment low freshwater flows in the Lehigh River, the lower Delaware River and the Delaware Estuary.

Although recreation facilities already exist at Walter Dam, the original project was never intended or designed for recreational use. As a result, existing facilities are minimal and evolved solely to accomodate project visitors. The proposed recreational facilities are to help satisfy regional demands and desires. These proposed recreational facilities preserve and enhance the rugged topography, sensitive environment, and naturally primitive aspects of the area and reflect local concerns and desires.

The existing project currently provides temporary storage of flood waters for the protection of the Lehigh River Valley downstream of the dam. The modified project would allow the dam's flood control capability to remain the same even during periods of extreme drought. During droughts in the 1960's and early 1980's, approximately 30% of the flood control storage was used for storage of emergency water supply.

When the Walter modification was authorized, hydropower was considered but was determined to be economically infeasible for authorization because, at that time, alternative lower cost fossil fuel generation was available. Now, hydropower is again being considered. There are two hydropower efforts which investigate this site. They are:

- U.S. Army Corps of Engineers, Philadelphia, "Lehigh River Basin Hydroelectric Power Study." which is on-going, and
- . Borough of Weatherly, PA "F.E. Walter Hydropower Feasibility Study." which was recently completed.  $\underline{1}/$

1/ Weatherly's license application was denied by FERG on March 21, 1985 because the proposed hydropower project "is not designed to utilize fully the head, as Federally authorized, at the Corps' modified project ••. Licensing the power project as currently proposed would not be consistent with the comprehensive development of the river and would not be in the public interest." The Borough, however, filed an application for rehearing. FERG granted a rehearing to more fully review arguments raised. No deadline has been established.

All potential hydropower schemes being investigated by these two efforts were fully coordinated and the most flexible modification was made so that hydropower could be developed in the future.

ADVANCED ENGINEERING AND DESIGN. Advanced Engineering and Design (AE&D) studies were initiated at the request of DRBC. These efforts included a complete analysis to:

- Bridge a more than 20 year gap between the time the project was first authorized and the present time;
- . Confirm that a water supply and recreation project is still needed;
- Evaluate the authorized modification to determine whether it is still the best plan for meeting these needs;
- . Evaluate the environmental/cultural/social effects and impacts;
- . Coordinate all aspects of the project with other governmental agencies, interested groups, and the general public; and
- Provide a reasonable degree of assurance that the local sponsors will carry out all required commitments of local cooperation

Following these iterative studies, detailed engineering and initial design was done on the "selected" plan alternative.

#### STUDY AREA

A REGIONAL PROJECT. The proposed modification of Francis E. Walter Dam will provide a source of water for the region - the Delaware River Basin. Waters flowing above and below the surface comprise an extremely complex system of interconnecting and interdependent resources which serves the entire Basin. The modified Walter Dam will serve some users directly and others indirectly by freeing for their use other water sources in the Basin. This redistribution occurs by movement of water naturally by groundwater and streams or mechanically by distribution and transfer systems. It also occurs administratively by allowing or changing total use and consumptive use withdrawal permits to suit the total available sources,

As a regional project, the modification of Walter Dam is intended to help meet the water supply needs of the Delaware River Basin. During years of normal precipitation, adequate amounts of water are available to meet the region's

needs. Most water used is returned after treatment and becomes available for reuse. Water originating in the upper Basin is partially diverted, used, and mostly returned to the river for downstream reuse. As this water travels the path from the upper portions of the Basin to the ocean, it is used over and over again for agricultural, municipal, manufacturing, electric generation, and private purposes. In this cooperative system, a single source of water directly and indirectly maintains streamflows; replenishes groundwaters; maintains surface and groundwater quality; and repels salinity in the estuary.

DELAWARE RIVER BASIN. As shown in Figure 1-1, the Delaware River drains a relatively long and narrow land area in the northeastern United States, extending some 330 miles southward from the upper Catskill Mountain valleys in New York State to the Atlantic Ocean at the mouth of the Delaware Bay. The Basin's terrain spans five physiographic provinces: the Appalachian Plateau, the Valley and Ridge Province, the New England Province, the Piedmont, and the Coastal Plain. The physiographic features range from the Catskill and Pocono Mountains in the upper portions of the Delaware Basin, through rolling hills in the central portion, to the sandy coastal plain of southern New Jersey and Delaware.

In general, the land uses in the Delaware River Basin are integrated in a regional system dominated by Philadelphia and New York City even though New York City lies outside the Basin. The transportation network interconnects the various subcenters within the region to each other and to the major commercial and employment centers. Existing land use patterns in the area are a result of a general expansion of population, industry, and commerce from Philadelphia and New York City. To some extent, a similar process has occurred in the secondary centers such as Trenton, Allentown, and Wilmington. Population density generally decreases as the distance from these centers increases and the land changes from urban uses to suburban and then rural uses such as agriculture. Industry tends to be concentrated along the major rivers and streams and in the population centers. Most municipal and industrial water used originates in surface water supplies from the Delaware River and its tributaries.

LEHIGH RIVER SUB-BASIN. The 1370 square mile Lehigh River Sub-Basin accounts for about one quarter of the Delaware River Basin above Easton (see Figure 2).

1-4

1



10

The upper portion of the Lehigh Sub-Basin above the project site at White Haven lies in the Appalachian Plateau physiographic province. This region has been glaciated and contains many lakes and swamps. Below White Haven, the Sub-Basin consists of two basic sections. The area between White Haven and Palmerton consists of a broad bank of long narrow ridges which are perpendicular to the general course of the river. The ridges and steep slopes are moderately wooded. This then transforms to broad rolling terrain extending from below Palmerton to the mouth of the Lehigh at Easton. Over its entire 103 mile length, the Lehigh River falls 1890 feet.

There are 101 municipalities which are either totally or partially located in the Lehigh River Sub-Basin. Allentown and Bethlehem, the largest cities, support the main industrial development in the Sub-Basin. Easton is the third largest community in the Sub-Basin. Outside of Carbon, Lehigh, and Northampton Counties, the Sub-Basin *is* largely rural in nature with textiles and cement being the most important industries.

The Lehigh River Sub-Basin has a favorable location relative to the Philadelphia and New York metropolitan areas. In addition, it is well endowed with natural resources which include coal, limestone, slate, zinc, and iron ore as well as rich farm lands and diverse recreational areas which encompass a "Four Seasons" operation. Manufacturing, highly diversified, is the leading industry and is augmented by an excellent transportation network and an adequate supply of labor. Large remaining native deposits of anthracite coal have improved the area's long-term prospects as a result of recent changes in national and world fuel preferences. However, foreign imports of textiles and steel may continue to have a dampening effect on the area's textile and steel industries.

PROJECT LOCATION. As shown in Figures 1-2 and 1-3, F.E. Walter Dam is located on the Lehigh River about 75 river miles upstream of Easton and 3 miles north of the intersection of the Pennsylvania Turnpike's Northeast Extension and Interstate 80. The dam is in a section of the Pocono Mountains which is composed mainly of forests containing scattered resort-type development. The nearest town is White Haven, about 5 miles south of the dam. Wilkes-Barre, the city nearest the project is about 10 miles northwest of the dam and lies

1-6

Ĺ





ouGsicte the Velaware Hiver Hasin's boundary. The proposed project would be partially located in Bear Creek and Buck Townships in Luzerne County, Kidder Township in Carbon County and Tobyhanna Township in Monroe County.

#### PROJECT AUTHORIZATION

Congressional authority for construction of the existing project (formerly Bear Creek Reservoir) is contained specifically in Section 10 of the Flood Control Act of 1946 (Public Law No. 526-79, 2nd session) which provided for construction of a single purpose reservoir with 110,000 acre-feet of shortterm storage for flood control (this was later altered slightly to 108,000 acre-feet in order to include 2,000 acre-feet for a conservation pool). Construction of the project by the Corps of Engineers began in 1956 and was completed in 1961. Limited basic recreation facilities have since been provided at the project in accordance with Section 4 of the Flood Control Act of 1944 (Public Law 543-78, 2nd Session). Because recreation was not an original project purpose, the existing facilities were constructed piecemeal.

In response to U.S. Senate Public Works Committee Resolutions adopted 13 April 1950, 14 November 1955, 20 February 1955, and 28 April 1958 and two House Public Works Committee Resolutions adopted 13 June 1956, the Corps of Engineers prepared the report on a <u>Comprehensive Survey of the Water Resources</u> of the Delaware River Basin which considered the advisability of improvements for flood control, water supply, and other purposes. The report was published in August 1962 as House Document 522-87-2. The study recommended that 19 major control projects and 39 small control projects be adopted as a guide to the timed and balanced development of the water resources of the basin. Eight of the 19 major projects recommended for construction by 1990 were authorized by the Federal Flood Control Act of 1962 (Public Law 87-874). The Walter modification to be modified for water supply and recreation was one of the projects recommended.

The authorizing legislation authorized projects (including the Modification of Walter Dam) for developing supplies of water to satisfy the broad geographic needs of the people of the entire Delaware River Basin and for a sizeable population beyond its boundaries. The supplies of water category included the

following uses: domestic, municipal, industrial, rural, agricultural, electric power generation, low-flow augmentation, salinity control, water quality and prevention of sedimentation. The House Document was authorized in accordance with the provisions of the Water Supply Act of 1958. The act basically states that water supply can be included in a Federal project provided that local sponsors agree to the following: pay back the reimbursable construction costs allocated to water supply; contract prior to construction any storage (up to 30% allowed) which will be deferred for future use; and pay back the entire amount of reimbursable interest and construction costs within the project life not to exceed 50 years after the water supply is first used.

(

"Minimum Required" modifications to be incorporated for hydropower would be done under the discretionary authority which was authorized with the modification for water supply and recreation. P.L. 87-874, which authorized the modification of Walter Dam, provides "••• that penstocks and other similar facilities adopted to possible future use in the development of hydroelectric power shall be installed in any dam authorized in this Act for construction by the Department of the Army when approved by the Secretary of the Army on the Recommendation of the Chief of Engineers and the Federal Power Commission." This philosophy has been reinforced by Engineering Regulation (ER) 1110-2-1, Engineering and Design <u>Provisions for Future Hydropower Installation at Corps of Engineers Projects,</u> Department of the Army, U.S. Army Corps of Engineers, Washington DC, 29 January 1982.

### PERTINENT DATA

The project confirmed for construction based on the current study does not vary significantly from the authorized modification as described in House Document 522 and recommended for construction by Public Law 87-874. In Table 1-1, the plan is described and compared with the existing project and with the modification as presented in House Document 522. Departures between the authorized and recommended plans are also discussed. The only major differences have resulted from changes in design criteria and legislated requirements; primarily, related to environmental, social and cultural matters.

### TABLE 1-1

~

1

Singly

# FRANCIS E. WALTER DAM MODIFICATION PERTINENT DATA

ITEM	UNIT	EXISTING	AUTHORIZED	RECOMMENDED
GENERAL				
Location of damsite above mouth of Lehigh River	Miles	77.5	77.5	77.5
REAL ESTATE				
Project Area Recreation Area	Acres Acres	1803	3950 2000	3551 2000
Easement Area Total Area	Acres Acres	1079 2882	1950 3950	624 3950
HYDROLOGY				a.
Drainage Area of Lehigh River Drainage Area above the damsite Maximum Allowable Release	Sq. Mi. Sq. Mi. c.f.s.	1368 288 8500	1368 288 10,000	1368 288 outlet capacity of 14,000 cfs
Reservoir Design Flood Maximum inflow Maximum outflow Peak pool level	c.f.s. c.f.s. Feet	50,500 . 8,500 1441 .2	N/A N/A N/A	90,200 14,000 1482

# TABLE 1-1 (continued)

ITEM	UNIT	EXISTING	AUTHORIZED	RECOMMENDED
Standard Project Flood Maximum inflow Maximum outflow Peak pool level Spillway Design Flood	c.f.s. c.f.s. Feet	58,000 9,000 1,452.3	N/A N/A N/A	79,150 14,300 1,477.4
Maximum Inflow Maximum outflow Peak pool level	c.f.s. Feet	170,0 0. 133,000. 1,.467.6	170,000 128,500 1,497.6	203,000 188,600 1,498.5
RESERVOIR				
Top o Inactive Storage Pool Elevation Top of Inactive Pool Area:, Inactive Pool Storage	Feet NGVD Acres Acre-Feet	1,300 80 <b>r,</b> 793	1,300 80 2,000	1,313 132 3,183
Top of Long Term Storage-Pool Elevation Top of Long Term Storage-Area Long Term Storage	Acres Acre-Feet	N/A N/A N/A	1,425 1,295 70,000	1,427 1,333 70,197
Top of Short Term Storage-Pool Elevation Top of Short Term Storage-Area Short Term Storage	Feet NGVD Acres Acre-Feet	1,450 1,830 107,815	1,481 2,726 108,000	1,482 2,768 107,745
Top of Dam Elevation Top of Surcharge Storage Area Surcharge Storage	Feet NGVD Acres Acre-Feet	1,474 2,432 50,682	1,503 3,662	1,504 3,714 70,817
RELOCATIONS				
New and improved state and county roads Bridges and culverts Relocation of service pole lines Pipelines	Mile Each Mile	0.2	5.4 2 5.4	3.6 1 2 1.5

٠,

÷.,

مبر

٩

TABLE 1-1 (continued)

.

ltem	UNIT	EXISTING	AUTHORIZED	RECOMMENDED
DAM				
Туре	-	Earth & Rockfill	Earth & Roc.kfill. <del></del>	Earth & Rockfill
Top Length	Feet	3,000		<b>3,</b> 500
Top Width	Feet	30	30	30
Height The Riese tion	Feet	234	263	264
Top Elevation	Feet NGVD	1,4/4	1,503	1,504
Freeboard above spillway				
design Flood	Feet	6.4	5.4	5.0
SPILLWAY				
Туре	-	Uncontrolled	Uncontrolled	Uncontrolled
		Ogee Crest	Ogee Crest	Ogee Crest
Crest Elevation	Feet NGVD	1,450	1.481	1,482
Crest Length	Feet	450	500	675
-				
DIKE				
Туре	-	Earth	Earth	Earth
Top Length	Feet	1,490		4,978
Top Width	Feet	30	30	25
Height	Feet	30	59	40
Top Elevation	Feet NGVD	1,474	1,503	1,504
Freeboard above spillway design flood	Feet	6.4	5.4	5.0

Ι-' Ι Ι-' ω

ودريصير

# TABLE 1-1 (continued)

ITEM	UNIT	EXISTING	AUTHORIZED	RECOMMENDED
OUTLET WORKS				
Intake Structure Type Top Elevation Number of service gates Size of service gates Number of emergency gates Size of emergency gates	Feet Each Feet Each Feet	-concrete tower 1,474 3 5' 8 <sup>11</sup> x 10 <sup>1</sup> 3 5' 8 <sup>11</sup> x 10 <sup>1</sup>	modify existing tower	new tower with selective withdrawal 1,504 2 5' 8" <b>x</b> 10' 2 5' 8" <b>x</b> 10'
Outlet Works Conduit Diameter Length	Feet Feet	16 1,150.5	16 1,280	16 1,285
Capacity Normal Pool Flood Control Pool	c.f.s. c.f.s.	8500* 8500*	<i>NIA</i> 10,000*	9,600
Maximum surcharge	c.f.s.	Conduit Capacity	10,000	11,500

.

\* controlled capacity

~

.

<u>)</u> 🤊

y.

#### SCOPE OF STUDY

This subject study initially concentrated on confirming that the regional water supply and recreation needs for which the project was planned still exist, and evaluating whether the authorized modification is still the best plan for meeting those needs. Once the plan to modify the Walter Dam was confirmed, the alternative schemes for accomplishing the modification were investigated and the best scheme selected. Detailed engineering and initial design followed this selection.

SURVEYING AND MAPPING. Aerial photography of the F. E. Walter Dam and Reservoir site including the proposed reservoir and real estate acquisition area was flown in March 1981. Topographic mapping from the aerial photography was prepared at three different sets of scale; one inch equals four hundred feet, one inch equals two hundred feet; and one inch equals fifty feet. The aerial photography and topographic mapping included horizontal control based on the Pennsylvania State Coordinate System and vertical control based on National Geodetic Vertical Datum (NGVD).

The four hundred foot scale mapping utilized five foot contour intervals and the two hundred foot and fifty foot scale mapping utilized two foot contour intervals. The topographic mapping complies with the National Map Accuracy Standards. The horizontal and vertical control was surveyed at second order accuracy. Cross-sections and hydrographic surveys were obtained to supplement the mapping and included the potential borrow areas within the reservoir, the approach channel to the proposed intake tower, and the Lehigh River from downstream of the dam to the Delaware River. Previously surveyed river crosssections between the dam and the Delaware River were also used along, with newly surveyed current cross-sections. During preparation of plans and specifications, additional field surveys may be required for specific items.

### HISTORY OF WATER RESOURCES DEVELOPMENT

Use of the Delaware River and its tributaries as a source of municipal and domestic water supply can be traced to the late 1700's with the building of municipal waterworks at Bethlehem and Philadelphia. Other forms of increasing industrialization and urbanization along the Delaware and its tributaries led to significant increases in pollution of those waters. That problem as well

as limitations on the available quantity of water in the basin, and the decision by New York City (NYC) to go to the headwaters of the Delaware River for additional water supply, led to an increasing concern of local and state governments in the 1920's regarding the equitable distribution of those waters. A summary of milestones in the evolution of water resources development in the Basin is shown in Figure 1-4.

1931 SUPREME COURT DECREE. In 1924, New Jersey, New York, and Pennsylvania appointed representatives to devise a plan for allocation of the Delaware's waters through some form of interstate agreement or compact. Much frustration followed. The seeming impossibility of a negotiated settlement led New York City and State to proceed with their own plans for the out-of-basin diversion. In response, the State of New Jersey sued the State and City of New York, invoking the original jurisdiction of the U.S. Supreme Court. The Commonwealth of Pennsylvania subsequently intervened.

The basic thrust of the ensuing decision, the 1931 decree, gave New York City permission to divert a fixed maximum quantity of water per day and instructed the city to release waters from its impounding reservoirs when and if the Delaware flow should fall below established criteria or goals. New York City could, therefore, not assert that its diversion signified a priority over other interested users.

1954 SUPREME COURT DECREE. The 1931 decree did little to resolve the problem of future planning, control and allocation of the Delaware's waters for the many purposes which all states wanted. By the early 1950's, New York City again was pressing what it considered to be its urgent needs for more Delaware Basin water. The Supreme Court was once again petitioned.

All provisions of the 1931 decree were superseded by the 1954 decision. New York City could divert 800 MGD once two of its reservoirs, Pepacton and Cannonsville, which were to be located in the Delaware River Basin, were constructed. That diversion continues to be New York's basic allocation. As a condition of this larger allocation, however, New York was obliged to make compensating releases from its reservoirs. This assured that communities along the Delaware would have a constant flow of water, even during dry periods, which is a guarantee these communities did not have while relying solely on natural river flow i.e.



before the decree. In addition, New Jersey was authorized to make out-ofbasin diversions in the amount of 100 MGD (through the Delaware and Raritan Canal), without any compensating releases being required. The Court again emphasized that authorized diversions did not constitute prior appropriations. It also reemphasized the supreme authority of the United States over the Delaware River and retained authority for modifying the decree if changed circumstances warranted this.

The Supreme Court intended that any party to the preceding litigation could petition the Court to re-open the decree. The execution of the Delaware River Basin Compact (described in following pages) in 1961, included a "bartering away" of the right of any of the states party to the compact (New York, New Jersey, Pennsylvania, and Delaware) and the City of New York to go back to the Court on its own for the life of the compact (100 year minimum) except for (four) very limited circumstances. It should be emphasized that it is always permissible for a signatory party to go to court to enforce the existing provisions of the 1954 decree.

DRBC's EMERGENCY POWERS. The compact which established the DRBC allows the DRBC to make "reasonable" rules for enforcement, including the power to define an "emergency" and then to fully utilize emergency powers. If, after declaring such an emergency, the Commission wishes to increase or decrease allocations, diversions, or releases required by the decree, the DRBC must obtain the unanimous consent of its members (this would include the United States representative, as well as the four states). DRBC got a chance to test its emergency powers during the 1960's and 1980's droughts by impounding temporary drought contingency storage in Flood control allocation storage at several Basin reservoirs, and by reducing diversions and flow releases. Its requests were honored by all parties.

COMPREHENSIVE PLANNING. As previously mentioned, as the region grew so did competing and often conflicting pressures on what was becoming limited water resources. It was not until 1933 that an assessment was conducted of the overall situation of water resources in the region.

<u>308 Report.</u> In 1933 the Corps of Engineers completed preliminary studies of the Delaware River that were submitted to the Congress and became part of the

concerning the Delaware River Basin dealt with navigation, hydroelectric power, flood control, irrigation, and water supply. Although no projects or programs were recommended, the report marked the beginning in the Delaware River Basin of a more comprehensive approach to water resources planning and development. . 10 Case Press. Bill Dave

<u>Incodel.</u> Two years after publication of the "308" report, the Interstate Commission on the Delaware River Basin (INCODEL) was created by reciprocal legislation in New York, New Jersey, Delaware and Pennsylvania. From its creation through 1948, INCODEL directed its program mainly to the problem of pollution in the Delaware River Basin. In August 1950, INCODEL published a comprepensive plan for the Delaware River Basin which included plans for water supply storage, hydroelectric power, pollution abatement, recreation, fish and wildlife, stream flow regulation and salinity control. Although the proposed plan failed to be ratified by all the member states, it was a major and historic contribution to the development of the Basin's resources.

By 1950, significant changes had occurred in the region's population and economy. The population had increased about 30 percent from 1933, total personal income had increased about 81 percent, total employment was up about 25 percent with employment in factories increasing about 33 percent and per capita personal income had increased about 40 percent. In response to these changes, on April 13, 1950, the United States Senate authorized a comprehensive review to update the #308# report.

<u>House Document 522.</u> Limited review of the #308# report was in progress in August 1955 when two tropical storms moved up the eastern coast of the continental United States about a week apart. The flood damage and other destruction resulting from these storms dramatically emphasized the need for a totally new and complete appraisal of the water problems of the Delaware Basin. The resulting investigation (House Document No. 522, 87th Congress, 2d Session) anticipated the requirements that would be placed on water resources in the future and planned for their continued beneficial use. It defined a comprehensive plan for this purpose which depended on the continuation of vigorous activity by government and non-government interests wherever these interests were engaged in the development and use of water resources.

Delaware River Basin Compact. Prior to 1961 a variety of Federal and state agencies managed the water resources of the Basin. The result was a maze of jurisdiction. In addition, there was no easy mechanism for the resolution of interagency or interstate disputes regarding the water resources of the basin. In 1961 the interstate agreement known as the Delaware River Basin Compact created the Delaware River Basin Commission (DRBC) consisting of the governors of the four basin states (Delaware, New Jersey, New York, and Pennsylvania) and an appointee of the President (generally the Secretary of the Interior). The responsibility of the DRBC was to manage the water and water-related resources of the basin by means of a Comprehensive Plan, with particular emphasis on water supply problems. On March 28, 1962, the DRBC adopted a Comprehensive Plan using many of the findings in House Document 522, and over the years, has amended that Plan to broaden its scope.

<u>Tocks Island Lake Study.</u> The largest project recommended in the DRBC's Comprehensive Plan was the Tocks Island Lake project. The impoundment was to provide storage for water supply, recreation, hydropower, and Flood control. In the early 1970's, however, major issues surfaced concerning the project's impact on the surrounding area. Alternatives to Tocks were suggested by various public and private groups and by individuals. In 1974, Congress directed the Corps and the DRBC to conduct a comprehensive review of the project and its alternatives. The ensuing report was the <u>Comprehensive Review</u> <u>Study of the Tocks Island Lake Project and Alternatives</u> by URS/Madigan-Praeger. As a result of this study, the DRBC voted against project construction at that time.

Level B. Since the Tocks Island Project was the cornerstone of the DRBC's Comprehensive Plan as it related to main stem Flood control and lower Basin water supply, the Tocks Island decision made necessary a review of the entire Comprehensive Plan. The major purpose of the 1981 Level B Study was to update the DRBC's Comprehensive Plan and recommend a basinwide management plan as a guide to future water resources development. The major water and land resource problem areas identified during the course of the Level B Study were:
Water Conservation Water Quality Flow Maintenance Water Supply Flood Loss Reduction Fish, Wildlife, and Recreation Energy Navigation

To solve these problems, the Study presented three alternative Basin-wide water and related land resource management options. The modified Walter project was included in all three alternatives. Major reservoir projects were reviewed as well as ranked. Five projects were part of the "Preferred Plan" recommended for expeditious construction, one of which was the Walter Modification.

<u>Good Faith Negotiations.</u> During the drought of 1982, it was realized that, during a dry period, the schedule of diversions, releases, and flow objectives originally considered in the Level B Study could not be met. Consequently, the parties to the previously described 1954 Supreme Court Decree (New York, New Jersey, Pennsylvania, Delaware, and New York City) met to negotiate amendments to the Preferred (Comprehensive) Plan. These discussions became known as the "Good Faith Negotiations" (GFN). Of the fourteen GFN recommendations, several were amendments to the Level B "Preferred Plan."

These amendments included an agreement which revised the operation of three New York City reservoirs with respect to Basin exports and compensating releases and new salinity-control objectives to the year 2000 to protect municipal and industrial water supplies and estuarine fisheries.

# INSTITUTION OF WATER RESOURCES

An integral component of any plan capable of implementation is the institutional arrangement required to first develop and then to make that plan work. Presently, there are numerous existing agencies at the Federal, regional, state, county, and local levels which have designated responsibility, input, experience and interests in some aspects of management and development of water resources in the Delaware River Basin. Together they constitute a very complex institution for managing the limited water resources of a very complex region.

A central role in this complex **system** which is of iruportance **to** the investigation of the Walter Modification is that of the DRBC. The DRBC, having been given the responsibility in the **Delaware** River Basin Compact of managing the water resources of the Basin has 1 since 1962, niaintained its Comprehensive Plan. 'I'his' Plan sets forth the framework for the Commission's programs, proposed projects., policies, and staudards. In thi-J respect, the DRBC serves as **an** extension of the water and related resource jurisdictions exercised by the States and the Federal Government.

## EXISTING PROJECT

Francis E. Walter Dam was constructed by the Corp.; C1956-1961) as a single purpose Flood control project. The dam is an earth-filled structure with an impervious core which rises 234 feet above the stream bed. The upstream and downstream faces of the dam are covered with rip-rap to protect thew from erosion. 'I'hetop of the dam carries a gravel maintenance road. A .!+67 foot long service bridge provides access to the intake from the top of the dam. Paved access roads connect the site to state highways on both banks. The concrete ogee-crested spillway runs through the dam's right ab tment (see Figure :1-5)..

Currently, Walter Dam normally impounds an 80 acre reservoir at elevation 1,300 feet (NGVD). At the spillway erest elevation of 1:450 feet (NGVD), the reservoir would have an area of 1830 acres and a 8torage capacity of 110,690 acre-feet, including; 107,81 incre-feet for flood cout:rol. The 8:Xisting shortterm flood control storage is most effective in reducing flooding in the narrow flood plains of the upper reaches of the Lehigh Hiver' f':rorWhite Haven to Lehigh Gap. Flooding is also reduced considercibly along the wider• flood plains of the lower reaches between Lehigh Gap and Eciston and to a. small degree along the Delaware River from Easton downstreaiil as fr.irbs Tr-ellton.

Recreation was not an original project purpose but smne minor facilities have been added over the years by the Corps. These facilities acummodate -chl:; activities of boating, hiking, picnicking, fishing 1 luce hunting. Simme the facilities were constructed piecemeal, they do not adequa-cely accumunoda to the growing number of visitors.



FIGURE 1-5

ľ

.

.

.

(

.

4

#### 2. PROBLEM

### .IDENTIFICATION

The waters flowing above and below the surface of the Delaware River Basin constitute an extremely complex system that should be managed to meet the needs of every individual within that system. The proposed modification of the Francis E. Walter Dam would provide an additional source of water to help meet these needs. The supplemental water provided would directly and indirectly benefit consumers by freeing other water sources for their use. Other direct and indirect resources could be provided by the project. These include both water oriented and land based recreation. The project should also accommodate future hydropower facilities.

#### WATER SUPPLY

The major concentration of water demands (i.e. both people and economic activity) and associated water supply problems are in the portions of Pennsylvania and New Jersey in the center of the Basin. However, the problems being experienced, needs unmet, and sources in future jeopardy extend to the rest of the Basin, including the State of Delaware.

PENNSYLVANIA. In Pennsylvania, over 200 individual water purveyors in the Delaware River Basin are identified in the State Water Plan as having water supplies expected to be deficient in yield, storage, or allocation by the year 2020. Currently, many areas are over-committed and vulnerable in drought periods. At present, 18 suppliers have yield problems, 11 have deficient water allocations, and 54 have storage deficiencies. By the year 1990, 70 expect yield problems, 16 expect water allocation deficiencies and 12 expect insufficient filtration plant capacities.

NEW JERSEY. The majority of southern New Jersey relies on groundwater for its water supply; however, extensive development of groundwater supplies over recent years has lowered groundwater levels by as much as sixty feet in some areas. As demands increase, many supplies are being lost and others are threatened. The immediate additional need for the Camden area alone is 5 mgd and will increase to 15 mgd by 1990. Due to the lowered groundwater levels, approximately 50% of the water withdrawn from the aquifer is actually induced infiltration from the Delaware River.

By the year 2000, the infiltration could increase to 70%. This becomes alarming when considering that river contaminants could easily enter the aquifer. Moreover, the area's pervious soils readily allow local contaminants from improper land use practices to enter the groundwater.

 $\backslash$ 

(

New Jersey's purveyors in the northern portion of the Basin have sufficiently developed or have readily accessible resources to assimilate any future increases. However, problems exist along the mainstream of the Delaware River due to low flow conditions which exacerbate the poor water quality situation. It should be noted that there is the potential of severe water deficiencies in northern New Jersey in the heavily populated areas located to the east of the Basin's eastern boundary. These deficiencies could conceivably result in substantial demands on the Basin's water supplies in the future.

DELAWARE. Approximately two-thirds of that portion of Delaware in the Basin uses groundwater as its water supply source. Most of the groundwater is normally of high quality, low cost, and readily available. Even under drought-of-record conditions, supply is expected to exceed demand through the year 2010.

These supplies, however, face a threat similar to that faced by southern New Jersey's aquifers. Over pumping of the aquifer resulting in recharge from the Estuary and local contamination through pervious soils threaten Delaware's groundwater supplies.

#### GROUNDWATER

Areas in the Delaware River Basin that depend heavily on groundwater include portions of southeastern Pennsylvania, southern New Jersey, and northern Delaware. In the last decade, increased water demands and several dry years have resulted in lowered water tables and limited water supplies. During recent dry spells, water suppliers have had to restrict water use because of supply and/or quality problems.

GROUNDWATER SUPPLY. Studies conducted in the past warn that water supply needs of existing urban and suburban development in many areas cannot be provided by groundwater during periods of drought. This has been recently

worsened in populous areas by regional wastewater treatment plants which have been substituted for on-lot wastewater disposal systems. This causes wastewater that was recharging the aquifer to be transported out of the watershed. Aquifer recharge is also reduced by increases in impervious surfaces such as streets, parking lots, and buildings.

GROUNDWATER QUALITY. Most of the Pennsylvania aquifers in the Basin are of good quality and are well within established drinking water standards; however some quality problems already exist with a potential for many more. Known incidents are primarily related to population centers and industrial sites. Existing and proposed industrial storage sites and waste piles, along with sanitary landfills, are areas with significant potential for groundwater contamination. None of these threaten any major sources in Pennsylvania. The more volatile conditions are in the New Jersey and Delaware aquifers.

Although most of the aquifers in southern New Jersey are still good, they are imminently threatened by salinity and local contamination. In its natural state, the aquifer discharged an estimated 50 mgd of fresh water into the area's waterways. Now, the Delaware River recharges the aquifer (see Figure 6). This poses a continual threat to the aquifer during drought periods. At the present rate of withdrawal, the U.S. Geological Survey (U.S.G.S., May 1982) estimates that the saltwater/freshwater interface is expected to migrate inland about one-half mile by the year 2000 and contaminate 10-15 square miles of the aquifer system.

In addition, several areas in New Jersey have already experienced serious water supply losses due to groundwater contamination from landfills, chemical dumping, and other improper land use practices. Evidence points to an increase in these occurrences in spite of expanded attention being paid to the control of waste products and to land use practices. Alternative sources are difficult to develop. Many aquifers are controlled by local surface conditions and are subject to rapid contamination from pollution sources. High concentrations of nitrates have been found, probably resulting from leaching of nitrate fertilizers in agricultural areas of the outcrop belt. Additionally, many of New Jersey's raw water supplies contain appreciable concentrations of hydrocarbons and other pollutants. The use of chlorine for disinfection of water supplies poses a potential hazard. It is possible that



toxic or carcinogenic substances may be created by the treatment processes themselves. Since groundwater receives less treatment, even low pollution levels are more harmful than in surface water. Once aquifers are olluted, an extremely long time period is required for flushing because of the water's slow rate of movement.

Like New Jersey, most of Delaware's groundwater is normally of good quality but is threatened by local contamination and salinity. Delaware has eight hazardous waste sites included in the U.S. Environmental Protection Agency's National priorities list (1982) which pose a threat to its aquifers. Groundwater pollution from chemicals, including industrial solvents, has been detected or is suspected at all of the sites. Wells along the estuary are experiencing salinity contamination and there is concern with further contamination of its deeper aquifers.

# WATER QUALITY

Historically, the importance of maintaining water quality to meet water supply needs has been widely recognized. House Document 522 surfaced the relationship of water quality in determining the Basin's water resources and ultimately the overall well being of the region. It recognized that failure to project future trends in water use may add to the overall water quality problems of the Basin and prevent water resource programs from achieving their full contribution to community welfare. Need was expressed for flow augmentation to improve in-stream water quality throughout the Region. The definition of water quality at that time, included dilution of only partially treated municipal and industrial discharges; acid mine drainage; suspended sediment; and salinity intrustion. The report stressed the importance of salinity control to reduce treatment costs, the need for additional investments in fresh water development, and the threat to water supplies for downstream users.

ACID MINE DRAINAGE. Acid mine drainage is the cause of a water quality deficiency in the middle reaches of the Lehigh River. During periods of high or normal flow, the acid is prevented from seriously degrading the downstream reaches by the inflow of diluting and neutralizing tributaries. Under low flow conditions, however, there is not sufficient water in the system to dilute the acid contamination. In this case, the water downstream used for industrial and public purposes would be threatened. The low pH which results

from increasing acid concentration can kill many forms of aquatic plant life, corrode pipes, and damage concrete. It also results in objectionable taste and stains and adds significantly to water treatment costs. In addition, it can kill fish and aquatic organisms on which fish feed.

(

SEDIMENTATION. An increase in suspended sediments is also a problem in the Lehigh River because, during dry periods, there is too little water for dilution. Suspended sediments causes blockage of intake structures and damage to industrial and municipal processors which draw water from the flowing streams.

MUNICIPAL AND INDUSTRIAL WASTES. In the same manner, inadequately treated industrial and municipal wastes cause a water quality problem in the Lehigh. Again, during average flow conditions the problems is not serious. However, during low flow periods the problem is aggravated to the point of causing a threat to social well-being.

LAND LEACHATE CONTAMINATION. Many areas in all the Basin states not only have local groundwater contamination but also surface water problems due to industrial and landfill leachate seepage, chemical dumping, and other improper land surface waste disposal practices. Alternative water supplies have already had to be developed in some areas due to the presence of toxins in the primary water supplies.

SALINITY INTRUSION. Salinity intrusion is not only a threat to groundwater but also surface water. During an extended low flow period the encroaching salt line threatens the water supply of the population and industrial centers of the Delaware River Basin. The results of such occurrences have been very costly to the region in the past and could be devastating in the future. Salinity is of such grave concern in the Estuary not only becaus@ of the damage and associated costs to the residents, municipalities, and industries in the region but also because of health problems associated with a highsodium water supply. Sea salts in detectable concentrations have been observed in the tidal Delaware River as far upstream as Philadelphia's primary water intake. Besides physical damages and health hazards, salinity limits industrial and municipal use of river and estuary water. For example, the 1960's drought forced industrial water users to reduce production and/or

switch to alternative sources of water. Finally, predation of oysters by oyster drills has been related to high salinities in the lower tidal Delaware River and Delaware Bay.

### FLOW MAINTENANCE

Flow maintenance plays the key role in water resources for all the states in the Delaware River basin. Flow augmentation accomplishes this by allowing streamflows to be sustained during dry periods through scheduled water releases from reservoirs. This increases the volume of freshwater available for use during drought periods; thereby, battling the local problems of acid mine drainage, suspended sediments, waste discharges, and land waste leachate; and the area-wide problems of salinity intrusion, lowered groundwater tables, and aquifer contamination.

FLOW OBJECTIVES. Flow objectives were developed through a series of constitutional decisions involving exportation and through flow targets. The primary interbasin export of water was authorized by the Supreme Court for New York City. The Supreme Court detailed the operation of the three New York City reservoirs in the Basin, (Cannonsville, Pepacton, and Neversink) in terms of the withdrawal of water to meet New York City's demands and the compensating releases into the Delaware River System. New York City is allowed up to 800 mgd with the provision that during periods of low flow compensating releases are such that a flow of 1750 cfs at Montague, New Jersey is maintained. This rate was considered the minimum necessary to prevent excessive salinity intrusion into the Delaware River estuary, which extends from the Delaware Bay to Trenton. The Court also permitted New Jersey to divert 100 mgd through the Delaware and Raritan (D&R) Canal with provisions made for increases in that diversion conditional on the development of compensating storage.

It has been determined that during a 1960's level drought, New York City's diversion and Montague's flow objective and a related 3000 cfs flow objective at Trenton could not be maintained with the present reservoir storage in the basin. In response to this situation, all parties of the "Good Faith Negotiations" agreed to operate under conditions differing from the Supreme Court Decree as it pertains to New York City reservoirs, and established flow objectives for Trenton as a technical criteria explicitly for repulsion of excessive salinity intrusion into the Estuary.

This "Rule Curve" in Figure 2-2 defines normal, drought-warning, and drought conditions in terms of the storage in the New York City reservoirs at given times of the year. This curve is used to establish the allowable diversions and flow objectives at Montague and Trenton.

Actual and projected depletive use from 1970 to the year 2000 are presented in Table 2-1. With depletive use through the year 2000, and a recurrence of the 1960's drought-of-record, operation of the Basin's existing impoundments would fall 600 cfs short of the year 2000 flow objective for salinity control. Supplies of water to be developed by modifying Walter Dam is to partially satisfy this need.

#### RECREATION

The Walter Site is located on the fringes of the Pocono Mountains Area which is a major vacation destination in the State of Pennsylvania. Tourism is the major industry in the four county Pocono area providing boating, picnicking, fishing, hunting, hiking, golf, tennis, skiing, tobogganing, ice skating, horse-back riding, and many other activities. In addition, a large network of eating establishments, resorts, motels, campgrounds, and retail establishments support the recreation industry.

MARKET AREA. The Francis E. Walter Dam Recreation Market Area is defined as that area from which the reservoir and its associated land acreage is most likely to attract visitors for recreational purposes. (See Figure 2-3). Fourteen counties are located within the Market Area; of which, thirteen are located in Pennsylvania and one in New Jersey. The Market Area is considered to be unique because it includes a large number of seasonal residents in addition to its permanent population. This influx of seasonal residents is primarily attracted to the Poconos Resort Region, which comprises a major portion of the market. A large number of competing recreational facilities exists within the F. E. Walter Market Area. Most of these facilities are privately owned and associated with the resorts found in the Pocono Mountain Region. Privately owned facilities do not, for the most part, offer the same type of recreational experience found at F. E. Walter and are, therefore, not necessarily considered "competing" resources.



FIGURE 2-2

# TABLE 2-1

# AVERAGE ANNUAL COMSUMPTIVE USE OF WATER (MGD) \_1/

	1970	<u>1975</u>	1.980	1985	<u>1990</u>	2000
IN-BASIN						
Municipal	92	103	111	121	131	147
Rural	4	5	6	7	8	8
Industrial	127	139	151	186	222	294
Steam Electric	43	22	52	97	139	157
Irrigation	70	77	84	98	113	140
Golf and Institutions	31	37	43	49	56	69
Livestock	8	_ 9	10	10	9	_9
TOTAL	375	392	457	568	678	824
EXPORTS AND IMPORTS						
Exports	651	695	911	911	911	911
Imports	30	31	47	47	47	66
TOTAL NET USE	996	1056	1321	1432	1542	1669

1/ Source - Delaware River Basin Commission's Level B Study, 1981.

۲

2



RECREATION AT THE WALTER SITE. Because recreation was not a congressionally authorized purpose, existing recreational facilities were developed in response to local demand and usage after construction of the darn.1, The first recreational facilities were placed in 1963 by the Pennsylvania Department of Forest and Waters (which is now the Department of Environmental Resources). These facilities, operated and expanded by the Corps of Engineers since 1964, support such activities as sightseeing, which takes place year round; picknicking, fishing, boating and hiking in the spring, summer, and fall; and hunting and cross-county skiing in the winter.

("

WHITE WATER RECREATION. White-water rafting and canoeing have long been popular through the Lehigh River gorge between White Haven and Jim Thrope. Commercial enterprises in conjunction with private white-water recreationists bring substantial revenues into the area. Only during the spring are the natural flows of the river normally sufficient for white-water recreation. During other times of the year, the rafting operations are dependent on releases from Walter Dam. Since 1968, augmenting flows for white-water recreation have been made as a public service. This has been made on a "water available" basis with no contractual agreement for providing or scheduling white-water releases.

MARKET AREA NEEDS. The Pennsylvania State Comprehensive Outdoor Recreation Plan 1980-1985 (SCORP) by the Pennsylvania Department of Environmental Resources, identified the activities which have the highest excess demand in northeastern Pennsylvania as boating, horseback riding and hiking. Two other activities, picnicking and cross-country skiing, although not specifically mentioned by the SCORP, have since been identified as activities which are facing a growing demand.

#### FLOOD WATER AND FLOODPLAIN MANAGEMENT

The Lehigh River Basin periodically experiences large floods from heavy rains and spring thaws. Tropical hurricanes, northeasters, and localized thunderstorms have all resulted in record flows and significant flooding. Narrow, constricted channels and generally flat slopes c n result in considerable channel overflow. The aftermath of a flood causes suffering and inflicts damages, losses and other related costs.

<sup>1;</sup> Recreational facilities were provided under the authority of Section 4 of the Flood Control Act of 1944 (Public Law 543-78) and the River and Harbor and Flood Control Act of 1962 (Public Law 87-874).

1-tAJOR DAMAGE CENTERS. Allentown, Bethlehem, and Easton are the three largest towns in the Lehigh River basin and are also subject to the most flood damages (see Figure 2-4). Other towns subject to flooding are Jim Thorpe, Lehighton, Weissport, Parryville, Palmerton, Bowmanstown, Northampton, Catasauqua, and Freemansburg. The Lehigh Navigation canal, (which extends from Jim Thorpe to Easton) and the 44 railroad and highway bridges spanning the Lehigh River are subject to recurring flood damage. The number of structures in the 1955 flood, 100 year flood and the Standard Project Flood (SPF) flood plains for each municipality by each type of land are summarized below. There are a total of 757, 955, and 2058 units for each respective flood plain. The 100 year and SPF floodplains include, respectively, 21 percent and 106 percent more units than the 1955 flood plain. Land use types include residential (RES); commercial (COM); industrial (IND); service (SER); public (PUB); utility (UTL); transportation (TRN); and historical (HIS).11

FLOOD PLAIN	RES	COM	IND	SER	PUB	UTL	HIS	TOTAL
1955	546	129	37	20	10	11	4	757
100 year	731	135	39	22	12	12	4	955
SPF	1481	406	80	41	26	19	5	2058

POTENTIAL FLOOD DAMAGES. Damages which would be caused by the occurrence of selected flood events are presented below.

FLOOD EVENT	10 Year	50 Year	1955 Flood	100 Year	SPF
Damages(\$ millions)	\$1.9	\$33.0	\$82.8	\$88.8	\$269.2
(Sept. 84 dollars)					

#### ENERGY

The Delaware River Basin's water resources have both a direct and an indirect role in regional electrical energy production. The indirect role is that of providing cooling water for nuclear/fossil steam generating units. In contrast, the direct role is in transforming kinetic and dynamic energy of falling and moving water to hydroelectric power.

.l; The Standard Project Flood (SPF) is a hypothetical flood representing critical flood runoff volume and peak discharge that may be expected from the most severe combination of meterologic and hydrologic conditions that is considered reasonably characteristic for the hydrologic region involved, excluding extremely rare combinations.



Although there are six hydroelectric facilities in the Delaware River basin, hydroelectric power provides a small fraction of the total electricity .generated in the Basin. Hydroelectric power has relatively low operation and maintenance costs, is highly reliable, and provides no toxic or thermal emissions. The ability to provide rapid changes in power output make hydroelectric plants valuable to serve peak loads, meet sudden demands for increased power, and provide starting power to steam electric plants following a major power failure.

The Delaware River Basin is contained within the Middle-Atlantic Area Council (MAAC) which is an organization of electric utilities formed to promote reliability of electric supply. The MAAC corresponds to the Pennsylvania-New Jersey-Maryland (PJM) Interconnection.

Eight members (electric companies) of the MAAC utility group serve the Delaware River Basin. The two which serve the Lehigh River Basin are Pennsylvania Power and Light (PP&L) and Metropolitan Edison Company, which is a subsidiary of the General Public Utilities Corporation.

LEHIGH RIVER BASIN HYDROPOWER STUDY. At the request of the U.S. Congress, a study of the feasibility of hydropower development in the Lehigh Basin was initiated by the U.S. Army Corps of Engineers in November 1979 and is currently in the final stage of pre-authorization planning. All potential hydropower sites in the Basin, both Federally and non-Federally owned, have been evaluated in a systematic manner. One of those sites is the modified F.E. Walter project, at which run-of-river, conventional peaking, and pumped storage alternatives are being studied.

BOROUGH OF WEATHERLY. Because of its proximity to F.E. Walter Dam, and the laws favoring hydropower development by non-Federal public agencies, the borough of Weatherly applied in March, 1980, to the Federal Energy Regulatory Commission (FERC) for a preliminary permit for hydropower development of the <u>existing</u> Walter Dam. The exclusive permit was granted allowing Weatherly a three-year period to perform certain feasibility studies on hydropower development at Walter. In March 1983, Weatherly completed a feasibility study and filed for a license for hydropower development. The license application is currently under review by FERC.

#### PROJECT OBJECTIVES

Most water used in the Basin is returned after treatment and becomes available for reuse. Water originating in the upper Basin is partially diverted, use9, and mostly returned to the river for downstream reuse. As this water travels the path from the upper portions of the Basin to the ocean, it is used over and over again for agricultural, municipal, manufacturing, utility and private purposes. A single source of water therefore, directly and indirectly maintains streamflows, replenishes groundwaters, and repels salinity in the Estuary.

1

During drought periods, however, a number of factors combine to upset this system. The low precipitation levels result in reduced streamflows due to inadequate surface run off and "base flow" from groundwater sources. High levels of depletive water use further strain the system by permanently removing water from surface and groundwater supplies. This results in further diminished Basin flow levels which are unable to repluse excessive salinity intrusion into the Estuary. This threatens both in-stream and groundwater sources of supply.

The current ability of the Delaware River Basin to withstand a drought-ofrecord (1960's) with 1980 depletive use levels and reservoir storage capacity would require severe contingency measures. In order to avoid a disastrous contamination of the Potomac-Raritan-Magothy (P-R-M) aquifer or Philadelphia's main water supply-intake at Torresdale, drastic conservation measures along with reduced exports to New York City would have to be required. Severe economic and social consequences would occur.

A 1960<sup>1</sup>s drought with a projected 26% rise in depletive water use levels from 1980 to 2000 would constitute a disaster in water quality and supply for the Delaware River Basin. There are very few alternative solutions to the future water supply needs of the Delaware River Basin. The available alternatives include conservation to reduce depletive use, reduce exportation, and increase water supply storage. The first two are inadequate solutions either singly or in combination. Emergency conservation measures during a drought would at most achieve a 15% to 25% reduction in depletive use. Furthermore, with

severe groundwater strain already occurring in basin areas characterized by large water withdrawals, depletive use obviously cannot be replaced by groundwater sources. Increased reservoir storage is being sought. It is, therefore, for these low flow or drought induced needs that the Modification of Walter Dam is primarily intended. However, the total objectives of the proposed project are summarized in the following paragraphs.

WATER SUPPLY. At this time there are no plans to utilize the proposed modification as a direct source of Municipal and Industrial (M&I) water. Water supply to be provided will be used for replacing depletive use in order to maintain flows. This will help protect surface and groundwater sources along the Lehigh River and the Delaware River and Estuary.

GROUNDWATER. Water from the project will not be directly used for recharging groundwaters. Its use.for flow maintenance will benefit groundwater in two ways. It will increase base stream flows during droughts for those reaches from which stream water is drawn into aquifers. It will also supply freshwater for combating groundwater contamination from salinity intrusion.

WATER QUALITY. Neither the data nor the readily applied science exists for quantifying the needs and conversely the benefits for maintaining sufficient flows for diluting acid mine drainage and preventing excessive suspended sediments in the Lehigh River. Nevertheless, the problems are real and are documented. Since flow to be provided by the proposed modification is delivered down the Lehigh River, these problems should be considerably reduced; if not completely eliminated. Combating salinity intrusion by maintaining fresh water flows is a primary purpose of the proposed project.

FLOW MAINTENANCE. Storage at the proposed project is for depletive use makeup through stream flow augmentation. Providing supplies of water for combating salinity intrusion by maintaining fesh water flows is the primary purpose of the Walter Modification. This flow augmentation will be a major portion, approximately 44%, of the required 600 cfs needed by the year 2000 to combat salinity.

RECREATION. The project site can not satisfy all the recreation needs of its market area; however, it can provide opportunities for satisfying some of these needs. The extent of such opportunities will depend on the site and its environments. Recreation is a secondary purpose of the Walter Modification.

FLOOD CONTROL. Flood control continues to be needed on the Lehigh River. The existing project could never totally satisfy this need; but significantly reduces this need. Flood control will continue to be a primary purpose of the Walter Modification.

HYDROPOWER. Hydropower is not an authorized purpose of the Modification, but the Corps of Engineers does have discretionary authority to add hydropower features which are integral to the structure during the modification if there is the potential for hydropower development at the site and it is more efficient to add these features at the time of the Modification. This discretionary authority is provided under both specific and general authorities. Specific discretionary authority was given under P.L. 87-874 that authorizes the modification of Walter Dam. Authority is also included under Public Law 761-75 which requires that hydroelectric power be investigated, where feasible, in conjunction with all Corps of Engineers water resources feasibility reports and/or design memoranda,.1.;

J.; Engineering Regulation (ER) 1110-2-1, Engineering and Design Provisions for Future Hydropower Installation at Corps of Engineers Projects Department of the Army, U.S. Army Corps of Engineers, Washington DC 29 January 1982.

The DRBC's Comprehensive Water Resources Plan for the Delaware River Basin has been continuOusly maintained since the Commission was established in 1961. This includes the addition, change or deletion of components to reflect changing needs of a dynamic region and its people. This maintenance requires the delicate balance of very complex and seemingly endless technical, illititutional, and political interests and concerns. The Modification of the Walter Dam is an intrinsic and important component of this Comprehensive Plan. The decisions on the need for the Modification and its configuration reflects its place in a delicate agreement or "Comprehensive Plan" reflecting the needs of a highly urban region which includes all or part of 5 states (including parts of Connecticut), 53 counties, 1318 municipalities and over 26 million people. The Walter Modification will be providing resources to be utilized in managing a complex, interconnecting system of surface and groundwater. The needs which it will partially satisfy are not for one locale or community with defined boundaries nor will its resources be directed to a well defined service area.

#### GENERAL METHODOLOGY

The Corps of Engineers has been directly or indirectly associated with the establishment of the initial Comprehensive Plan and the continuous maintenance of that plan. The affirmation of the proposed Walter Modification is a part of this on-going process. This subject, Advanced Engineering and Design (AE & D) was, therefore, detailed investigations, planning, and engineering for a specific component of a continuous framework planning process. The basic affirmation portion of the formulation procedure was a methodical review and extension of this on-going process to insure that all Federal and Corps' planning procedures and criteria are satisfied.

The overall purpose of the formulation was first to affirm the proposed modification as authorized or to make changes as required and then to select the best scheme for its modification. Once the best scheme was selected further refinement of the plan and its design followed. The general approach was to:

- Confirm that there is still a need for water supply and recreation;
- Confirm that the Walter Modification is still the best plan to meet that need;

- Select the best scheme for the Modification;
- Bridge a more than 20 year gap between the time when the project was first authorized and the present time; and
- Evaluate and make decisions based on current criteria, standards, and planning philosophies.

### COMPREHENSIVE PLANNING

The Delaware River Basin was introduced to comprehensive planning in 1933 with the "308 Report" and in 1950 with the INCODEL Comprehensive Report. The first detailed effort, House Document 522, recommended a series of projects and programs for the timed and balanced development of the Basin's water resources. In 1962, the newly formed Delaware River Basin Commission (DRBC) instituted a Comprehensive Plan; initially based on the plan developed by the Corps of Engineers (House Document 522). The largest project in the Basin Plan, Tocks Island, was reevaluated in the 1975 Madigan-Praeger Report, and susequently the project was deferred. Due to the 1960<sup>1</sup>s drought and numerous and major changes in the posture of water resource needs and projects in the Basin, DRBC updated its Comprehensive Plan with its 1981 Level B Study. In 1982, the Good Faith Negotiations were conducted to amend the Preferred Plan resulting in new diversion schedules; other management options; and priortizing of near-term projects with the Walter modification being given the highest priority.

HOUSE DOCUMENT 522. This study examined not only existing problems but also anticipated future demands on the water resources of the Basin and considered improvements in flood control, water supply, recreation, hydropower, and related purposes. In formulating the Basin plan, all potential measures were considered including: major control projects, small control projects, and land and water use programs.

Land and water use programs consisted of a variety of non-structural or management measures to optimize utilization of water resources and satisfy local needs.

3-2

Ę

Major control projects consisted of a system of major dams for flood control, water supply, flow augmentation, recreation, hydropower and fish and wildlife habitat. The study evaluated and screened 193 potential major dam sites and 396 potential small dam sites in the Basin. The report recommended that a plan consisting of 19 major control projects and 39 small control projects be adopted as a guide to the timed and balanced development of the water resources of the basin. The Federal government was to build 8 of the 19 major control projects by 1990. The 19 projects are listed in Table 3-1 with their location, original construction schedule, purposes, and status. In addition, land management, soil conservation, reforestation, flood plain management, conservation, water quality, hydrologic data collection, and groundwater quantity and quality programs were also included in the Comprehensive Plan.

The modification of Walter Dam would be only the third project of the original 19 to be constructed Five major projects which were scheduled to be completed prior to Walter, have not been constructed. Only the Prompton Modification may be the only other project to also be constructed before the year 2000.

TAMS STUDIES. As part of DRBC's on-going Comprehensive Planning process, specialized studies are conducted. One such study was the 1972 <u>Water</u>. <u>Resources Study for Power Systems</u> by Tippetts, Abbett, McCarthy, and Stratton (TAMS) to determine the amount of water available for future use including that for thermal power generation plants in the Delaware River Basin. This involved an inventory of surface and ground water resources, assessment of utilization of these resources, analysis and projection of non-power water needs to the year 2020, and for thermal power to the year 1986, and . exploration of additional new water sources.

A resurvey of the Basin was performed to locate reservoir sites. Factors which were not present in House Document 522 were: the 1960's drought; pumpin or off-line reservoirs; changes in the Basin's development; and the knowledge that many alternative projects recommended in House Document 522 can not be developed.

#### TABLE 3-1

#### MAJOR PROJECTS AUTHORIZED BY FEDERAL FLOOD CONTROL ACT OF 1962 (Public Law 87-874)

Project. Name	Location	Purposes	Construction Schedule	Status
Hawk Mountain	E. Br. Delaware R. near HanOock, NY	S,P,R	2001	Development Pree lude,1
Prompton* (Modification)	Lackawaxen R. Near Honesdale, PA	S,R,F	1974	AE & D Study Planned
Tocks Island*	Delaware R. near De. Water Gap, PA	S,P,R,F	1974	Deferred
Walter * (Modification)	Lehigh R. near White Haven, PA	S,R,F	1989	AE & D Study Underw;,y
Beltzville*	Pohopoco Cr. near Lehighton, PA	S,R,F	1965	Constructed
Aquashicola*	Aquashicola Cr. near Palmerton, PA	S,R,F	1981	Deferred
Trexler*	Jordan Cr. near Allentown, PA	S,R,F	1972	Inactive
Maiden Creekll	Maiden Cr. near Reading, PA	S,R,F	1982	Being Deleted
Blue Marshll'	Tulpehocken Cr. near Reading, PA	S,R,F	1969	Constructed
Newark	White Clay Cr. near Newark, Del.	S,R	1975	Development Unlikely
Christiana	Christiana R. near Christiana, Del.	S,R	1980	Development Unlikely
Paulina	Paulins Kill near Blairstown, NJ	S,R	9111	Development Unlikely
Pequest	Pequest R. near Oxford, NJ	S,R	111	Development Unlikely
Hackettstown	Musconetcong R. near Hackettstown, NJ	S,R	:111	Being Deleted
New Hampton	Musconetcong R. near Washington, NJ	S,R	111	Development Unlikely
Tohickon	Tohickon Cr, near Ottsville, PA	S,R	**	Constructed (Nockamixon)
Newtown	Neshaminy Cr. near Newtown, PA	S,R	!III	Development Unlikely
French Creek	French Creek near Phoenixville, PA	S,R	**	Development Unlikely
Evansburg	Skippack Cr. near Collegeville, PA	S,R	**	Deferred***

\*Recommended for Federal Development in House Document 522-87-2 and authorized for construction by PL 87-874. \*\*1st stage construction for recreation prior to 2010 with 2nd stage construction for other purposes after 2010. \*\*\*Land acquired by Commonwealth of Pennsylvania but development has been deferred indefinitely.

S = Supplies of water to augment low flows

P = Hydroelectric power

R = Recreation

F = Flood control

AE & D = Advanced Engineering & Design

Fourteen reservoir sites, were classified as Priority sites and seven as High Priority - one of which was the Walter Modification. Of the priority sites, only the Walter Modification is being further considered for construction.

FURTHER DRBC STUDIES. In 1975, DRBC conducted a study of the <u>Water Management</u> of the <u>Delaware River Basin</u> which analyzed needs, resources, and policies. It described those physical facilities and operating criteria necessary to regulate high and low stream flows, manage Basin water quality, and sustain or enhance fish, wildlife, and recreation. Depletive water use, groundwater, reservoirs, water quality, flooding, salinity, and exportation were also studied. The report recommended fresh water flow objectives and stressed the importance of the projects recommended in the 1962 Comprehensive Plan, including the Walter Modification

TOCKS ISLAND LAKE STUDY. The study reevaluated project impacts and investigated alternative projects to the Tocks Island Project and associated institutional aspects such as the desirability of reopening the 1954 Supreme Court Decree, deferring the Tocks Island project, and developing a National Recreation Area without a lake. Seven on-stream impoundments were identified as "partial" alternatives to the project.

In July of 1975, on the basis of the results of this study, the DRBC voted against project construction at that time. **However**, the DRBC has retained the authorized project in the Comprehensive Plan for possible implementation after the year 2000. Of the alternative impoundments recommended, all have since been determined as unjustified for multi-purpose development, with single purpose water supply development being highly unlikely.

DRBC COMPREHENSIVE PLAN - PRIOR LEVEL B. Since the Tocks Island Project was the cornerstone of the DRBC's Comprehensive Plan as it related to main stem flood control and lower Basin water supply, the 1975 decision made necessary a review of the entire Comprehensive Plan. This review included present and projected demands for water, a comparison of those demands with available water supply, and the development of appropriate measures to keep the supply and demand in balance.

Further studies were made for the 21 sites recommended by TAMS in 1975 and 1976 studies. The purpose of these studies was to identify and evaluate reservoir sites to supply fresh water consumptive use requirements for power plants if Tocks Island were deferred.

LEVEL B. The major purpose of the 1981 Level B Study was to update the DRBC's Comprehensive Plan and recommend a basinwide management plan as a guide to future water resources development. The Study presented three alternative Basin-wide water and related land resource management options: one directed at maximizing National Economic Development (NED); one directed at maintaining Environmental Quality (EQ); and a compromise .between the two referred to as the Mixed Objective (MO) alternative. The modified Walter project was included in all three alternatives.

The Level B Study also established near-term and long-term courses of action. Many other efforts have been and are still being conducted following the Level B Study. Planning efforts during and since the Level B Study are being conducted on: water conservation, water quality, flow maintenance, water supply, flood loss reduction, fish, wildlife, recreation, and energy.

The Level B Study reviewed and updated the findings on major reservoirs which was conducted by others through the years. Twenty-six sites were evaluated in detail. These included both on-stream and off-stream impoundments for Federal or non-Federal development. The projects were ranked with five projects being recommended for expeditious construction, including the Walter Modification.

GOOD FAITH NEGOTIATIONS. Since the diversions, releases, and flow objectives originally considered in the Level B Study could not be met, the parties to the previously described 1954 Supreme Court Decree (New York, New Jersey, Pennsylvania, Delaware, and New York City) met to negotiate amendments to the Preferred (Comprehensive) Plan. These "Good Faith Negotiations" (GFN) resulted in the recommendations summarized in Table 3-2. Of the fourteen GFN recommendations, several were amendments to the Level B "Preferred Plan".

### TABLE 3-2

a. . . . . . . . . . .

ſ

÷

## "GOOD FAITH NEGOTIATIONS" RECOMMENDATIONS

,

POLICY Conservation	Contingency plans to be developed by each state with a basin-wide reduction goal of 15%,*		
Design Drought	1960's Drought*		
Sea Level Rise	Consider in future flow projections		
Drought Operation	Revised based on reservoir storage and location of salt front up the Delaware Estuary.		
Depletive Water Use Budget	Develop a regulatory program limiting future depletive water use to meet available capacity.		
<u>GROUNDWATER MANAGEMENT</u> Conjunctive use surface & groundwater	Develop conjunctive use systems.•		
Transfer water from Wharton/Cohansey Sand	Studies to use this supply during drought emergency should be undertaken.		
Groundwater Pricing	Recommended a program to institute groundwater pricing*		
Interconnection with and water transfer . from Philadelphia to Camden	Recommended that New Jersey undertake a study.		
Groundwater Pumpage from Glacial Drift	For emergency flow augmentation purposes. Recommended additional feasibility and environmental studies and a field demonstration to gather further information for study,*		
STANDARDS Salinity	Maximum 30 day average (specified for river mile 98)** 180 mg/1 Cl 100 mg/1 Na		
Interstate operation formula	Varying flow objectives at Montague and Trenton according to season, (matrix prescribed).		
Flow Objectives for salinity control to year 2000	Drought Warn Drought   Max NYC 680-560 cfs 520 cfs   Min MONT 1655-1550 cfs 1100-1650 cfs   NJ 70-85 cfs 65 cfs		
	Slightly alters objectives. Location of salt front an additional consideration when determining reductions. Follows "rule curve",		
PROJECTS Preferred Plan	Francis E. WalterConstruction by 1990*CannonsvilleConstruction by 1990*PromptonConstruction by 1995*Merrill CreekConstruction by 1986*HackettstownDeleted		
Retained in Compre- hensive Plan	Consider the Middle Delaware River as a Scenic Recreation Area.		
	Consider the deferred Tocks Island project after year 2000*		

\*Basically a confirmation of a Level B recommendation. \*\*River Mile 98 is located at Camden, New Jersey.

,

# AFFIRMATION OF THE MODIFICATION

The Level B Study and the Good Faith Negotiations were fully coordinated gathering input from Federal, State and local agencies and the general public. The Study Steering Committee consisted of representatives of the four signatory States, Delaware, New Jersey, New York and Pennsylvania. Eight Federal agencies involved with water and land resources planning, including the Corps of Engineers, the Federal Energy Regulatory Commission (FERC), the Environmental Protection Agency (EPA), and the Departments of the Interior, Agriculture, Commerce, Housing and Urban Development, and Transportation were, along with the states, the policy advisory body for the Study. They provided information and participated in technical committees. Options or alternatives were developed and their likely impacts were presented for citizen and agency comment.

The Water Resources Council's (WRC-study sponsor) "Principles and Standards" were followed in developing and evaluating alternative management options.<sup>JI</sup> The WRC's requirements that the Study be based upon existing data and "judgemental planning; participation and leadership of the States; participation of Federal agencies; and active public participation" were followed. The Level B planning met National Environmental Policy Act (NEPA) requirements; therefore, the report was, in itself, its own Environmental Impact Statement.

The parties to the Supreme Court Decree unanimously recommended in the Interstate Water Management ("Good Faith Negotiations") Report to the DRBC that the Walter modification be constructed by December 31, 1990. Following public coordination, the DRBC, in its 1983 Water Resources Program, endorsed the Walter project for prompt modification.

# AFFIRMATION OF THE AUTHORIZED PLAN

This current review (AE & D) of the planning process which confirmed the need for the Walter Modification has not only reaffirmed the need for the project; but also its designated priority. It also confirmed the same basic configuration and size as authorized. With respect to recreation, the

1/ The U.S. Water Resources Council was an independent Executive Agency of the U.S. Government formed in 1965 with the purpose of reviewing the adequacy of the water resources plans of a region and encouraging the proper development and management of these resources.

(

resulting scope of recreation to be provided reflects the physical and environmental carrying capacity of the site and the desires of the public. Minimum hydropower requirements have also been defined.

STORAGE ALLOCATION. The sizing of the project was an iterative process which began by assessing total practical storage development at the site. It then proceeded to confirm the individual goals for each project purpose. This established minimum storage to meet project goals. This was followed by the investigation of all practicable schemes for enlarging the reservoir. Findings from these investigations confirmed the same amount of storage allocation as authorized in House Document 522 (see below).

	<u>Acre - feet</u>	<u>billion</u> <u>allons</u>
Water Supply	70,000	23
Recreation	0	0
Flood Control	108,000	35
Inactive <b>J.;</b>	3,000	1

The Modification will provide approximately 70,000 acre-feet of water supply storage for partial satisfaction of a total augmentation of 600 cubic feet per second (cfs) which is required for the Delaware River Basin by the year 2000 to offset the increase in consumptive use above current (1980) levels. The 70,000 acre feet will provide a firm gross yield of 264 cfs. With the (minimum required) in-stream water quality release of 63 cfs, this translates to a traditional "water supply yield" of 201 cfs.

Recreation is a secondary purpose for the modification. Lake surface area did not enter the process for selecting storage requirements. Inactive storage and water supply requirements dictated the size of the permanent pool. Recreation will utilize the resultant lake. There were, therefore, no storage goals for recreation.

From a flood control perspective, the modification of Walter was to retain existing flood control protection as a minimum and to consider additional flood control storage if warranted. Study results conclude that there is no

 $J\!.\!/$  Inactive Storage - the amount of reservoir capacity available for sediment accumulation has been re-evaluated at approximately 3,000 A-F.

need for additional storage. When measured according to the above criteria, the flood control storage volume of 108,000 acre-feet recommended in House Document 522 was confirmed as being adequate and would provide some flexibility for the future.

RECREATIONAL DEVELOPMENT. Unlike the existing project, recreation is an authorized purpose of the Walter Modification. Full consideration was given to needs, the physical and environmental carrying capacity of the site, and the desires of the Commonwealth of Pennsylvania and its citizens.

The evolution of the recreation plan was a two-phase cyclic process. The first phase established the types and general level of recreation. The second developed the desired scheme. A variety of alternative levels of development ranging from in-kind replacement of existing facilities to maximum development were considered; three levels (described below) were analyzed in detail. This consideration of the alternative schemes and the site's recreational carrying capacity yielded an initial scheme which served as a starting point for the formulation of the specific facility mix through coordination with all the parties (public and private) concerned with recreation at the Walter site.

- <u>Alternative I.</u> In-kind replacement of existing facilities at the modified Walter project would provide recreation opportunities superior to the existing facilities and project. The reasons for this are that the modification would produce a larger pool for recreation and more formal facilities. Besides the boat beach and its associated parking area, other recreation facilities which would require relocation are the spillway area information booth and a picnic area.
- <u>Alternative II.</u> The second alternative is an intermediate recreation scheme for the modified project between in-kind replacement and the maximum development plan. This alternative was the result of a strategy for blending utilization of available resources; the environmental limitation of the area; and initial interpretation of governmental and general public input to the type and capacity of recreation activity desired.
- <u>Alternative III.</u> This scheme represents maximum utilization of the area for recreation. It was originally planned to have a swimming beach in response to high regional demand for swimming facilities, (Further investigations found the beach incrementally infeasible because of high cost).

Alternative I (in-kind replacement) underutilizes the aesthetic and recreation potential of the site; thereby, ignoring an opportunity to satisfy local and regional recreation demand.

Alternative III (maximum recreation development) exceeds the ecological carrying capacity of the site in that the relatively fragile ecology could not absorb the large numbers of visitors and their associated impacts. In addition it would result in a level of development which is not supported by the Commonwealth, the impacted counties and municipalities, and the general public.

Alternative II (intermediate development) strikes a reasonable balance, and for this reason was initially chosen to provide the selected level of recreational development.

Alternative II was the basis for the conceptual design which evolved into the selected scheme and eventually the recommended plan. The process required numerous cycles of coordination and revisions. The selected scheme reflects a compromise among regional needs; specialized interests; the environmental carrying capacity of the site; concerns of impacted local municipalities and counties; and the desires of the Commonwealth. Final revisions were made to reflect the concerns of the impacted municipalities and counties as expressed through the Commonwealth of Pennsylvania. These last changes are noted below.

WEST BANK (Bear Creek Township side)	
Visitor Center	Downgrade to an Information Center
Boat Launch	For future development
Bear Creek Boat Launch	Eliminate from the plan.
Nature Education Center	Slight increase in size
Sportsman Camp	Eliminate from the plan.
Bank Fishing	Increase parking.
EAST BANK (Kidder Township side) Visitor Center/Camp Control	Upgrade
Family/Boating Camp sites/ picnic table car/RV parking	Initially develop as a picnic area and trail with overlooks. Camping for future development

Boat Launch

Increase initial and no future expansion

<u>AREA WIDE</u> Hiking/Cross Country Skiing/ trails/overlooks		Increase in the future family/boat camp site
Supplemental parking		No Change
Equestrian Facilities		Add Equestrian facilities
Access Across Dam for Recreation	Ţ	Possible addition of vehicular access across dam to be considered in final design

White water releases will continue to be offered as a public service if requested and approved. Releases will be coordinated among the different interests by the Pennsylvania Department of Environmental Resources. Release will continue to be made on a "water available" basis. This would translate to less than one-foot of additional storage above the proposed water supply pool, and would be an almost guaranteed "availability of water" in non-drought periods.

#### HYDROPOWER CONSIDERATIONS

Hydropower was not considered economically feasible in House Document 522 because alternative lower cost fossil fuel generation was available; however, discretion to provide for future hydropower was provided.

The Corps' responsibility with respect to any future hydropower development at the site is to insure that there is no conflict or incompatibility with the existing flood control and the authorized modification for water supply and recreation. However, once the potential for hydropower was identified in the Lehigh River Basin Hydropower Study, future hydropower development became an integral consideration in the design of the Modification. Although hydropower is not being developed as part of the Modification, compatibility with potential future hydropower facilities is anticipated in design of the Modification. Further findings of both the Lehigh Hydropower Study and the Borough of Weatherly Study will continue to be coordinated in the future.

The minimum required design provisions to accomodate future development of run-of-river and modified conventional peaking, will be incorporated in the project. The changes may require only small increases in the hydraulic capacity and efficiency of the selective withdrawal system beyond what is required for the water supply modification. Possibly changes may be as little

as providing a gate house and penstock in the embankment. This change is minor and may be done under the discretionary authority which was provided in the authorizing legislation (Public Law 87-874) and which has been reinforced by Corps regulations. 1/

#### SCHEME SELECTION

The modification was formulated primarily for water supply with recreation receiving secondary consideration. The additional water supply storage is provided by raising the existing dam, thereby, increasing the size of the reservoir. Since flood control capability of the dam is to remain unchanged, the increased reservoir necessitates modifying the existing spillway or providing a new spillway to maintain proper discharge capacity. The existing intake tower requires modifications to accomodate the increased reservoir elevation and the additional downstream water quality requirements. The existing downstream outlet structure requires modifications to accomodate the changes caused by the raising of the dam. Dikes are required in low areas to contain the increased reservoir during flood stages. In addition, additional items associated with these changes include: relocations of an existing state highway, a township road and existing utilities; additional clearing of the expanded reservoir area; new project access roads; new operation support facilities; and care and diversion of the reservoir waters during construction. The impact of additional upstream flooding was investigated, but no structural protection is required; however, aquisition of additional real estate is required. Development of recreation was then designed to suit or compliment the basic scheme selected for the addition of water supply storage.

In selecting a scheme, only those alternative components pertinent to the scheme selection process were investigated and compared. Components which were similar for all alternatives or which were extraneous to comparisons were deferred to later phases of this investigation. All practical concepts for each pertinent component were considered. As with most analyses of this type, concepts rrad both advantages and disadvantages which had to be considered.

.1; Engineering Regulation (ER) 1110-2-1, Engineering and Design Provisions for Future Hydropower Installation at Corps of Engineers Projects, Department of the Army, U.S. Army Corps of Engineers, Washington DC, 29 Jan 82.

\_ \_\_\_

Each alternative which was eventually compared reflected attempts to minimize adverse impacts (including environmental) without altering the basic function or performance of that concept.

SPILLWAY AND DAM. Four methods for raising the dam, three separate spillway locations, three types of spillways, two outlet structure modifications, and various dikes were investigated in selecting the spillway and dam. Three basic schemes which were investigated and compared in detail are distinguished by the spillway type and location as described below: (

{

- Scheme A uncontrolled concrete ogee spillway at a new location to the right of the existing spillway
- Scheme B an uncontrolled concrete ogee spillway at the site of the existing spillway.
- Scheme C a tainter gate spillway at the site of the existing spillway.

The four methods investigated for raising the dam included an upstream raising, center raising, downstream raising, and a downstream raising using reinforced earth. All schemes require removing the top portion of the existing dam. For each type raising, an array combining six different widths of spillway and two or more spillway locations were investigated.

The proposed methods of raising the dam except for the upstream raising would, in turn, result in an extension of the downstream embankment slope of the dam to the extent that the existing outlet and apron would be covered. This requires consideration of either an extension of the existing tunnel or construction of a retaining wall to support the dam embankment above the existing outlet.

Raising and extending the existing dike through the shallow valley to the right of the present reservoir and dam is also required. This alignment is similar for all schemes, however, the length and height of the dike varies depending on the scheme.

A 675 foot-wide spillway (approximate) from Scheme A with a downstream raising of the existing dam and a retaining wall above the existing outlet was selected. None of the three basic schemes provided a distinct or significant
cost advantage or difference in impacts on the site. However, the selected scheme does provide the least complex design and construction procedures. This is an advantage in maintaining a design and construction schedule; avoiding uncertainties in cost; and requiring less maintenance.

TOWER MODIFICATION. The basic choices for providing flood control and selective withdrawal capability in a tower were either modifying the existing intake tower or constructing a new tower. The following four tower arrangements were considered:

- Tower A modify the existing intake tower for the increased reservoir and add a selective withdrawal system.
- Tower B construct a new tower with a selective withdrawal system upstream of the existing tower and extend the existing conduits upstream to connect with the new tower.
- Tower C construct a new tower with a selective withdrawal system on the left bank of the reservoir with a new tunnel and outlet structure.
- Tower D modify the existing tower for the increased reservoir and construct a new selective withdrawal tower on the left bank with a new tunnel and outlet structure.

The selective withdrawal system provides the capability of selecting water from the reservoir at various levels to be discharged downstream of the dam. A selective withdrawal system for water quality was incorporated into each tower arrangement considered.

Tower B was selected because it is the most suitable and least costly tower arrangement. Structural inadequacy of the existing tower resulted in the elimination of Tower A and D from further consideration. In addition to higher costs, Tower C involves uncertainties in subsurface conditions for the associated construction of a new tunnel.

REALIGNMENT OF BEAR CREAK ROAD. Almost 3 miles of the present Bear Creek Road (LR 40041) including the bridge over Bear Creek would be affected by the dam raising. The Pennsylvania Department of Transportation (PennDOT) designated Bear Creek Road as a Major Collector based upon a 1982 survey. The road has

3-15

1

an annual average daily traffic count of 550 vehicles per day and a 20 year projected count of 600 vehicles per day.

There were a total of five alternative alignments investigated. The first one considered basically follows an abandoned railroad right-of-way which was initially thought to provide favorable terrain and could provide a scenic view of the new lake. However, weathered rock conditions and (PennDOT) design criteria required massive cuts and fills. This resulted in high costs and major disturbances (scars) both above and below the right-of-way. Compared to the other alternative alignments, this one would require more maintenance with probable problems with rock slides and winter drainage. Shadows and long ice melts may create safety problems during the winter.

The remaining four alternatives routed the road over a hill. The least costly route would go through previously undisturbed wetlands; not only eliminating approximately three acres of wetlands but also bisecting the remaining acreage. This alternative was eliminated. Of the three remaining "over-thehill" alternatives, the one selected is the least costly to construct, is shortest in length to maintain, and will cause the least overall surface, volume and aesthetic disturbance. This alignment is a compromise with other routes which either cut through the upper portion of the hill top disturbing its unique environmental continuity or locates the road on the lower side of the hill increasing construction difficulties.

SELECTED SCHEME. The best scheme consists of combining the various components required to achieve the additional water supply storage without compromising the integrity of the existing project or reducing protection.

The selection was based on a combination of cost, constructability, and reliability with a desire to minimize adverse impacts. The basic modifications which were selected are described below. This scheme was then further refined into the recommended plan; therefore, feature details are not necessarily the same as those finally recommended.

ľ,

- . Raise the existing dam by the downstream raising method, and extend it through the existing spillway •
- . Locate a 675 foot-wide spillway downstream of the existing operation facilities and to the right of the existing spillway (Scheme A) .
- Raise and extend the existing dike •
- Protect the existing outlet structure from the downstream raising of the embankment by a retaining wall.
- Construct a new intake tower with a selective withdrawal system upstream of the existing tower (Tower B).
- Relocate Bear Creek Road (LR 40041) using the modified "Over the Hill" alignment and construct a new bridge across Bear Creek upstream of the existing bridge.

In addition, ancilliary facilities will include new access roads, operations facilities, and recreational facilities. Additional real estate will be required; and gas, oil, power and telephone utilities will have to be relocated or protected.

(

Ń

~

.

DESCRIPTION OF PROPOSED STRUCTURES AND IMPROVEMENTS

The investigation of the alternate schemes and their components was done in sufficient detail to allow valid comparisons. Once the basic scheme was selected it was developed in a greater level of detail. Refinements and changes were made as required to the selected scheme. Any such changes are reflected in the plan as described in this chapter and recommended for construction.

The proposed project modification includes raising the existing dam and dike embankments, construction of a new spillway and intake tower, construction of new maintenance facilities, and relocation of existing Bear Creek Road (Pennsylvania Legislative Route 40041) and Township Road T-553.

DAM EMBANKMENT. The existing dam is a zoned embankment consisting of a central impervious core, with an upstream zone of pervious fill and a downstream zone of random earth fill. The crest of the existing dam (elevation 1474.0) is 30 feet wide and the external slopes are 2.5 horizontal to 1 vertical. The modifications to the dam include a downstream raising to carry the new 30-foot wide crest to elevation 1504.0. The raising section will consist of an upstream rock shell, a central impervious zone, and a downstream raising zone of rockfill and random earth fill. The upstream slope will be a continuation of the existing 2.5 horizontal to 1 vertical slope and the downstream slope will be 2.75 horizontal to 1 vertical. A transition zone will be provided between the existing downstream random earth zone and the new rockfill raising zone. A blanket drain will be provided under the entire raising section and a toe drain will extend to the new spillway crest elevation (elevation 1482.0). Supplemental grouting of the existing dam grout curtain will be provided along with the new grout curtain to be constructed under the new portions of the dam on each abutment between elevation 1475 and elevation 1504. Riprap slope protection will be provided along the downstream toe of the embankment to the maximum tailwater elevation. The embankment section is shown on Plate 1-03.

DIKE EMBANKMENT. The existing retaining dike consists of a homogenous earth embankment with a 30-foot crest width and 2.5 horizontal to 1 vertical slopes. The crest of the dike supports a paved access road to the damsite. The raised dike will consist of zoned embankment with a central impervious core, upstream and downstream random earth zones. The dike crest (elevation 1504) will be 25 feet wide and the slopes will be 2.5 horizontal to 1 vertical. The existing dike and access road will be incorporated into the downstream zone of the raised dike. Internal drainage will include a blanket drain under the downstream random zone and a chimney drain to the spillway crest elevation. Discharge of seepage collected by the internal drainage system will be provided at the maximum dike section (Sta. 300+00 + 1). The dike sections are shown on Plate 1-04.

SPILLWAY. The proposed spillway will be located in the right abutment of the dam and will consist of a 675-foot wide ogee weir, a straight discharge channel, and an approach channel flared on both sides at a 15-degree angle. The grades of the approach and discharge channels will be 0.5 percent and 1.0 percent, respectively. The uncontrolled concrete weir will be anchored in rock to a depth of 13 feet below the base of the weir. Drains in the weir to reduce hydrostatic uplift were not assumed in the stability analysis and none are proposed. The base of the weir is at elevation 1,465 to avoid a clay seam in the road. The left side spillway wall will be concrete lined 50 feet upstream and 80 feet downstream of the weir centerline. The right side spillway wall will be concrete lined 50 feet upstream and downstream of the weir centerline. The walls on both sides of the spillway consist of a lower tack-on wall anchored into rock and an upper gravity retaining wall extending to elevation 1504. Both the tack-on walls and retaining walls will have weep holes to relieve water pressure behind the walls. For spillway profiles, sections and details see Plates 1-05 and 1-06.

OUTLET WORKS. The proposed outlet works will include utilizing the existing outlet structure, tunnel, and the existing intake tower flood control conduits and air vents. New construction will consist of an approach channel, intake tower with selective withdrawal portals, a service bridge, a downstream retaining wall above the existing outlet structure, and erosion protection downstream of the outlet works (Plates 1-01 and 1-02). Modification of the

existing outlet works will consist of removal of the existing service bridge and modification of the existing intake tower to allow utilization of the flood control conduits and air vents.

EXISTING TOWER MODIFICATION. All obsolete mechanical and electrical equipment shall be removed from the interior of the tower and holes will be drilled through floors and exterior walls allowing the tower to become inundated. This will equalize both internal and external hydrostatic pressures, thereby eliminating stability and uplift as governing factors. An interior, one foot thick concrete wall, forming a portion of the air vent, will be removed as required between elevations '1,308.5 to 1.474.0. The air vent will be replaced by a stainless steel pipe attached to the exterior wall. The entire operating house will be removed beginning at elevation 1, 474.0. The pipe will discontinue at this point and a new cast-in-place concrete air vent will extend up to elevation 1,499.0.

<u>Approach Channel.</u> The proposed approach channel will be excavated in rock and overburden along the right abutment. The channel will be excavated to an invert elevation of 1251 with a minimum width of 30 feet and will be approximately 250 feet long. For approach channel layout see Plate 1-07.

Proposed Intake Tower and Transition. The proposed intake tower will be located about 640 feet upstream of the new dam centerline and along an extention of the outlet works centerline. The tower will be a dry well type structure of reinforced concrete about 253 feet in height to the service deck. A 632-foot long service bridge from top of dam, approximate sta 33+50, to the tower is proposed. The lower part of the tower will contain the gate chambers, two  $5^{1}-8^{11} \times 11^{1}-0^{11}$  rectangular flood control conduits, and two 3'- $6^{11} \times 10^{1}-0^{11}$  selective withdrawal conduits joining into a single 51-8<sup>11</sup> x  $10^{1}-0^{11}$  conduit.

A reinforced concrete transition section will be constructed joining the new tower with the existing tower. Details of the tower and transition are shown on Plates 1-09 and 1-10. The upper part of the tower structure will contain two 18 ft. x 18 ft. wet wells, five 10 ft. diameter and two 10 ft. x 12.5 ft. rectangular selective withdrawal portals. All interior floor slabs are

designed for a 100-psf live load plus dead loads and are used to support the abutting walls. The service deck at elevation 1504 is designed for a 30-ton mobile crane with maximum wheel load of 25 tons. The tower base is 20 ft. thick and bears directly on rock. Access to the interior of the tower will be through the entrance building on the service deck. Blockouts will be provided for installation of future hydropower control gates.

<u>Stability Analysis.</u> To assure the tower's stability under critical conditions, stability analyses were made for the tower with full uplift forces, hydrodynamic forces, seismic acceleration and reactions from the bridge.

Gates and Appurtenances. The control tower will contain butterfly type gates for water quality regulation and service gates for large release flood control. The butterfly gates are for low flow and water guality service. A total of 7 gates are required for the selective withdrawal intake. The gates will be actuated with hydraulic pistons through levers. A 3.5 ft. x 10 ft. selective withdrawal conduit is provided for each wet well. Control gates for the selective withdrawal conduits are actuated directly by hydraulic pistons. Two 5<sup>1</sup>-8<sup>11</sup> x 11<sup>1</sup>-0<sup>11</sup> flood control service gates are provided for large discharge rates. These gates are operated directly by hydraulic pistons. Each service gate is backed up by an emergency gate. The hydraulic power unit will be located at floor level elevation 1274. The unit will provide fluid at 3000 psig to operate all hydraulic actuators. A remote control panel for all hydraulic gates will be provided at floor elevation 1484.5. Open-close push buttons will be provided for all gates as well as remote position indicators for all gates. Controls will be provided to start and stop the hydraulic power unit. Bulkheads will be provided for the flood control conduits and selective withdrawal conduits. One bulkhead will be provided for use at the 10 ft. diameter selective withdrawal portals and one for the 10 ft. x 12.5 ft. portals. All bulkheads will be positioned by a truck crane driven onto the service deck. The bulkhead for use with the butterfly gate openings will require a lifting beam in order to be placed in position over any of the openings.

<u>Tower Elevator</u>. An elevator will be provided within the tower to provide access from the service deck to the floor elevation 1274. The elevator car size is approximately 6 feet by 5 feet. Platform doors will be manual sliding type and the car gate will be manual sliding type.

<u>Optional Standby Power Supply.</u> A 200 kw deisel engine-generator will be installed inside the tower at floor elevation 1484.5. Two tandem 275 gal. fuel oil storage tanks will be installed next to the engine-generator within a spill containment dike. Fill vent lines will run up to service deck elevation 1504.

<u>Hoisting Equipment.</u> A 7-ton monorail hoist will be provided above floor elevation 1290. The hoist will move along curved track to be positioned over each of the 2 selective withdrawal slide gates for gate removal. The hoist will be single speed lift and single speed trolley. The monorail will have removable rail sections to allow for use of the mobile crane from the service deck. Electrification will be by hot shoe pickup on the open collector rail.

Emergency and service gates will be removed by a mobile 30-ton crane. Access to the gates is provided through hatches located on the service deck. If gates are to be removed from the site, transportation will be provided by a 10-ton truck with a 30-ton trailer.

<u>Heating and Ventilating.</u> An oil-fired warm air furnace will be provided at floor elevation 1484.5. Ductwork to and from the warm air furnace will distribute warm air to each level in the tower. Outdoor air for ventilation will be tempered and mixed before distribution. The furnace will be used in the summer for ventilation only. Zone dampers will be provided at each level for control. A 575-gallon fuel tank will be provided.

<u>Sump Pump</u>. A sump pump will be provided in the sump pit at floor elevation 1274. The pump will have sufficient pressure to pump against full lake head. The sump will collect water from all floor drain piping throughout the tower.

<u>Sanitary Facility.</u> An electric waste incinerator will be provided within the tower at floor elevation 1484.5. The incinerator will exhaust through the service deck. A bottled water cooler will be provided next to the incinerator.

<u>Rewatering Line.</u> A 12-inch rewatering line will be provided between the lake and the wet wells.

<u>Service Bridge.</u> The proposed service bridge will be constructed using three simple spans of 210<sup>1</sup>-0<sup>1</sup> 211<sup>1</sup>-4<sup>11</sup> and 210'-0'', spanning between the raised dam and the new intake tower. The new bridge will have a 12-foot wide roadway. The reinforced concrete deck is designed as composite construction with the supporting plate girders. The two laddered concrete piers are approximately 170 feet and 91 feet high and both bear on existing compacted fill. The bridge is supported at the tower by a concrete corbel support and at the dam by a concrete abutment on piles. Plan, Elevation and Details of the Service Bridge are shown on Plate 1-08.

<u>Design Criteria.</u> The bridge is designed in accordance with PennDOT design specifications, AASHTO Standard Specifications for Highway Bridges (1977), AISC (Eight Ed.), and ACI 318-77. The basic live load is an H-15 truck or a 30-ton mobile crane. Provision for a future 2-inch wearing surface on the deck is also included in the design.

<u>Retaining Wall.</u> In lieu of extending the existing outlet tunnel, a retaining wall will be constructed above the existing outlet structure to retain the downstream embankment of the raised dam. The wall, which rests partly on rock and partly on embankment, reaches a maximum height of 34 feet. The cantilevered wall will incorporate weep holes to release water behind the wall. The retaining wall is shown on Plate 1-07.

OPERATION AND MAINTENANCE BUILDING. The building will be a one-story, slab on grade structure with a gross floor area of 5363 sq. ft. The building is located east of the left abutment of the dam and is along the access road from Rte. 940 to the dam. For description of building, floor plan layout, site plan and utility plans, see Appendix I. The building will be served by a paved drive, visitor and staff parking areas, and a service maintenance area.

L.R. 40041 RELOCATION. Existing L.R. 40041 will be relocated above the proposed top of dam or downstream of the protection. The proposed alignment requires excavations up to 40 feet in depth into overburden and bedrock, and construction of embankment up to about 40 feet in height. A new bridge spanning 530 ft., requiring four piers and two abutment structures, will be constructed across Bear Creek near the upstream end of the alignment. A plan of the proposed relocation is shown on Plate 1-20.

ELECTRICAL UTILITIES. General. This section presents the electrical power, lighting, and communication requirements of the intake tower.

<u>Service</u>. Electric power for the intake tower will be supplied by the Pennsylvania Power and Light Company from their distribution system that exists in the area. Service voltage will be 480 volt, three phase. Service transformer KVA capacity is estimated to be 225 DVA. Service transformers will be installed on the crest of the dam at the entrance to the service bridge. Secondary service conductors will be extended to the intake tower by a conduit system attached to the bottom supports of the service bridge.

Pennsylvania Power and Light Company's distribution system in this area consists of aerial pole line construction carrying two (2) phase conductors. This type of distribution will require that transformers to serve the intake tower be connected open-wye open-delta for 480 volt service,

<u>Distribution System.</u> The 480 volt service conductors will be connected to a main service disconnect switch located in the intake tower operating floor room, elevation 1484.5. Disconnect switches will supply power to a 480 volt power panel, a 480-120/208 volt dry type transformer, and a 120/208 volt lighting and appliance panel. The power panel will supply power to motors 1/2 horsepower and larger. The lighting and appliance panel will supply power to lighting, convenience receptacles, small motors and controls.

Lighting. Lighting system design will utilize fluorescent and high-intensitydischarge lighting to the maximum extent possible for both interior and exterior lighting. Fluorescent fixtures installed in unheated or low temperature heated area (freeze protection) will be provided with low temperature ballast. Emergency lighting units and battery packs will be installed on all levels of the intake tower.

Ĩ

**?**•

<u>Raceway System and Grounding.</u> Raceway systems will be installed exposed, and systems installed below elevation 1482 will conform to the National Electrical Code requirements for wet locations. All raceway systems, motor frames, metallic enclosures of electrical equipment, etc. will be connected to ground conductors and driven ground rods.

Lightning Protection. Lightning protection will be provided in accordance with TM5-811-3 and National Fire Protection Association Lightning Protection Code No. 78.

<u>Generator Power.</u> Optional standby electrical power will be provided by a manually controlled 200 KW diesel electric generator set. The generator will be connected to the interior power system by a manual transfer. switch installed on the load side of the service disconnect switch.

<u>Communications.</u> Telephone service for the intake tower will be supplied by the Bell Telephone Company of Pennsylvania. A total of three (3) telephones will be installed in the tower, one at elevation 1484.5, one at elevation 1274, and one in the elevator.

RESERVOIR CLEARING. Clearing is divided into five zones, as indicated on Plates 1-11 thru 1-17. The limits of each zone are defined as follows.

<u>Zone I - Limit of Existing Clearing.</u> Zone I is that portion of the existing reservoir, previously cleared, that will require removal of only down timber, snags and debris from previous flooding. This zone consists of that portion of the reservoir area below elevation 1350 to the existing pool elevation.

Zone II - Limit of Complete Clearing. Included in this zone is that portion of the reservoir area above elevation 1350 and below elevation 1430. All trees, stumps, and brush shall be removed flush with the ground surface with the exception of brush between elevation 1427 and 1430. Brush and ground cover within the upper three feet of the zone shall be preserved to provide shoreline erosion protection. All down timber shall be removed. Note that below elevation 1392 most of the timber is dead, due to the high pool maintained during two droughts (1965-66 and 1981-82).

<u>Zone III - Designated Habitat Zone.</u> This zone consists of relatively flat areas of the reservoir between elevation 1410 and 1430 that are designated as shoreline habitat. These areas shall be cleared of all down timber and debris. Live timber, standing dead timber, and brush shall be left standing. Note that this zone falls within the limits of Zone II. In the final design, this zone will be extended to elevation 1400.

Zone IV - Down Timber Clearing. Included in this zone is that portion of the reservoir area above elevation 1430 and below elevation 1458. Elevation 1458 represents the flood pool having a 20-year recurring interval. Only down timber, including debris, shall be removed. Live timber, standing dead timber, and brush shall be left standing. This criteria is used to reduce operational and potential safety and health hazards.

<u>Zone V - Limit of General Clearing</u>. General clearing refers to clearing of items other than timber and debris from the reservoir area. This includes the removal of all residential and recreational buildings, clean-up and removal of septic systems, plugging of wells, and removal of guard posts, fencing, signs, and other similar miscellaneous items. This zon consists of the reservoir area between elevations 1350 and  $148T_{\odot}$  Note that this encompasses zones II, III and IV.

#### ACCESS ROADS

<u>Right Bank Access Road.</u> A new paved access road 5100 feet long, will be constructed on the right bank around the proposed spillway connecting the top of dam with the existing access road from LR40041 as shown on Plates 1-01 and 1-02.

Left Bank Access Road. The left bank access road will be paved and will connect the proposed top of dam with the existing access road from State Route 940 as shown on Plate 1-01. Approximately 500 LF of the left bank access road, beginning at the top of dam, will be on new embankment. The remaining 2950 LF of access road will consist of upgrading the existing access road.

<u>Top of Dam Access Road.</u> Paving the top of Dam and providing public access across the top to connect the Left and Right Bank Access Roads will be investigated in final design. The road across the dam will be for recreational use only, including vehicular, pedestrian, and equestrian. Speed control devices would be included.

# PROJECT ACCOMPLISHMENTS

The proposed modification adds water supply and recreation while maintaining the same level of flood control. The primary accomplishments of the Modification is providing approximately 70,000 acre-feet of supplies of water which will allow a firm gross yield of 264 cfs for flow maintenance. This is 44% of the 600 cfs which is required in the Delaware River Basin by the year 2000 for maintaining adequate flows in the Lehigh River, lower Delaware River and the Delaware Estuary.

During dry periods and droughts, this low flow augmentation will assure normal dilution of acid mine drainage and also help prevent excessive suspended sedimentation in the Lehigh River. It will help maintain surface and groundwater quality along the lower main stem Delaware River and combat salinity intrusion. This will protect direct withdrawal users and groundwater aquifers along the River and estuary.

By maintaining the existing volume of flood control storage, the Modification maintains the same level of protection.\ This insures that average annual damages will not increase and that damages from a recurring historic event will not increase. Seemingly inherent residual storage assures performance without increasing risk; no matter how slight.

In addition, the project will inherently protect wetlands and other sensitive areas within the project limits. These natural areas will provide educational

opportunities. the project will preserve most of its rugged and panoramic beauty which will be displayed from observation decks. Fishery and wildlife areas will provide refuge, shelter and reproductive environments, Downstream temperature and water quality will be managed by selective releases.

ECONOMIC PERFORMANCE. The only project benefits for which monetary values have been computed are for water supply, recreation and flood control. These incremental tangible benefits are sufficient to justify the proposed Modification. Although other benefits of the Modification are discussed in this report, they are intangible and therefore only enter into the investigation as supportive dialogue or rationale for a positive decision on the proposed Modification. The economic analysis is computed using October 1984 dollars, and economic life of 100 years and an interest rate of 3 1/4% (interest rates are discussed more fully in Chapter 5, Plan Implementation).

<u>Water Supply Benefits.</u> The water supply benefits are determined by the "least costly, most likely alternative" method. If the Walter Dam were not modified, then its flow maintenance would have to be provided by other means. DRBC has identified the next two sites (Aquashicola and TrexJer) which would be considered to provide such flows.

In reality These sites are not definite but are rea:, onable alternatives. Because of the complexity of selecting and gaining ::mpport for impoundment sites in the Delaware River Basin, it is unrealistic to merely designate the "next" site or sites to replace the Walter Modification. The present Walter Modification has itself become an alternative to a project (Tocks Island) which has been deferred. Since project cost is one of the primary criteria for selecting projects, it can be assumed that the alternatives represent realistic costs for developing supplies of water in the region. This assumption is supported by a cost per cubic feet per second (cfs) of flow augmentation type analyses for prospective projects conducted by the DRBC during their "Level B" Study. As a proxy, the cost for an alternative to duplicate the flow maintenance to be provided by the Walter Modification was computed as the average prorated cost per cfs (\$510,000/cfs) to duplicate Walter's gross yield. The two dam sites were assumed to be developed by the sponsor as single purpose (water supply) projects in order to maximize

downstream flow yields, The average construction cost for duplicating the gross yield at Walter would be \$148,000,000, The benefits are, therefore, the foregoing of expenditures for These alternative projects. Average annual benefits are equal to the amortization of These foregone expenditures which is equal to \$5,015,000, The net or residual benefits would, therefore, be the savings or difference between this cost and the Walter Modification costs allocated to water supply,

<u>Recreation Benefits.</u> Recreation benefits are based on an estimate what people would be "willing to pay" for the type of recreation being offered. This is calculated using a "Sjmilar Project Method" to estimate project visitation and the "Travel Cost Method" to estimate the monetary value of the recreational use. These methods measure the benefit of the difference in "willingness to pay" with and without the proposed project. Total average benefits (i.e., willingness to pay) for the selected recreation plan are equal to \$2,220,000, Total average benefits (i.e. willingness to pay) over the project life under the no-build (without) or existing condition are equal to \$1,110,000, Thus, incremental average annual recreation benefits are equal to \$1,110,000.

<u>Flood Control Benefits.</u> Flood control related benefits from the Modification are in the form of additional years of economic life which would be added to the existing flood control project. These additional years can be measured as the period between the initiation of operation of the existing project (1961) up to the completion of the Modification which is currently estimated to be in 1992 (31 years). The value of each of These 31 years of additional flood protection can be estimated as equal to the value of the existing flood control p<sup>4</sup>urpose's average annual benefit and would occur form year 69 to 100 of the modified project's 100 year economic life. Extension of flood control benefitr have not been included in the economic justification or cost allocation,

inre : has been dc.:•mcl unrcaf'lon:1ble th:it the original project would not have
provided L>neflts during that 31 year period.

\*

AVERAGE ANNUAL COSTS. The average annual cost (AAC) of the Modification includes the amortization of the project cost, plus annual operation and maintanance (O&M), it should be noted that the opportunity cost (50%) of net or

residual water supply benefits) to the non-Federal sponsor does not enter this analysis. Incremental and total average annual costs are presented below.

AVERAGE ANNUAL COST (AAC)

.

		ALLOCATED	amortized $.l/$	?J	TOTAL
		PROJECT COSTS	PROJECT COST	<u>O&amp;M</u>	AAC
k	Water Supply	\$ 89,526,000	\$3,350,000	\$ 84,000	\$3, 1f34,000
	Recreation	\$ 21,274,000	\$ 810,000	\$106,000	\$ 916,000
	TOTAL	\$110,800,000	\$1£,160,000	\$190,000	\$4,350,000

BENEFIT/COST ANALYSIS. Economic performance was measured by the benefit/cost ratio (BCR) and the net benefits (NB). The results of the analysis are presented below (in thousands of dollars).

	AAB	AAC	BCR	NB	
* Water Supply	\$5 <b>,</b> 020	\$3,434	1.5	\$1,586	
Recreation	\$1,110	\$ 916	1.2	\$ 194	
TOTAL	\$6,130	\$4,350	1.4	\$1,780	

It should be noted that the opportunity cost to the non-Federal sponsor also does not enter this analysis.

\*

 $\frac{1}{2}$  Includes estimated interest during construction.  $\frac{2}{2}$  Includes only incremental increase in O&M.

### HYDROLOGY AND HYDRAULICS

INTRODUCTION. Included in the studies made for F.E. Walter Modification are hydrologic and hydraulic analyses needed to modify a dam for additional water supply storage. The detailed studies made and their results are presented in the Hydrology and Hydraulics Appendix J. A brief summary of the hydrologic and hydraulic analyses follows.

SUMMARY. Through the analysis of historical storms and flow records, an HEC-1 hydrologic Basin model was developed for the Lehigh River Basin above the F.E. Walter Dam and for the Lehigh River Basin areas downstream of the dam. This model was used to analyze the runoff response of the Basin and to size the F.E. Walter ReBervolr with the higher conservation pool under the splllway design flood. The results of the analysis include a new 675 foot wide spillway in the right abutment. The spillway weir height is 8,6 feet with the weir crest at 1,482 feet NGVD. The modified top of dam is a 1,504 feet in conjunction with the runoff analysis, a new tower with a selective NGVD. withdrawal system and outlet works were designed with total outflow capacity of 14,000 cfs. The tower is positioned slightly upstream of the existing tower. Downstream of the new spillway exit channel, to protect the dam toe, there is a spur dike running from the left bank of the spillway exit channel to the existing training wall for the existing spillway.

The hydraulic analyses were carried out with the HEC-2 backwater computer program to determine the water surface profiles for areas both upstream and downstream of the F.E. Walter Dam. The calculations for the upstream areas considerEid various pool elevations. In the downstream areas the water surface profiles were computed for flood discharges of varying probabilities of exceeden, e. These discharge probabilities were computed using a Log Pearson Type III analysis of the streamflow records at the different gages.

The effects of F.E. Walter regulation at the downstream locations were computed by routing the F.E. Walter holdouts downstream and adding or subtracting the routed holdout from the pertinent observed hydrographs.

Investigations were also made to confirm th0 existence of surplus flood control ;torage at F.E. Walter. This Lnvestigation affirms that the Modified F.E. WaHer Dam ln no way infringes on the original flood protection provided.

Inveatigttions were carried out to incorporate the most flexible minimum modifications for potential future addition of hydropower. For instance, the capacitJ is of the selective withdrawal system conduits leading from each of the wetw!lls were increased over that required for water quality to suit

possible future approximately 10 MW run of river hydropower requirements (see Chapter 23 of Appendix J).

Dependable yield analyses for the F.E. Walter dam Modifications were based on a 50 year simulated inflow to the reservoir for the period October 1927 to September 1977. The yield analysis was carried out using the HEC-5 simulation of flood control and conservation systems computer program. The results of the analysis show that with the simulated inflows and with a starting pool elevation of 1,427 feet NGVD, a 400 cfs average daily discharge can be maintained with a 96 percent dependability. Other pertinent information on the analysis is provided in Chapter 24 of Appendix J.

# WATER QUALITY

EFFECTS ON WATER QUALITY DUE TO INCREASED POOL LEVEL. The modification of F.E. Walter Dam will affect the existing water quality conditions in the lake and downstream. Raising the long term pool elevation from 1,300 feet to 1,427 feet changes the physical characteristics of the lake and affects water quality. Table 4-1 shows select physical characteristics for two different pool elevations (existing and modified project). Among the characteristics shown on Table 4-1, hydraulic residence has the greatest effect on water quality of the lake. The increased retention time of the modified project increases the averaging ability of the project on inflow quality, increases utilization of nutrients, and greatly influences potential impacts downstream. The longer retention time increases nutrient loading from sediments so the lake will exhibit greater eutrophication potential than the existing lake. The new lake will still be oligotrophic in character. The greatest single impact to downstream quality is the altered thermal regime of the modified project. This impact is well controlled by the proposed selective withdrawal outlet works.

Elevation	Surface		Mean	Hydraulic
NGVD	Area	Storage	Depth	Residence
(ft)	(acres)	(acre-ft)	(ft)	(day)
1,300	80	1,793	22.2	1.7
1,427	1,333	73,380	55.1	59.7

## RESERVOIR PHYSICAL CHARACTERISTICS FOR DIFFERENT POOL LEVELS

In deep lakes such as F.E. Walter, effective control of downstream and in lake water quality can only be attained through use of a well planned and constructed selective withdrawal system.

WATER QUALITY EVALUATION OF THE EXISTING 1,300 POOL. Inflow quality covers a wide range from poor to excellent. Inflow from the Lehigh River generally ranges in pH from 5.3 to 7.5. Normally, the waters from Bear Creek are more acidic (pH 4.9 to 7.3). Heavy rainfalls preceeded by a prolonged dry period cause low pH and higher nutrient loadings into F.E. Walter. The long term annual average of total nitrogen and phosphorus loads to the reservoir are 0.61 mg/1 and 0.16 mg/1, respectively. These concentrations are relatively high and may eventually yield eutrophication problems in the modified project.

The intake tower of the existing 1,300 pool does not have selective withdrawal capacity. Although without the selective withdrawal outlet works, the present project does not have any major water quality problems, because the lake is shallow (mild thermal stratification) and has short retention time. The lake pH is generally between 6 and 7 with a median of 6.5 but ranges from 5 to 8. The lake water pH frequently changes because of inflow pH fluctuations and the short retention time. This results in a relatively unproductive system. The existing project does not experience any significant DO depression in the lake or downstream. The outflow quality of the existing lake generally reflects water quality of the inflow. The limited operational flexibility and short retention time allows no temperature or quality control of the release.

EXPECTED WATER QUALITY CONDITIONS IN THE LAKE. The intake tower for the proposed 1,427 pool will be equipped with selective withdrawal outlet works. The outlet works will have 7 gates at 7 different elevations to control water temperatures and quality in the lake and downstream.

The 1,427 pool is expected to undergo thermal stratification, which is characteristic of deep lakes in the Northern United States.during summer months. Based on the thermal model study, the lake will be stratified between mid-April and mid-October every year, but the degree of the thermal stratification will vary with downstream quality objectives, inflow volume and distribution, and inflow temperature. The downstream objective temperature of the releases from the project will approximately match the inflow temperature.

The expected surface temperature zone (epilmnion) is approximately 5 to 25 feet in depth with temperatures ranging from 22 to 25 degree C. An area of abrupt temperature change is expected to occur from 10 to 25 feet below the surface.

A low temperature zone (hypolimnion) is expected to occur below the thermocline with temperature in the range of 5 to 7 degrees C. This large volume of cold water will stay at the bottom of the lake throughout summer.

The lake is expected to exhibit mild chemical stratifications. Generally, in summer, the lake pH will be of better quality near the bottom and top and worse in the middle layers. This statement is based on actual data collected at the Bloomington and F.E. Walter projects.

The Pennsylvania standard for the lake for pH is greater than 6.0 and less than 9.0. The pH in the F.E. Walter Reservoir is expected to often be below 6.0 in the summer months.

The trophic state will be oligotrophic, with somewhat limited biological activity. The major limiting factors of biological activity are nutrients, especially phosphorous. Nitrogen concentration will be relativ-ely low. Farm non-point nutrient sources are very limited in the region. Sewage disposal systems may be a factor.

In the hypolimnion, iron and manganese may accumulate during the first few years of impoundment because *the* hypolimnitic water will exhibit anoxic conditions. With proper water control management, the ditritus will be gradually consumed; then anoxic conditions should disappear and with them the iron and manganese problems.

Ĩ

ł

EXPECTED WATER QUALITY CONDITIONS DOWNSTREAM. Generally, the outflow temperature will be closely matched to inflow temperature by the selective withdrawal system. The selective withdrawal outlet structure will be able to control down.stream water quality except during extremely high outflow. During the extremely high inflows, releases must be made through the flood gates. At that time, downstream temperature will drop substantially, but not a lethal amount as long as the releases are tempered by the selective withdrawal release system. Outflow pH will be in the range of about 6 except during high runoff when it may be slightly lower. No D.O. problem is expected downstream.

SELECTIVE WITHDRAWAL SYSTEM DESIGN. The proposed selective withdrawal system consists of two wetwells. Each independent wetwell has its own ports to control release quality. Releases are blended under stratification conditions. Total system capacity of 2,400 cfs (1,200 cfs for each wetwell) was determined, based on the thermal model (WESTEX) and the consideration for preventing possible occurences of fish kills during the flood control operations. The maximum flow rate of the uppermost port and of lower portals was fixed at 1,200 cfs and 785 cfs, respectively. The number of portals and vertical locations were determined so as to meet downstream temperature as well as pH objectives, and were based on the thermal stratification patterns, the projected drawdown of the pool due to water supply release, and experiences at other projects. Table 4-2 shows the basic dimensions and capacity of the selective withdrawal system for the proposed project. A detailed description of the water quality and selective withdrawal system can be found in Appendix K of this GDM. The intake tower elevation and section are shown on Plate 1-09.

#### TABLE 4-2

### SELECTIVE WITHDRAWAL SYSTEM FOR MODIFIED PROJECT

Port Gaye Type_!	Size	Centerline Elevation (ms/1)	Design Maximum Portal Discharge (cfs)
RectangularJI	10 x 12.5'	1416.5	1,200
Rectangular	10 x 12.5'	1411.5	1,200
Circular	Dia. 10'	1396.0	785
Circular	Dia. 10'	1378.0	785
Circular	Dia. 10'	1360.0	785
Circular	Dia. 10'	1339.0	785
Circular	Dia. 10'	1313.0	785

1/ Butterfly-type rectangular and circular valves.

#### GEOLOGY AND SOILS

GENERAL. Bedrock underlying the reservoir area consists principally of thick persistent sandstone strata with occasional shale zones. Overburden consists of soils of glacial origin with the valley bottom deposits consisting of pervious sand, gravel, and cobbles, while higher overburden deposits are more impervious in nature.

SURFACE GEOLOGY. F.E. Walter Dam is located at the northern end of the Lehigh River gorge. The gorge terrain is characterized by escarpments, considerable amounts of exposed rock outcrops, extremely steep grades, boulder-strewn benches, and occasional rocky riverwash flats. Vegetation is prolific and tenacious, having found footholds in soil pockets, rock fissures, and thinly accumulated detritus over rock. Surface soils range from a predominantly sand, gravel, cobbles, and boulders to a thin organic forest litter cover over and around rock. Occasional pockets of deeper loamy organic soils occur in isolated swales or upland flats. Glacial activity scoured this land removing or redepositing much of the surface soil, and created deep cuts of exposed bedrock and boulder strewn areas of gentler grades. Over time the deeper pockets accumulated a finer soil cover from water erosion. As the vegetation sequence continued, forest litter added organic material to the soils, creating a more productive growing medium. Still, in most places this soil

surface mantle is thin and sustains vegetative growth through the availability of moisture from numerous springs.

1

1

SITE GEOLOGY. The foundation conditions for each major feature of the project are described in detail in Appendix L. The dam embankment is founded on bedrock consisting of sandstone and occasional shale zones which is heavily jointed near the surface. Overburden at the damsite varies from pervious soils on the right abutment and valley floor, to impervious soils on the left abutment. The new intake tower will be founded on sandstone about 100 feet upstream of the existing tower at the base of the right abutment. The new spillway will be excavated into the sandstone bedrock high on the right abutment. Overburden from the spillway site is generally impervious and will be utilized in the embankment raising. The existing dike, which is to be raised, is founded on impervious overburden which is underlain by bedrock containing more shale and siltstone than the other project features.

MINERAL RESOURCES. The principal mineral resources located in the proposed reservoir consist of: (1) sand and gravel concentrated in the terrace adjacent to the left abutment; and possibly in other areas (2) sandstones which outcrop throughout the area and (3) clays which also occur in the reservoir. Sands and gravels of the quality equal to those available in the reservoir area are available at other locations in the study area to supply local needs in the foreseeable future. The deposits located at the dam site are generally underwater and this fact, together with availability of like materials elsewhere, makes it economically infeasible to use these materials for commercial purposes.

Commercial use of the sandstone available in the area is not likely for similar reasons.

The clay materials, although present in various deposits, occur generally as a portion of a heterogenous mixture of clay through boulder size material. Use of the clay portion would require its removal from the other soil materials, an expensive process. Because of this, exploitation of the clays for construction or industrial purpose is considered infeasible.

4-20

There are no known deposits of peat within the area of proposed inundation.

GEOTECHNICAL CONSIDERATIONS FOR MODIFICATION FEATURES. The existing dam embankment will be modified by adding a downstream raising section and extending the ends of the dam to tie into the abutments at the new dam crest elevation. The raising section will make maximum use of soil and rock excavated from the new spillway and will use minimum quantities of soil from borrow sources. Appropriate filter zones will be incorporated in the raising section to control seepage. While the majority of the new embankment fill will be placed directly on existing overburden which has been stripped of surface vegetation, excavations will be made downstream toe for a toe drain, and beneath the core of the dam extensions to allow contact with bedrock. To provide additional control of seepage through bedrock, a grout curtain will be constructed in each abutment beneath the dam extensions. Some grouting may also be accomplished beneath the existing dam.

The new spillway will consist of an excavation through overburden and bedrock in the right abutment. A concrete weir structure will be located near the center of the excavated channel, and concrete walls will stabilize the rock excavation in the vicinity of the weir. The remainder of the excavation will be treated as necessary to prevent erosion during spillway flow.

The new intake tower will be founded on a firm bedrock surface excavated just upstream of the existing tower. Bridge piers for the new service bridge will be founded on the pervious fill forming the upstream face of the dam. The discharge channel at the downstream end of the outlet works will be protected from erosion by new slope protection.

The existing dike will be modified by an upstream raising founded on a stripped overburden surface. A 200 foot reach of the existing dike at the maximum section will be removed and replaced with a new embankment incorporating an outlet for seepage discharge.

### SOURCES OF CONSTRUCTION MATERIALS

GENERAL. Materials generated by required excavation will be utilized to the maximum extent possible in order to minimize the need for borrow sources and

off ite sources. It is anticipated that all but a very small portion of required excavation materials can be incorporated in the raising design and that the required excavation will supply the majority of necessary materials.

REQUIRED EXCAVATION. Required excavations include the new spillway cut, spoil fill removal at the toe of the existing dam, cutoff trench excavations for the raised dam and dike, and toe drain excavations for the raised dam and dike. It is anticipa ed that these excavations will supply all rockfill materials, all impervious earth material, and rock slope protection materials, and some of the required random earth materials. The impervious earth will consist of clayey, silty, and sand with some gravel and cobbles, and sandy clay (weathered shale) obtained from required overburden excavation in the new spillway. Should any shortage of impervious earth develop, additional materials could be obtained from the old Pine Run No. 2 Borrow Area. Random earth will consist of all required earth excavations not needed for or suitable for impervious earth. This will include excess overburden from the spillway and spoil fill removed from the downstream toe of the dam. Typical gradation curves for spillway overburden materials are contained in Appendix L. Rock will be excavated from the new spillway channel by ripping and using controlled blasting techniques to produce minus 3-inch rock for use as a transition between the existing random earth embankment zone and the proposed rockfill raising zone, plus 3-inch rock to be utilized in the downstream rockfill zone, and select rock to be used as slope protection at the downstream toe of the dam and along the right side of the spillway approach channel. In order to limit the amount of larger size rock and to produce adequate quantities of minus 3-inch rock, blast hole spacing may be closer and explosive charges greater than would otherwise be necessary to accomplish the spillway excavation.

BORROW SOURCES. Borrow sources will be required to supply most of the random earth materials and may supply materials required for processed drainage materials and/or concrete aggregate. It was anticipated that these materials would be obtained from pervious glacial terrace deposits located just upstream of the existing dam (areas A, B, C and D). See Plate 1-18. These areas were designated borrow areas for the existing project. They contain granular soils which should be suitable for either the pervious or random earth zones of the

4-22

£

dam or dike raising. Area A was used extensively during construction of the existing project. Although surveys indicate that material still remains, dewatering may be required which could make this area the most costly to use in spite of its better location. Area B was only partially used and Areas C and D were not used. They should contain useable random and pervious material. Utilization of These sites, especially if if kept below the future permanent pool elevation, would result in minor or no environmental mitigation. Areas B, C and D would require transport of material from its valley bottom location over 2 miles to the construction site. Haul roads would have to be constructed over rugged terrain which may increase costs. Areas Band D would require the construction of stream crossing over Bear Creek or the Lehigh River.

More economical sources for embankment materials may be from areas E and F which were used for the existing projects referred as Pine Run Borrow areas No. 1 and No. 2, respectively. The intent would be to expand the previous sites to the northeast and southwest. These areas could provide both random and impervious materials for the dam or dike and random for the highway relocation. Borrow activity would be limited because part of these areas contain a pond, upland marsh, and surface water feeding downhill marshes. Development of parts of these areas may either be precluded or would require significant mitigation. Portions of these areas are currently being reclaimed and managed by the Pennsylvania Game Commission.

Areas G and Hare located immediately below the existing dam. Area G could provide random material and Area H random or pervious. Since the area downstream of the dam abuts the Lehigh Gorge State Park being developed by Pennsylvania, aesthetics is an added concern to that of usual project appearance. The area is not only visible from the proposed top of dam, recreation facilities, and overlook; but also, it is contingous with the State Park. Because of the terrain, restoration of these sites will be extremely difficult and may eventually result in their elimination from consideration.

Area I contains materials which could be used for impervious or random sections of the dam or dike. It is located immediately to the west of the proposed spillway. A preliminary review of the area indicates that it is

primarily forest cover similar to most of its surrounding environment and should require extensive mitigation. It is the only identified borrow area which is not located on existing or proposed project lands. It would, therefore, require additional real estate acquisition.

ALCONT.

{

The proposed borrow areas will be explored and investigated prior to preparation of the Feature Design Memorandum. It is intended to attempt to utilize the areas (A, B, C and D) below the proposed pool and areas of previously opened sites (E and F). Only with more detailed information on suitability and availability of source and costs, including environmental mitigation costs can a priority for site selection and source utilization be established.

OTHER SOURCES. Materials for concrete aggregate and processed drainage fill may be obtained from commercial offsite sources within 20 miles of the site unless it proves more economical to develop on-site facilities. It is anticipated that These materials could be obtained by processing materials from valley bottom terrace deposits or from rock-crushing operations.

#### RELOCATIONS

RELOCATION OF PENNSYLVANIA LEGISLATIVE ROUTE 40041. Existing L.R. 40041, which has been desic.--t,ed by PennDOT as a major collector, extends from White Haven to U.S. Route 115 (LR 169) at the community of Bear Creek. The relocation of L.R. 40041 consists of relocating approximately 2.7 miles of highway, beginning at the dam access road, rising to the crest of the hill, northwest of the existing highway, then descending the hill crossing Bear Creek over a bridge spanning 530 feet and ending approximately one-half mile north of the existing Bear Creek Bridge. The road will be designed in accol'-:lance with PennDOT Highway Design Manual Part 2. Further details of the relocation including cost estimate may be found in Appendix H, Relocation of Pennsylvan a L.R. 40041.

RELOCATION OF TOBYHANNA TOWNSHIP ROAD T-553. Township Road T-553 is an existing local unpaved road off Pennsylvania Route 115 just south of the Lehigh River. Approximately 900 LF of this road will be raised to the spillway crest elevation 1482. Due to the nature and location of this road, it will be raised on the same approximate alignment to provide minimum encroachment of the adjacent properties.

UTILITY RELOCATION, GENERAL. The project requires the relocation of facilities of three pipeline companies, two telephone companies, and one power company, as shown on Figures 4-1 thru 4-8. The pipelines involved are: Buckeye Pipeline Company, Emanus, Pennsylvania; Mobile Pipeline Company Plainfield, New jersey, and Transcontinental Gas Pipeline Corporation, South Plainfield, New Jersey. The telephone companies involved are: Bell Telephone Company of Pennsylvania, Wilkes-Barre, Pennsylvania; and Commonwealth Telephone Company, Bangor, Pennsylvania. The power company involved is Pennsylvania Power and Light Company, Hazelton, Pennsylvania. The relocations described below are based on field reconnaissance and data supplied by the respective companies. Their planning will be further reviewed and analyzed for economics in a future design memorandum. All rights-of-way below elevation 1487 owned by or conveyed to the utility companies will be subordinated to the Government's right to flood. The following subparagraphs give a brief description of the relocations proposed for each company.

Buckeye Pipeline Company. The facilities requiring relocation consist of one 14-inch and one 16-inch line that cross Stony Run and the Lehigh River. These lines carry various petroleum products from the Buckeye Terminal in Allentown, Pennsylvania through the F.E. Walter project to the Buckeye Terminal near Wilkes-Barre, in Dupont, Pennsylvania. The Buckeye right-of-way is adjacent to the Mobil right-of-way in the project area. The 14-inch and 16-inch lines must be protected up to elevation 1482 wherever they cross the pool. Where they cross the pool, new lines with a 0.5-inch wall thickness and protective coating will be placed adjacent to and generally parallel to the existing pipe, along with any valves necessary to isolate the crossings. Both the 14inch line and the 16-inch pipelines will need relocating for about 1310 feet and 1360 L.F., respectively, at their crossings of the Lehigh River. Both pipelines will require about 715 feet to be relocated at their Stony Run crossings. The lengths of pipe replaced by protected pipe will be removed unless it proves to be more economical to fill and leave the existing pipe in place. The proposed relocations are shown on Figure 4-1.

<u>Mobile Pipeline Company.</u> Mobile facilities requiring relocation consist of an 8-inch pipeline that crosses Stony Run and the Lehigh River in a right-of-way adjacent to the Buckeye right-of-way. The line carries various petroleum products from their Malvern, Pennsylvania, terminal to Binghamton, New York.

The 8-inch line must be protected up to elevation 1482 wherever it crosses the reservoir. Where it crosses the pool, a new line with a 0.5-inch wall thickness and protective coating will be placed adjacent to and generally parallel to the existin# pipe, along with any valves necessary to isolate the crossings. The Stony Run crossing will require relocating about 715 feet and the Lehigh River, about 1,310 feet of pipe. The existing pipe will be left in place unless it proves to be more economical to remove it. The proposed relocation is shown on Figure 4-1.

Transcontinental Gas Pipeline Corporation. Transcontinental facilities requiring relocation consist of 23 3/8-inch and 24-inch pipelines that cross the Lehigh River and an unnamed tributary of the Lehigh River just above Stoddartsville. The two lines flow northwest to a pumping station north of the project near Shades Glenn. the 23 3/8-inch line continues in a northwest direction out of the project area while the 24-inch line turns to the west near the pumping station and crosses Bear Creek and Pennsylvania L.R. 40041 (Bear Creek Road) about 1.8 miles below State Route 115. Both lines must be protected up to elevation 1482 wherever they cross the pool. Where the lines cross the pool, new lines with a 0.5 wall thickness and a protective coating will be placed adjacent to and generally parallel to the existing pipes, along with any valves necessary to isolate these crossings. Both the 23 3/8-inch and the 24-inch pipelines will need relocating for 330 feet at their crossing of the unnamed tributary of the Lehigh River, and 1030 feet will need relocating at the Lehigh River crossing. The 24-inch line will require 445 feet to be relocated at the Bear Creek crossing. The existing pipe will be filled and left in place unless it proves to be more economical to remove it. The proposed relocations are shown on Figure 4-2 and 4-3.

<u>Bell Telephone Company of Pennsylvania.</u> Bell Telephone serves all of the project area except Monroe County and the southeastern part of Luzerne County. There is a 25-pair line out of the White Haven exchange that runs north on Bear Creek Road to the right Bank Access Road, and then along the access road to the intake tower at the dam. This line will require relocation between the proposed new operations building and the intake tower bridge Because of the construction of the new spillway and the raising of the embankment. About 3,400 feet of 25-pair line will be removed and 3,600 feet of new line will be constructed. Some temporary relocations will also have to be made to maintain service to the outlet works during the placing of the new

(









^

embankment and the construction of the new spillway, The proposed relocations are shown on Figure 4-4. Also, there is a line running south on Bear Creel, Road from the Bear Creek exchange that crosses Bear Creek at a location thnt will be in the spillway pool. This single pair line will have to have about 420 feet of line raised to clear the new spillway flood pool. The proposed relocation is shown on Figure 4-5.

Commonwealth Telephone Company. The Commonwealth Telephone Company serves all of Monroe County and the southeastern part of Luzerne County. The only lines affected by the proposed project are in the Stoddartsville area. There is a 25-pair line running northeast on Tobyhanna Township Road T-553 from State Route 115 for about 900 feet on poles jointly used and owned by the Pennsylvania Power and Light Company, This line will have to be relocated to higher ground along its entire length, There is also a 25-pair line crossing the Lehigh River along Tobyhanna Township Road T-629 on the south side of the river and Buck Township Road T-443 on the north side of the river. This line will fall in the new pool and will have to be raised to higher ground. This will result in a long span which might require an alternate relocation plan. The alternate plan would be to continue the line north on Rte. 115 on existing poles across the river to the dirt road by the cemetery, 700 feet along the dirt road to Township Road T-443, where it would tie back into the existing line. Existing Pennsylvania Power and Light Company poles would be utilized, and no new poles would be required. The proposed relocations are shown on Figure 4-1.

v

. L'anage

{

·

ŗ










Pennsylvania Power and Light Company. The Pennsylvania Power and Light Company serves the entire project area. There is a 138 KV transmission line that runs from Lake Harmony to the south, crosses Tobyhanna Creek about 1.5 miles south of Stoddartsville, and then runs east away from the project. The first pole on each side of Tobyhanna Creek will have to be moved to higher ground above elevation 1482, and high poles may have to be used to get sufficient clearance above the pool. This proposed relocation is shown on Figure 4-7. There is a 3-phase distribution line that runs along the Right Bank Access Road between the new operations building and the intake tower. This line will require relocating because of the construction of the new spillway and the raising of the embankment. About 3,400 feet of 3-phase line will be removed and about 3,600 feet of new line will be constructed. The present line is on Bell Telephone, PP&L, and/or Government poles. Some temporary relocations will also have to be made to maintain service to the outlet works during the placing of the embankment and the construction of the new spillway. The single phase line now serving the well pump on the upstream side of the dam will have to be extended to reach the new 3-phase line. New service will have to be furnished to the new operations building. The proposed relocations are shown on Figure 4-4. There is also a single phase line that crosses Bear Creek upstream of the present pool on poles jointly used with Bell Telephone. About 420 feet of this line will be raised to clear the new spillway flood pool. This proposed relocation is shown on Figure 4-4. In the Stoddartsville area, there is a single phase line running northeast of Tobyhanna Township Road T-553 from State Rte. 115 for about 900 feet on poles owned by PP&L and jointly used with Commonwealth Telephone. This line will have to by moved to higher ground along its entire length. This proposed relocation is shown on Figure 4-8.

### CONSTRUCTION PROCEDURES

CONSTRUCTION SEQUENCE. The construction of the modification can be divided into four general and independent phases of work. These include a) construction of the relocation of Pennsylvania L.R. 40041; b) construction of the new tower, conduit section service bridge and approach channel; c) construction of the new spillway and raising the dam and dike embankments; and d) the other associated features.





FIGURE 4-7





L.R. 40041 Relocation. The L.R. 40041 relocation consists primarily of excavation and embankment fill placement to achieve the design grade and alignment and the construction of a new bridge across Bear Creek, well upstream of the dam. It is anticipated that this work will be initiated prior to the construction of the dam and dike and therefore be independent of the other phases of construction and will depend on its own required excavation and borrow sources for required construction materials.

<u>Outlet Works</u>. Construction of the new intake tower can commence any time following drawdown of the reservoir to elevation 1250 and construction of a temporary cofferdam to dewater the tower and conduit site. Inflow from Bear Creek and the Lehigh River will be carried through temporary conduits to the existing tunnel. Rock excavated in the construction of the outlet modification can be utilized in the dam raising.

Dam, Dike, and Spillway. The construction sequence for the dam, dike, and spillway is controlled generally by materials distribution considerations. Since all materials excavated from the spillway, except for stripping, are to be used for the dam and dike raising, the spillway excavation must be initiated prior to placement of fill in the embankments. Since rockfill materials will be needed in the early phases of embankment fill placement, most of the spillway overburden will be stockpiled for later use in the random and impervious zones of the dam raising. The general sequence of construction will be as follows:

(1) The foundation for the embankment raising will be stripped and excavations for the toe drain will be completed. Extension of the existing grout curtain on each abutment will be one of the early items of work.

(2) Pervious materials for the toe drain and blanket drain will be placed prior to any rockfill placement.

(3) Simultaneously, spillway excavation will be initiated. Overburden will be stock piled on the right abutment downstream of the new spillway and the embankment extension. Rockfill materials will be produced to construct the lower portions of the embankment raising.

(4) The structural fill for the outlet retaining wall will be placed and the wall will be constructed.

(5) Rockfill placement will continue until all rock from the spillway excavation has been utilized. From that point, the embankment raising will consist of a downstream random earth zone.

(6) Upon reaching elevation 1474.0 with the raising, the top 24 feet of the existing dam will be removed to elevation 1450.0.

(7) Downstream of the existing spillway weir and within the limits of the embankment, the existing spillway wall sections will be removed and the embankment fill will be constructed to elevation 1450.

(8) The remainder of the spillway walls within the limits of the embankment and the spillway weir will then be removed and the embankment will be completed to the upstream face and to elevation 1450.0 within the limits of the existing spillway. This reach of the embankment will be maintained at least 20 feet below the elevation of the rest of the raising and will serve as the temporary emergency spillway until the raising reaches about elevation 1495. At that time, the new spillway cut (to about elevation 1473.5 without the weir in place) will serve as the emergency spillway. Rock will be stockpiled for placement in the event of the anticipation of flow through the temporary notch in the embankment fill.

(9) The remainder of the embankment raising will be completed to the top of dam elevation, 1504.0, using earth and rock from stockpiles and random earth from borrow sources.

(10) The dike raising may be initiated at any time during the dam raising and must be started soon enough to maintain the top of the dike at least 20 feet above the elevation of the temporary spillway.

(11) Following completion of the dam and dike raising the spillway weir and walls will be constructed.

(12) During completion of the spillway structures, rock facings will be placed on the dam embankment, the upstream face of the dike, and the right side of the spillway approach channel.

<u>Associated Features</u>. The associated features such as access roads, maintenance facilities, recreation roads and facilities and environmental and cultural mitigation are initially dependent on a final definition of the features discussed above. Once they are located and defined, these associated features can be developed independently for timely completion of the project.

### RECREATIONAL AREAS

GENERAL. The proposed recreation plan as shown on Plate 1-22 and 1-22a and the proposed future recreation plan as shown on Plate 1 reflect the consideration of all government and public recreation interests and concerns.

The final decisions on how to accommodate vehicular, equestrian and pedestrian access between the West and East Bank recreation areas will be deferred until development of the feature design memorandum. The alternatives are as follows:

- . Equestrian, pedestrian and only Corps of Engineer maintenance vehicles across the top of the dam (no other vehicles);
- . Pedestrian and vehicular traffic across the top of the dam and equestrian traffic along a lower train (berm) on the downstream face of the dam; or
- . Pedestrian and vehicular traffic across the top of the dam and no equestrian access from the East to West Bank.

The decisions depend on the availability of excess (spoil) material and the final design of the dam (berm) structure itself. If the material is available, accommodating design changes can be accomplished at essentially no change in cost.

Any design allowing vehicular traffic across the top of the dam would include speed control devices (i.e., road bumps). If no equestrian access is provided from East to West, holding corrals would be provided on the West Banks.

PROPOSED RIGHT BANK (WEST BANK) FACILITIES. The following facilities are included for recreation along the right bank of the reservoir.

Bank Fishing Access. Bank fishing access shall consist of providing recreation roads and parking areas upstream and downstream of the dam. The upstream bank fishing area is accessible by Road "D" and the downstream fishing area is accessible by Road "C".

Nature Education Pavillion. The pavillion will be located upstream of the proposed dike, adjacent to the upland marsh. A gravel recreation road (Road "A") and parking area will provide access from the proposed Right Bank Access Road.

<u>Information Center</u>. This small pavillion is located along the existing right bank access road, southeast of the proposed dike. A small, paved parking area will be provided.

<u>Picnic Area</u>. This area is located north of the proposed dam and east of the proposed spillway. Access and parking for the picnic area will be along the proposed Right Bank Access Road. Water and sanitary facilities, picnic tables, trash cans and grills will be provided.

Picnic tables will be provided adjacent to the Nature Education Pavillion for limited picnicking without facilities.

<u>Pedestrian and Equestrian Trails</u>. Pedestrian and equestrian trails will connect all areas. Equestrian trails, however, will be kept away from high activity areas. Trails will also utilize an abandoned railroad right-ofway. The pedestrian trails will provide access to shoreline upland marshes and other natural interest features. The trail system will utilize existing trails and forest openings or meander on natural grades through forested areas. Parking for the trails will be located along recreation Road "B", north of the proposed spillway and along the proposed Right Bank Access Road, as well as other small pull-off areas strategically located. <u>Warming Corral and Warming Hut</u>. A warming corral will be located along the trails north of the proposed spillway. A warming hut will be located south of the proposed dam in the vicinity of the downstream bank fishing parking area.

<u>Sanitary Facilities</u>. Vault-type comfort stations will be provided accessible from the warming corral north of the proposed spillway and accessible from the picnic area.

<u>Overlook</u>. One overlook will be located at the east edge of the picnic area overlooking the lake.

<u>Water Supply System</u>. Water for the picnic area will be provided by a hand operated, spigot type well, suitable for outdoor use. The water will be tested.

PROPOSED LEFT BANK (EAST BANK) FACILITIES. The following facilities are included for recreation along the left bank of the reservoir.

<u>Picnic Areas</u>. There are two picnic areas proposed for the left bank. One area is located on the high knoll east of the left abutment of the dam. Access to this area will be by the left bank access road. Parking will be located along the access road at the high knoll. The other picnic area is located north of the proposed visitor center. Access will be provided by Recreation Road "F". Parking will be located at the end of Road "F" Water and sanitary facilities, picnic tables, trash cans, and grills will be provided for both areas.

<u>Overlooks</u>. Four overlooks are planned for the left bank facilities. Three overlooks will be located along the trail system north of the access road from Route 940, overlooking the lake at the confluence of the Lehigh River. The fourth overlook will be located on the knoll east of the left abutment of the dam.

<u>Visitor Center</u>. This structure will be the primary visitor center for the project. The visitor center will be located along the access road from Route 940 just east of the proposed Operations and Maintenance Building. This structure will be divided into a visitor center, park office, storage area,

and restrooms. The center will be heated using electric baseboard radiation. The restrooms will be provided with separate ventilation. The office and visitors' areas will be provided with summer cooling by use of small through-the-wall units. The expected cooling load is 9000 BTUH and the expected heating load in 35000 BTUH. The sanitary system for the Operation and Maintenance building will also provide waste removal and treatment for the Visitor Center.

The restrooms will be equipped with standard and handicapped fixtures. An electric water heater will supply 100 degree water.

Primary electric service will be expected from the line servicing the Operation and Maintenance Building. Service transformer KVA capacity is estimated to be 25 KVA. Secondary service to the Center will be 10.3W, 120/240 Volt, installed underground. The interior lighting will be primarily fluorescent lighting.

Boat Launch Facility. The boat launch facility, located upstream of the dam, will consist of parking for cars and trailers, a joined concrete-batt blanket boat launch, a courtesy floating dock and mooring cable. Water and sanitary facilities, picnic tables and trash cans will be provided. Access to the facility will be by recreation Road "E".

<u>Pedestrian and Equestrian Trails</u>. Pedestrian and equestrian trails will connect all areas. Equestrian trails will be kept away from high activity areas. The pedestrian trails will provide access to upland marsh areas, game field, natural resources and overlooks. The trail system will utilize existing trails and forest openings or meander on natural grades through forested areas. Parking for the pedestrian trails will be located along the access road from Route 940, Road "F" and Road "G", as well as other small pull-off areas strategically located.

<u>Warming Corrals</u>. Two warming corrals are located north of the access road from Route 940 along the equestrian and pedestrian trail system.

Sanitary Facilities. Vault-type comfort stations will be provided adjacent to the boat launer parking lot and the pienic area parking lots. The sanitary wastes from the visitor center will be pumped to the sewage system which serves the Operations and Maintenance Building.

<u>Water Supply System</u>. Water for the boat launch facility and the two picnic areas will be provided by hand operated, spigot type wells suitable for outdoor use. At locations where a well supply is developed, the water will be tested. Water from the Visitor Center Facility will be supplied from the well supplying the Operation and Maintenance Building. The water supply and treatment system will be designed to satisfy the combined demands of both facilities.

<u>Play Field</u>. An existing borrow area south of the access road to Route 940 will be graded and used for various field sports. The existing parking lot will remain to be utilized for access to the sports area and pedestrian trails.

Equestrian Center. The equestrian center will be located south of the access road to Route 940 and west of recreation Road "G". It is anticipated that the facility, to be developed by a private concessionaire, will include stables, a riding ring area, water, and a vault type comfort station.

PENINSULA FACILITIES. The following facilities are included for recreation at the peninsula area.

<u>Pedestrian Trails</u>. Simple boat beaches or clearing will provide hikers and hunters access to the peninsula. A complex of trails will provide primitive passive, and consumptive recreation.

Boat Beaches. The beaches will provide an area to ground the boats and secure them to piers.

FUTURE RIGHT BANK (WEST BANK) FACILITIES. The following facilities are proposed for future recreation along the right bank of the reservoirs.

<u>Boat Launch Area</u>. The area will be located northeast of the proposed dike tie-out. Access to this area will be from relocated LR 40041 along recreation Road "AA". The boat launch facility will include parking for cars and trailers, a dual launch ramp, two floating docks and a shoreline mooring cable. Water and sanitary facilities, picnic tables and trash cans will be provided. <u>Sports Field</u>. The sports field will be located east of the proposed dike tieout and access will be from relocated LR 40041 on recreation Road "AA". The area will be graded and treated to be used for various field sports. A parking area will be provided.

FUTURE LEFT BANK (EAST BANK) FACILITIES. The following facilities are proposed for future recreation along the left bank of the reservoir.

<u>Campground</u>. The proposed campground will be located north of the access to Route 940 and access will be from recreation Road "F". The campground roads will be located along the portions of the pedestrian trail system. The primitive type campground will include water and vault-type comfort stations, pienic tables, fire rings and trash cans. The campground will be incorporated into the trail system to provide access to the overlooks.

<u>Picnic Area</u>. This picnic area will be located south of the access road to Route 940 and north of the sports field. Access and parking will be provided along recreation Road "G". Water and vault-type comfort stations, picnic tables, trash cans and grills will be provided.

<u>Trailer Sanitation Area</u>. A trailer sanitation area will be located along recreation Road "F" opposite the Visitor Center. Construction of the Left and Right Bank recreational facilities will be started when the major features dam, dike, spillway - are winding down. This is to avoid interference with too many construction activities.

### FUTURE PENINSULA FACILITIES.

<u>Pedestrian Trails</u>. The trail complex will be expanded. It will extend and expand the existing trail complex. An overlook(s) will be placed at a strategic location(s) to view the lake and recreation area.

Boat Beaches. The beach facilities will be expanded and upgraded if warranted.

#### REAL ESTATE REQUIREMENTS

CRITERIA FOR ACQUISITION. Real Estate interests to be acquired are based upon the provisions of EP 405-1-2.

LANDS TO BE ACQUIRED IN FEE. The reformulation will require 2,625 acres new fee and an additional 926 acres fee over easement. A total of 3.551 acres in fee will be required.

EASEMENT AREA. An additional 6.4 acres will be required for new easements.

AREA REQUIRED. A summary of area requirements is given below.

	LAND REQUIR	EMENTS	
Location	New Fee	New Easement	Fee over Easement
Monroe County			
Tobyhanna Township	58 ac	192 ac	65 ac
Total Land Requirements		315 ac	
Improvements		Number	
Residential		1	
Recreational (camp)		1	
Cable Suspension Bridge		1	
Causeway		1	
Carbon County, Kidder Twp	1,041 ac	96 ac	211 ac
Total Land Requirements		1,348 ac	
Improvements		None	
Luzerne County, Buck Twp	232 ac	139 ac	237 ac
Total Land Requirements		608 ac	
Improvements		Number	
Residentials		2	
Recreational (camps)		2	
Luzerne County,	11,294	197 ac	413 ac
Bear Creek Twp.			
Total Land Requirements		1,904 ac	
Improvements		None	

REAL ESTATE COSTS. The estimated costs of all lands and interest improvements together with the estimated cost of acquisition, plus estimated severance and contingencies are summarized as follows:

MONROE CO	UNTY T	OBYHANNA TO	NSHIP	
Land &	Intere	sts - 315 Ac	res	
141 acres - Woodland	0	\$ 800.00	) p.a.	\$112,800
104 acres - Wasteland	0	\$ 400.00	) p.a.	\$ 41,600
5 acres - Bldg. Site	0	\$2,500 p	.a.	\$ 12,500
65 acres - Subject to 1	Flowag	e Easement		
0	80% \$	800.00 p.a	1.	\$ 41,600
				\$208,500
Improvements				
1 Residential	0	\$ 20,000		\$ 20,000
1 Recreational (camp)	0	\$ 4,000		\$ 4,000
1 Cable Suspension				
Bridge	0	\$ 4,000		\$ 4,000
1 Causeway	0	\$ 3,000		\$ 3,000
Total Improvements				\$ 31,000
				\$239,500

### CARBON COUNTY, KIDDER TOWNSHIP

			Land & Int	er	est	- 1	,348 Acres	
1,017	acres	-	Woodland	0		\$	800.00 p.a.	\$813,600
115	acres		Wasteland	0		\$	400.00 p.a.	\$ 46,000
5	acres	-	Bldg. Site	0		\$2	,500 p.a.	\$ 12,500
211	acres	-	Subject to	FJ	Lowag	ge H	Easement	
				0	80%	\$	800.00 p.a.	\$135,040

\$1,007,140

# LUZERNE COUNTY, BUCK TOWNSHIP

Land & Interest	13 - 603 Acres	
300 acres - Woodland 0	\$ 800.00 p.a.	\$240,000
65 acres - Wasteland @	\$ 400,00 p.a.	\$ 26,000
6 acres - Bldg. Site @	\$2,500 p.a.	\$ 15,000
237 acres - Subject to Flowage	e Easement	
e 809	\$ \$ 800.00 p.a.	<u>\$151,680</u>
		\$432,680

Improvement	s	
-------------	---	--

2 Residentials	1	6	\$ 20,000	\$ 40,000
2 Recreational	.s (camp)	0	\$ 4,000	\$ 8,000
				\$ 48,000
				\$480,680

# LUZERNE COUNTY, BEAR CREEK TOWNSHIP

			Land	& Inte	ere	ests	-	1,904 Ac	eres			
1,156	acres	-	Wood1	and	0		\$	800.00	p.a.	\$	924 <b>,</b> 8	300
231	acres	-	Waste	land	0		\$	400.00	p.a.	\$	92,4	100
100	acres	-	Waste	land	0	98 <b>%</b>	\$	400.00	p.a.	\$	39,2	200
4	acres	-	Bldg.	Site	0		\$2	,500 p.a	<b>.</b>	\$	10,0	)00
413	acres	-	Subje	ct to	FJ	lowag	ze	Easement	C			
					0	80%	\$	800.00	p.a.	\$2	264,3	320
										\$1,3	330,7	20

### F. E. WALTER REFORMULATION

SUMMARY - LAND AND ACQUISITION COSTS - PROJECT TOTAL

Lan	ds and Damages	
Land & Interests		
New Fee	- 2,625 acres	
Fee over Easement	- <u>926 acres</u>	
	3,551 acres	
Easements	- <u>624 acres</u>	
	624 acres	
	4,175 acres	
	.e	
Land and Interest	\$2,979,040	
Improvements	\$ 79,000	
Severance	\$ 305,850	
Contingencies	<b>\$</b> 672 <b>,</b> 850	
Acquisition	\$ 193,200	
Relocations	\$ 39,450	
	\$4,269,390	

TOTAL LANDS AND ACQUISITION COSTS (Rounded) \$4,270,000

#### COST ESTIMATE

COST INDEX. The construction costs given in this report are based upon prevailing prices in the Francis E. Walter Dam and Reservoir project area. A construction cost index of 4160.91. (1913=100) as published by the Engineering News Record of October 1984 is applicable throughout, and should be used in the event it is necessary to adjust the cost estimate for subsequent economic conditions.

COMPARISON OF CURRENT ESTIMATE WITH LATEST APPROVED PB-3 ESTIMATE. The current Federal cost estimate of \$112,800,000 reflects an increase of \$35,800,000 over the latest approved PB-3 estimate of \$77,000,000 (1 Oct 83 prices). The increase includes increases of \$4,850,000 based on higher price levels to 1 Oct 84 and \$42,915,000 for design changes based on preliminary general design studies principally reflecting the need for a new intake tower, extension and raising of the proposed new spillway and upgrading of highway and utility relocations to meet current design criteria. These increases of \$47,765,000 were partially offset by a decrease of \$11,965,000 for post contract award and other estimating adjustments due to reanalysis of quantities and unit costs for real estate and construction features.

COMPARISON OF CURRENT ESTIMATE WITH THE HOUSE DOCUMENT ESTIMATE. The current Federal cost estimate of \$112,800,000 reflects an increase of \$99,400,000 over the estimate of \$13,400,000 (Jan 59 prices) in the project authorization document (House Document 522/87/2). The increase includes increases of \$55,355,000 based on higher price levels to 1 Oct 84, \$42,915,000 for design changes based on preliminary GDM studies (discussed above), and a net increase of \$1,130,000 for post contract award and other estimating adjustments due to reanalysis of quantities and unit costs for real estate and construction features.

### F.E. WALTER DAM MODIFICATION

SUMMARY OF PROJECT COSTS October 1984 Price Level

COST		
ACCT.	ITEM	COST
01	Lands and Damages	\$ 4,270,000
02	Relocations	16,177,000
03	Reservoir	4,195,000
04	Dam	66,324,000
	(Dam)	(11,770,000)
	(Dike)	(3,686,000)
	(Outlet Works)	(31,740,000)
	(Spillway)	(19,128,000)
06	Culture and F & W	1,553,000
	Mitigation	
08	Roads	1,470,000
14	Recreation Facilities	2,156,000
19	Buildings, Grounds & Utiliti	Les 899,000
20	Permanent Operating Equipmen	nt 199,000
30	Engineering and Design	10,425,000
31	Supervision and	5,134,000
	Administration	

TOTAL PROJECT FIRST COST

\$112,800,000

# MOD. OF F.E. WALTER DAM AND RESERVOIR

### COST ESTIMATE

## (October 1984 Price Level)

COST					
ACCT				UNIT	
NO.	DESCRIPTION	UNIT	QUANTITY	PRICE	AMOUNT
01.	Lands and Damages		<del> </del>		
	Lands, Acquisition and Resettlement	JOB		LS	\$4,270,000
	Total (including Co	ontingene	ies)		\$4,270,000
02.	Relocations				
	.1 Relocated T553	JOB		LS	174,900
	.2 Relocated LR 40041 (App.B)	JOB		LS	11,546,000
	.3 Bell of Pennsylvania	JOB		LS	18,000
	.4 Commonwealth Telephone Co.	JOB		LS	5,000
	.5 Pennsylvania Power and Light Co.	JOB		LS	83,000
	.6 Buckeye Pipe Line Co.	JOB		LS	1,617,000
	.7 Mobil Pipe Line Co.	JOB		1S	668,600
	.8 Transcontinental	JOB		LS	2,064,600
	Total (incl. Conting	gencies)			\$16,177,100
03.	Reservoir				
	Full & Partial Clearing	JOB		LS	3,648,671
	Contingencies		15 <b>%</b>		547,300
	Total (incl. Conting	gencies)			\$ 4,195,971
04.	Dam				·
	.1 Dam Embankment				
	Clearing and Grubbing	AC	18.5	3000.00	55,500
	Diversion of River	JOB		LS	537,000
	Stripping	CY	11,700	5.86	68,562
	Removal existing spoil	CY	65,320	3.14	205,105
	Removal existing dam to	JOB		LS	928,000
	elev. 1450				
	Excavation, toe drain	СҮ	33,250	3.04	101,080
	Excavation, cutoff	CY	13,400	3.04	40,736
	Borrow-random	CY	23,000	5.96	137,080

# MOD. OF F.E. WALTER DAM AND RESERVOIR (continued)

# COST ESTIMATE (October 1984 Price Level)

COST

ACCT				UNIT	
NO.	DESCRIPTION	UNIT	QUANTITY	PRICE	AMOUNT
	Foundation Grouting	JOB		LS	675,000
	Random earth fill	CY	621,800	2.32	1,442,576
	Unprocessed rock fill	CY	616,200	1.90	1,170,780
	Minus 3" rockfill	CY	325,400	2.30	748,420
	Plus 3" rockfill	CY	286,800	2.30	659,640
	Drainage fill	CY	151,720	9.00	1,365,480
	Processed gravel	CY	27,330	14.80	404,484
	Slope protection	CY	1,850	10.00	18,500
	Paving	SY	12,500	13.65	170,625
	Guardrail	LF	7,100	13.84	98,264
	Instrumentation	JOB		LS	320,500
	Impervious earth fill	СҮ	418,200	2.60	1,087,320
	Subtotal dam embankment				\$10,234,652
•	2 <u>Dike Embankment</u>				
	Clearing and Grubbing	AC	18.5	\$3000.00	\$ 55,500
	Stripping	CY	900	5.86	5,274
	Excavation, Inspection trench	CY	16,000	3.24	51,840
	Remove exist. access rd. & dike				
	Sta. 28+50 to 30+50	JOB		LS	141,000
	Borrow-random	CY	416,530	2.60	1,082,978
	Borrow-impervious	CY	120,635	2.60	313,651
	Random earth fill	CY	362,200	3.14	1,137,308
	Impervious fill	CY	104,900	2.60	272,740
	Drainage fill	CY	14,800	9.00	133,200
	Seeding	AC	17.4	665.00	11,571
	Subtotal dike embankment				3,205,062

### MOD. OF F.E. WALTER DAM AND RESERVOIR

# COST ESTIMATE

## (October 1984 Price Level)

COST ACCT					UNIT	
NO.		DESCRIPTION	UNIT	QUANTITY	PRICE	AMOUNT
	.3	Outlet Works	<del></del>			
	.1	Intake channel				
		Excavation, common	СҮ	4,600	3.24	14,904
		Excavation, rock	CY	7,650	44.00	336,600
	.2	Service Bridge				
		Super structure	JOB		LS	571,000
		Piers	JOB		LS	923,000
		Abutment	JOB		LS	151,000
		Excavation & bkfill for piers	JOB		LS	13,500
		Structural fill	CY	650	11.15	7,248
		Modify exist. tower & bridge	JOB		LS	206,700
	.3	Intake tower				
		Exc. & backfill for tower	JOB		LS	454,000
		Concrete, tower	CY	40,000	370.00	14,800,000
		Steel reinforcement	LB	4,002,300	0.60	2,401,380
		Tower entrance bldg.	JOB		LS	18,200
		Tower mechanical	JOB		LS	6,928,000
		Tower, electrical	JOB		LS	232,200
	<b>.</b> 4	Retaining Wall				
		Excavation, common	CY	5,750	3.24	18,630
		Excavation, rock	CY	760	44.00	33,440
		Structural fill	CY	4,040	11.15	45,046
		Concrete	CY	1,200	300.00	360,000
		Steel Reinforcement	LB	142,000	0.60	85,200
		Subtotal outlet works				\$27,600,048

### SCHEDULES FOR DESIGN AND CONSTRUCTION

GENERAL. Consideration of this project will include highway and utility relocations, Operations and Maintenance, Building, raising of the existing dam and dike, and construction of a new tower and spillway. Construction of the project is scheduled to be initiated in July 1986 with completion scheduled for the fall of 1991.

UTILITIES. The relocation of electric power lines, telephone lines, gas lines and other utilities is scheduled to begin in May 1987 and be completed in spring 1991.

HIGHWAY RELOCATIONS. There are two highways that will require relocation; Pennsylvania Legislative Route 40041 and Tobyhanna Township Road T-553.

Legislative Route 40041. The work on Design Plans and Specifications for this highway relocation is scheduled to begin December 1985 and to be completed December 1986. Construction is scheduled to start in February 1987 and to be completed by November 1988.

Township Road T-553. Because of the remoteness of this road from the other areas of construction. Plans and Specifications will be accomplished seperately from LR 40041 and construction will be by separate contract. Contract Plans and Specifications are scheduled to begin May 1986 and be completed September 1986. Construction is scheduled to begin April 1987 and be completed November 1987.

DAMS AND APPURTENANCES. The design and preparation of Plans and Specifications for the spillway, tower, raised dam and other appurtenances is scheduled to begin in September 1985 and be completed by August 1987. Construction for the major features scheduled to begin in February 1988, continue through three construction seasons and be completed in the spring of 1991. A description of the work performed during each construction is given below:

#### FIRST SEASON

(1) Site Clearing. Initial work will consist of clearing in the areas of the spillway and new embankment for dam and dike and the two access roads.

(2) Spillway. Spillway excavation will proceed with the overburden being stockpiled and the rock utilized for the dam embankment.

(3) Excavation Spoil. The existing spoil toe of the dam shall be excavated to approximate elevation of original ground surface and removed to a spoil area. Suitable materials from the spoil excavation may be reused in the embankment or to fill the old river channel downstream of the new embankment toe.

(4) Drawdown Lake and Cofferdam. The first season the lake will be drawn down to elevation 1250. When drawdown is complete a cofferdam can be constructed to facilitate construction of the new tower. Diversion will be made by a bypass pipe through the existing tower. This diversion scenario will continue until the third construction season when the new tower is complete.

(5) Embankment. As material becomes available from the spillway excavation, placement of the new downstream embankment can proceed. It's anticipated that the retaining wall can be constructed and that the embankment could be placed to the top of the retaining wall.

### SECOND SEASON.

(1) Spillway. Excavation of the spillway will be completed and construction of the concrete walls and well will be started. Rock excavated from the spillway will be transported directly to the dam embankment for use in the downstream raising.

(2) Embankment. Construction of the downstream dam embankment will be completed to approximate elevation 1450. When all spillway rock excavation has been utilized, the embankment raising section will be continued with random earth materials from borrow sources. The existing spillway structure will remain functional throughout the second construction season and during the subsequent wintering over. Construction of the dike embankment raising will be initiated.

(3) Tower. With the cofferdam in place, construction of the new tower will begin. Construction of the service bridge piers may be initiated.

### THIRD SEASON.

(1) Embankment. The embankment raising section will be completed to elevation 1474, which is the elevation of the existing embankment crest. The top of the existing dam will then be removed to elevation 1450 to permit the tieing together of the impervious zones of the existing dam and the raising section. The dam embankment will then be completed to the proposed elevation. The dike embankment will be completed.

(2) Existing Tower and Service Bridge. The existing tower will be modified, with portions removed, to serve as an air vent for the outlet works. The existing service bridge will be demolished and removed.

(3) Tower. The new intake tower and service bridge will be completed and operational.

(4) Spillway. The spillway construction, including concrete structures, spillway channel stabilization, and spillway slope protection placement, will be completed.

(5) Outlet Protection. The grading, pervious fill, reworked existing stone and placement of new 36 inch riprap will be completed.

RECREATION. Construction of the proposed recreation is scheduled to begin May 1991 and be completed by December 1991.

MITIGATION. Implementation of environmental mitigation and completion of cultural resources documentation have not been scheduled at this time. They are dependent on the final location and definition of the other project features and the limits of real estate aquisition. They will be incorporated in the detailed schedule for design and construction of the project.

FUNDS SCHEDULE. The estimated funds required by fiscal years are summarized below:

(Thousands	of	Dollars)

-----

----

FY	E&D/S&A	CONSTRUCTION	
82	\$ 1,259	\$ O	
83	1,070	0	
84	1,420	0	
85	850	0	
86	1,556	300	
87	2,115	4,035	
88	1,215	25,785	
89	1,066	22,904	
90	1,148	21,732	
91	943	16,620	
92	213	8,869	
	\$ 12,555	\$ 100,245	

TOTAL - \$ 112,800

### OPERATION AND MAINTENANCE

The operation and maintenance of the F.E. Walter Dam and Reservoir and associated lands will be under the direction of District Engineer, Philadelphia District. The local sponsor has indicated that it is willing to assume the operation and maintenance of the Federal recreation facilities. The District will be responsible for supervision of physical operation and maintenance of the project. The District will also be responsible for supervision of functional operation, including the establishment and operation of rainfall, stream, and pool level gages in cooperation with the U.S. Weather Bureau and the U.S. Geological Survey.

Operation and maintenance of the dam and reservoir, including the downstream fishing area, will be under the direction of the reservoir manager. The work force for operation and normal maintenance of the F.E. Walter Dam and

Reservoir will consist of a reservoir manager, one dam operator and two laborers. Around the clock attendance is not contemplated.

MAINTENANCE AND MAJOR REPLACEMENT. The reservoir manager will be responsible for the maintenance of equipment, embankment slopes, appurtenances, grounds, access roads, embankment instrumentation, gage operations and the preparation and keeping of operating records. Maintenance and major replacement of relocated roads and utilities will be the responsibility of non-Federal interest. Maintenance of recreation areas will be the responsibility of the non-Federal interests, while major replacement of these facilities will be a Federal responsibility. Average annual costs of major replacement is estimated at \$150,000 for the 100 year economic life of the project.

FACILITIES. The maintenance building will be constructed to provide space for housing two service trucks, a tractor, storage area, shop area, utility room, office and communications room. The building will provide an effective space of approximately 5,360 square feet. On site housing for the dam operators will not be provided. Adequate housing is available within a short commuting distance of the project.

ANNUAL COSTS FOR OPERATION AND MAINTENANCE. The estimated annual cost for maintenance and operation of the reservoir and recreation facilities are listed below. The estimate includes cost for a contract with local police to provide security in absence of on-site residences for dam tenders.

Reservoir (O&M) Costs	
Staff-Reservoir Manager, Dam Tender a	nd \$150,000
Two Laborers	
Maintenance and Repair of Buildings a	nd
Equipment	70,000
Utilities	6,000
Supplies and Materials	14,000
Vehicle Costs	10,000
Security	10,000
Sub-	Total \$260,000

Hydrologic	Data Collection & Control	130,000
Management	& Administration (District Office)	70,000
		\$460,000
Recreation	(O&M) Costs (For Initial Recreation)	90,000

COMPARISON WITH PROJECT DOCUMENT. The total annual cost of operation and maintenance, including directly related recreation, was given as \$117,000 in the project document (House Document 522). A price level increases from January 1959 to September 1984 would result in an annual cost of \$580,000. The difference is primarily due to changes in the recreation plan.

### 5. PLAN IMPLEMENTATION

This section presents the cost allocation and cost apportionment procedures as well as the division of implementation responsibilities between Federal and non-Federal interests. Cost allocation refers to the division of total project costs among the various project purposes in a multiple-purpose project. When all costs have been allocated to the project purposes, costs for each purpose are then apportioned (shared) among the potential users of the project (beneficiaries). At this time, no costs have been defined for making the tower suitable for the future hydropower. When they are defined, a decision on the assignment of these costs would have to be made at that time. Final designs would, therefore, reflect this decision.

Cost allocation, apportionment, and reimbursement are based on guidance provided on June 21, 1984, by the Assistant Director of Civil Works, U.S. Army Corps of Engineers as applied to the appropriate regulations under the Corps Internal Water Resources Planning Guidance.  $\frac{1}{4}$  Formulas for allocating and apportioning first or project costs, opportunity costs, sunk cost and operation and maintenance costs were developed based on this guidance. The cost allocation and reimbursement requirements are computed in October 1984 dollars and an interest rate of 3 1/4% was used for allocating costs. The interest rates are discussed further in the following paragraphs.

### INTEREST RATES

Based on current criteria, several different interest rates are used for projects such as the Walter Modification. The Walter Modification takes advantage of a "grandfathered" interest rate for computation of project justification and cost allocation which are normally computed at the current rate. (This "grandfathered" rate is discussed further in the next paragraph).

Applicable current rates are prescribed below but they are subject to future revisions as required.

Reflects specific guidance for the Walter Modification applied to Engineering Regulation 1105-2-20, Project Purpose Planning Guidance, Department of the Army, U.S. Army Corps of Engineers; Change 3, 6 April 1984.

÷. 4
Project	Justification:	3.25%	(a)

Cost Allocation:

Interest During Construction:

Water Supply:	10.403%	(b)
Recreation:	10.403%	(c)
Flood Control:	8.125% <u>1</u> /	(c)

3.25%

(a)

Payback:

Water Supply	10.403%	(b)
Recreation:	10.403%	(c)
Flood Control:	8.125% <u>1</u> /	(c)

(a) Section 80(b) of the Water Resources Act of 1974.

- (b) The Water Supply Discount and Payback Rate is established by the U.S. Treasury according to the Water Supply Act of 1958, Section 301 B.
- (c) Water Resources Discount and Payback Rate is prescribed according to U.S. Army Corps of Engineers, Engineering Circular 1105-2-128 dated 29 February 1984.

From the year Walter was authorized up to 1974, projects were analyzed under the interest rate prescribed by legislation for analysis. In 1974, the adoption of the 1974 Water Resource Development Act altered the method of calculating the interest rate for certain projects as follows:

> "In the case of any projects authorized before January 3, 1969 if the appropriate non-Federals have, prior to December 31, 1969, given satisfactory assurance to pay required non-Federal share or project costs, the discount rate to be used in computation of benefits and costs for such project shall be the rate in effect immediately prior to December 24, 1968, and that rate shall continue to be used for such projects until construction has been completed...".

 $\frac{1}{4}$  FY 85 discount rate of 8 3/8% would not significantly affect results.

The Modification was authorized in 1962 and has been supported by non-Federal interest ever since. It therefore qualifies for a  $3 \ 1/4\%$  interest rate, but only for project justification and cost allocation purposes.

# COST ALLOCATION

A preliminary cost allocation was made for the recommended plan on the basis of cost estimates developed at this time. This cost allocation would undergo several refinements as the project moves through the detailed engineering and design phase to the construction phase. The emphasis during the preliminary cost allocation is directed toward the method of allocation as well as an approximate derivation of allocated costs.

PROJECT COST ALLOCATION. A variation of the Separable Cost Remaining Benefits (SC-RB) analysis was applied to allocate total costs among project purposes  $\frac{1}{2}$ . Modifying the existing project produces two new categories of benefits: water supply and recreation. In addition, benefits will also accrue to the existing project purpose, flood control, by extending the economic life of the project. Therefore, all three purposes were included in the SC-RB analysis.

O&M COST ALLOCATION. The operation and maintenance (O&M) costs will include both separable and joint-use costs. No separable costs have been identified for either flood control or water supply; therefore, O&M costs specific to recreation will be borne by that purpose. The allocation of joint-use costs are to be based on an "incremental" philosophy. Flood control will continue to bear O&M costs proportional to those costs which are currently being incurred for the existing project. All costs above this level (incremental) will be allocated primarily between water supply and recreation. A SC-RB analysis will be used to allocate these costs. The percentages for distributing the joint-use O&M costs for the life of the project will be computed when the modified project is operational. They will be based on the following:

-/SC-RB is a method for obtaining an equitable distribution of the cost of multiple-purpose project among the purposes served. It provides for assigning to each purpose its separable costs and a share of the residual or remaining joint costs in proportion to the remaining benefits.

5-3

- . The average annual (updated to current dollars) O&M costs for the existing project prior to construction;
- . The estimated incremental O&M costs (total estimated less average for existing project); and
- . Allocation of incremental costs based on the final (best estimate) project costs.

# COST APPORTIONMENT

As mentioned previously, cost apportionment refers to the division of project costs between the Federal government and the participating non-Federal entities. Cost allocation is the necessary first step to cost apportionment as costs allocated to the various purposes are shared in different proportions according to applicable Federal laws. Under current policies, the apportionment of costs between the Federal government and the non-Federal sponsor differs for the construction costs and the operation and maintenance (O&M). Both methodologies are summarized in the following paragraphs.

PROJECT COST APPORTIONMENT. Apportionment between Federal and non-Federal interest followed the allocation of project cost. This included a water supply opportunity cost. Rules for this apportionment are presented below. These are based on current policies.

#### a. WATER SUPPLY

- . Non-Federal 100% of the construction costs allocated by the SC-RB method to water supply.
- . Non-Federal 50% of the remaining benefits for water supply. The remaining benefits for water supply are defined as the cost of the most likely least costly alternative (Aquashicola and Trexler projects) to be considered by the local sponsor in lieu of the Walter Modification less the cost of the Modification of Walter attributed (allocated) to water supply.

b. FLOOD CONTROL

- . Federal 65% of the construction costs as allocated by the SC-RB analysis.
- . Non-Federal 35% of the new construction costs as allocated by SC-RB analysis.

### c. RECREATION

. Federal - 50% of the specific and allocated joint costs. . Non-Federal - 50% of specific and allocated joint costs.

LS + A + B + C A' + B' + C' + EP

- LS = Local share of costs for existing project; in this case equals zero.
- A, B, C = The non-Federal apportionment of items a, b, and c, as described in the preceding paragraph.
- A', B', C' = The Non-Federal share of only the new construction costs (i.e., 50% of the remaining benefits for water supply are excluded) of items a, b, and c of the preceding paragraphs.

EP = Total actual cost of the existing project.

O&M COST APPORTIONMENT. All O&M costs attributed to water supply and recreation are totally (100%) a non-Federal responsibility and reimbursable to the Federal Government. This includes both separable and allocated costs. In practice, there should be no reimbursement transactions for separable recreation costs since normally the non-Federal sponsor performs the actual operation and maintenance of all (specific) recreation facilities. As for the existing project, the O&M costs attributed to flood control are a Federal responsibility.

#### REIMBURSEMENT

The reimbursement for water supply, recreation and flood control project costs assigned to the non-Federal sponsor are to be paid during construction. The opportunity cost (50% of the remaining water supply benefits) are to be paid within a period not to exceed 25 years from completion of the modification. In comparison, under the Water Supply act of 1958 the pay back would have been required to begin when the water was first used and be completed within the project life; which can exceed 50 years.

# SUMMARY AND COMPARISON

The estimated allocation and apportionment of project construction, opportunity and O&M costs are presented in Table 5-1. This is based on a current estimate of \$112,800,000 for development of the Modification and a waiver from the requirement for opportunity cost reimbursement.<sup>1/</sup> The allocation and apportionment of the estimated project costs as they would have been distributed as authorized and under policies at the initiation of the AE&D in 1981 are compared in Table 5-2 to the distribution under current policies and compared at the "grandfathered" interest rate and the projected rate for Fiscal Year 1986. The AE&D will be completed and ready to initiate construction in 1986. As long as the allocation of storage did not change, the percentage prescribed in House Document 522 which was authorized by the Federal Flood Control Act of 1962 (PL 87-874) was to have been used to implement the project.

1/ The requirement for a cost reimbursement of 50% Opportunity Benefits has been waivered for the project in a (DAEN-CWP-G) letter dated 28 May 1985, subject: "Cost Sharing and Financing for the Modification of the Francis E. Walter Dam, Pennsylvania".

# TABLE 5-1 ALLOCATION AND APPORTIONMENT OF COSTS FOR WALTER MODIFICATION

	Construction & Opportunity Costs / 2/	Operati Mainten Cost:	on & ance s
		Percentage	Total Cost
Water Supply Cost Allocation			
((% of Total))	$((78.1\% \frac{4}{1}))$	((14.8%))	
Non-Federal (100%)	\$88,100,000	100%	\$ 80,000
Federal (0%)	0	0	0
Water Supply-Allocation of 50% of Remaining Water Supply Benefit:	S		
Non-Federal (100%)	\$ <u>6</u> /	0	0
Federal (0%)	0	0	0
Flood Control Allocation	((3.7%))	((65,5%))	
Non-Federal (35%)	0	0	0
Federal (65%)	\$4,200,000	100	\$354,000
Recreation Allocation			
((% of Total))	((18.2%))	((19.7%))	
Non-Federal (50%)	\$10,250,000	100	\$106,000
Federal (50%)	\$10,250,000	0	
Total Cost Allocation Before Limitation	5,		
Non-Federal	\$129,800,000		\$271,000
Federal	\$12,950,000		\$279,000
Limitation of Non-Federal Share $\frac{5}{4}$	<u>7</u> /		
Total Cost Allocation (Limited)			
Non-Federal	\$ 98,350,000		\$186,000
Federal	\$ 14,450,000		\$354,000
1/ Initial Project Construction Cost - 3 2/ Interest during construction is not n 3/ Percentages for Non-Federal, Federal Policy. 4/ Rounded. 5/ Formulas include a ceiling on non-Federal	\$112,800,000. required for financing during are based on current Corps C	construction. ost Allocation	
opportunity cost. $\frac{6}{7}$ , The rquirement for opportunity costs	have been waivered for this	project.	

 $\frac{7}{2}$  With waiver, limitation does not apply.

# IMPLEMENTATION ARRANGEMENTS

The Walter Modification has been supported by the Delaware River Basin Commission (DRBC) as part of its Comprehensive Plan since the project was authorized in 1962. The commission as sponsor requested the AE&D and construction of the project. Appropriate letters of intent have been provided and the appropriate contracts between the Federal Government and DRBC are being negotiated. These contracts will include provisions for both new project purposes (water supply and recreation) for which the DRBC will be responsible as the non-Federal sponsor.

The DRBC has assumed complete sponsorship for the project. This will result in more efficient financing and implementation of the project and for the non-Federal operation and maintenance responsibilities. This arrangement also results in greater efficiency and savings in obtaining and administering financing (i.e. bonds). The DRBC has formed a finance committee specifically for resolving and obtaining financing for this project. Their goal is to have the financing in place by Federal Fiscal Year 1986.

Orginally the project and subsequent contract was assumed to reflect a division of total water supply storage costs in general accordance with the Water Supply Act of 1958, as amended. The act permits the designation of present and future storage needs, with repayment of costs allocated to present storage needs to begin when the project is first operational for water supply storage. Costs allocated to future storage would begin when use is first made of such storage. Costs allocated to future storage would begin when use is first made of such storage, with an interest free period of up to 10 years, as outlined in the Water Supply Act of 1958. Payments were also expected to be made over a 50-year period. For the present contract, all storage is designated as present and the non-Federal cost sharing for construction is to be paid during costruction.

5-8

# TABLE 5-2 COMPARISON ALLOCATION AND APPORTIONMENT PROJECT COSTS OF WALTER MODIFICATION (\$ million) $\frac{1}{2}$ $\frac{2}{3}$ $\frac{4}{3}$

	HD 52	22	AE&D Init	tiation	Current	Guidance	Current	Guidance
	Straight Pe	rcentage	<u>e 3 1</u>	4%	e3	1/4%	<u>e o</u>	5/07
Water Supply								
Non-Federal	100% 5/	\$76.4 6/	100%	\$89.9	100%	\$ 88.1	100%	\$104.6
Federal	0 -	0 <u>6</u> /	0%	0	0%	0	0%	0
Water Supply								
Remaining Water Supply Benefits								
Non-Federal	0	0 6/	0	0	50%	9/	50 <b>%</b>	9/
Federal	0	$0 \overline{\underline{6}}$	0	0	0	ō	0	ō
Flood Control								
Non-Federal	0	0 6/	0	0	0	0	0	0
Federal	100%	29.5 <u>6</u> /	100%	0	100%	4.2	100%	0.1
Recreation								
Non-Federal	0	67	50 <b>%</b>	11.4	50 <b>%</b>	10.25	50 <b>%</b>	4.05
Federal	100%	6.9 <u>6</u> /	50 <b>%</b>	11.4	50 <b>%</b>	10.25	50%	4.05
Total Cost Allocation Before Limitation	1							
Non-Federal	67.8%	\$76.4	N/A	\$101.3	N/A	\$ 98.350	N/A	\$108.65
Federal	32.2%	\$36.4	N/A	\$ 11.4	N/A	\$ 14.45	N/A	\$ 4.15
Limitation of non-Federal share	N/A	N/A	N/A	N/A	N/A	<u>7</u> /	N/A	<u>7</u> /

1/ Initial Project Construction Cost - \$112,800,000.

2/ Interest during construction and operation and maintenance not included. Assumed payments made during construction.

<u>3/</u> 4/ Percentages for Non-Federal, Federal based on current Corps Cost allocation Policy.

Costs may not add due to rounding.

<u>5</u>/ House Document 522 developed "Supplies of Water" which did not breakdown the categories but reserved that to the more advanced future studies prior to initiation of construction of the projects, individually.

The final cost sharing (percentages) was prescribed in the authorization. 6/

 $\overline{\underline{7}}$ / Requirement for reimbursement was waivered for this project; therefore, not applicable.

The draft provisions for the recreation portions of the contract follow the general format for contracts negotiated under the authority of the Federal Water Project Recreation Act of 1965. The draft recreation provisions specify the DRBC's repayment responsibilities for 50 percent of the investment cost and 100 percent of the operation and maintenance cost associated with the recreation facilities. It is important to note, however, that this draft contract deviates from the standard practice in one important aspect. At this time, DRBC will be assuming sponsorship for recreation and the responsibility for operation and maintenance of recreational activities. In the past, this has normally been the role of the Commonwealth of Pennsylvania for similar-type projects in Pennsylvania.

Following coordination of the draft General Design Memorandum (GDM) and draft Environmental Impact Statement (EIS), the letter-of-intent with accompanying draft contract will be required from DRBC. The final GDM and EIS accompanied with the draft contract will then be submitted to higher authority for approval. This will include further coordination with other Federal and state agencies. The detailed engineering and design and plans and specifications would be prepared. A final contract would then have to be consummated with the DRBC before actual construction could begin. It is estimated that the advanced engineering and design phase would take about 1-1/2 years followed by about 6 years for construction. Assuming the above process of review, approval, funding, design, and construction progresses in a timely manner with no major delays, the modified project could be operational in 1992.

5-10

# 6. ENVIRONMENTAL IMPACT STATEMENT

#### FINAL

ENVIRONMENTAL IMPACT STATEMENT FRANCIS E. WALTER DAM MODIFICATION MONROE, CARBON, AND LUZERNE COUNTIES PENNSYLVANIA

**RESPONSIBLE AGENCY:** 

U.S. Army Corps of Engineers Philadelphia District

PROPOSED ACTION:

Francis E. Walter Dam Modifications Monroe, Carbon, and Luzerne Counties, Pennsylvania Draft Environmental Impact Statement

# FOR FURTHER INFORMATION CONTACT:

Mr. J. Jeffrey Radley U.S. Army Corps of Engineers Philadelphia District Custom House 2nd & Chestnut Sts. Philadelphia, PA 19106 Tel: (215) 597-4833

# ABSTRACT:

The Corps of Engineer's report, Comprehensive Survey of the Water Resources of the Delaware River Basin (1962), recommended the modification of Francis E. Walter Dam as part of its plan for meeting the flood control, water supply, and other water resource needs of the Delaware River Basin. The Delaware River Basin Commission's (DRBC) Comprehensive Plan for water resources, which was originally based on the Corp's plan, was updated in 1981 and confirms the recommendation of the modification of Walter Dam as a cost effective and least environmentally impacting alternative. Prior to the completion of the DRBC's reevaluation, the states of New Jersey, Delaware, Pennsylvania, New York, and the City of New York started discussions on the proper management of Basin water resources. Known as the "Good Faith Negotiations", these discussions confirmed the need for the modification of Walter Dam - placing a priority on its construction. The DRBC, therefore, requested that the Federal Government direct the Corps of Engineers to conduct preconstruction planning and engineering studies on the modification.

The proposed modification plan includes expanding the existing flood control project to create a 70,000 acre-feet capacity long-term storage pool. Under the plan, flood control capabilities of the project would be maintained. The plan also includes development of recreation facilities.

i

This Environmental Impact Statement presents the assessment of environmental impacts of the proposed modification on the environment. Mitigation plans to reduce adverse environmental impacts are described.

# FINAL ENVIRONMENTAL IMPACT STATEMENT FRANCIS E. WALTER DAM MODIFICATION MONROE, CARBON, AND LUZERNE COUNTIES PENNSYLVANIA

# TABLE OF CONTENTS

			Page		
	VI	TAE AND ABSTRACT	i		
	TAI	BLE OF CONTENTS	iii		
I.	SUN	MARY			
	A.	Major Conclusions & Findings	EIS-1		
	в.	Areas of Controversy and Unresolved Issues	EIS-2		
		<ol> <li>Minimum Releases</li> <li>Habitat Impact</li> <li>Recreation</li> <li>Cultural Resources</li> <li>General</li> </ol>	EIS-2 EIS-3 EIS-3 EIS-4 EIS-4		
	с.	Relationship to Environmental Protection Statutes and Other Environmental Requirements	EIS-4		
II.	NEED FOR AND OBJECTIVE OF ACTION				
	A.	Study Authority and Scope	EIS-7		
	в.	Public Concerns	EIS-7		
	с.	Planning Objectives	EIS-8		
III.	ALT	TERNATIVES			
	Α.	Plans Considered in Formulation of Project Modification	EIS-9		
		<ol> <li>No Action Alternative</li> <li>Other Structural and Non-Structural Measures</li> <li>Variations in Sizing the Impoundment</li> <li>Environmental Protection Alternatives</li> <li>Hydropower as a Project Purpose</li> </ol>	EIS-9 EIS-10 EIS-10 EIS-14 EIS-15		
	в.	Selected Plan	EIS-15		
		<ol> <li>Description of Proposed Modifications</li> <li>Construction Sequence</li> </ol>	EIS-15 EIS-16		

# TABLE OF CONTENTS (Continued)

			Page				
	C.	Alternative Actions Which Avoid One or More Environmental Impacts	EIS-16				
IV.	AFF	FECTED ENVIRONMENT - SIGNIFICANT PROJECT AREA RESOURCES	EIS-19				
	A.	A. Geology and Soils					
		<ol> <li>Physiography and Geology</li> <li>Soils</li> </ol>	EIS-19 EIS-19				
	в.	Hydrology	EIS-20				
		1. Surface Water 2. Groundwater	EIS-20 EIS-20				
	с.	Water Quality	EIS-20				
	D.	Aquatic Ecology	EIS-21				
	E.	Terrestrial Ecology	EIS-21				
	F.	Land Use	EIS-22				
	G.	. Cultural Resources					
	н.	Socio-Economics	EIS-25				
	I.	Transportation Network	EIS-25				
	J,	Health and Community Services	EIS-26				
	ĸ.	Recreation	EIS-27				
	L.	Aesthetics	EIS-27				
	М.	Air Quality	EIS-28				
v.	ENVIRONMENTAL EFFECTS						
	A.	Authorized Plan - Impacts on Project Area	EIS-29				
		<ol> <li>Geology and Soils</li> <li>Surface Water</li> <li>Groundwater</li> <li>Terrestrial and Aquatic Ecology</li> <li>Land Use</li> <li>Cultural Resources</li> <li>1 Historic Resources</li> <li>2 Archaeological/Prehistoric Resources</li> <li>Speio-Economic</li> </ol>	EIS-29 EIS-30 EIS-32 EIS-33 EIS-40 EIS-41 EIS-41 EIS-42 EIS-42				

# TABLE OF CONTENTS (Continued)

		Page
	<ol> <li>8. Transportation Network</li> <li>9. Health and Community Services</li> <li>10. Recreation</li> <li>11. Aesthetics</li> <li>12. Air Quality and Noise</li> </ol>	EIS-45 EIS-47 EIS-47 EIS-50 EIS-51
	B. Relationship Between Local Short-Term Uses of the Environment and Long Term Productivity	EIS-51
	C. Irreversible or Irretrievable Commitment of Resources	EIS-51
	D. Evaluation of Potential Environmental Impacts (Brief Write-up and Table)	EIS-52
VI.	LIST OF PREPARERS	EIS-56
VII.	PUBLIC INVOLVEMENT	EIS-58
	A. Public Involvement Program	EIS-58
	B. Required Coordination	EIS-59
	C. Public Views and References	EIS-61
VIII.	EVALUATION OF 404(b)(1) GUIDELINES	EIS-62
IX.	FINDINGS OF COMPLIANCE	EIS-67
x	REFERENCES LIST OF TABLES	EIS-68
		Page
1	Compliance with Environmental Quality Protection Statutes and Other Environmental Review Requirements	EIS-6
2	Summary of Screening Process for the Bear Creek Road Alternatives	EIS-18
3	Summary of Habitat Units at Francis E. Walter Reservoir Project	EIS-37
4	Comparative Impacts Summary of Road Realignment Alternatives	EIS-48
5	Significant Environmental Quality Effects	EIS-53
6	Effects of the Recommended Plan on Natural and Cultural Resources	EIS-55
7	Section 404(b)(1) Evaluation	EIS-63

# LIST OF FIGURES

		rage
1	Bear Creek Road Realignment Alternatives	E1S-12
2	Terrestrial Habitat Types	EIS-23
3	Clearing Plan Reservoir Pool	EIS-34
4	HEP Team Wildlife Mitigation Analysis, F.E. Walter Dam (Modified)	EIS-39
5	Cultural Resources	EIS-43
6	Two-Stage Recreation Plan	EIS-49

# A. Major Conclusions and Findings

The modification of the Francis E. Walter Dam was one of 8 projects recommended for Federal implementation in the Corps of Engineers report on a <u>Comprehensive Survey of the Water Resources of the Delaware River Basin</u> for improvements for flood control, water supply, and other purposes. The report was authorized by the Federal Flood Control Act of 1962 (Public Law 87-874).

The Delaware River Basin Commission (DRBC) has reevaluated its Comprehensive Plan for the Delaware River Basin. Its Comprehensive Plan was basically an updated version of the plan presented in the Corps' 1962 "Comprehensive Study". This DRBC effort, known as the "Level B" Study, was completed in May 1981. The Level B Study reviewed all solutions to problems involving both the conservation and use of water supplies and water-related resources and provided the basis for updating the Delaware River Basin Commission's Comprehensive Plan; prepared an Environmental Impact Statement for the Level B Study's Preferred Plan; and considered federal and state environmental laws and resource plans.

In accordance with the Water Resources Council's "Principles and Standards for Planning Water and Related Land resources," three final alternative plans were developed, National Economic Development (NED), Environmental Quality (EQ) and Mixed Objectives.

The Francis E. Walter Modification is included in all of the three final alternative plans. It is identified as having the least environmental impact of potential projects supplying water and also one of the lower capital costs per cubic feet per second (cfs) of net yield. The Level B Study culminated with the recommendation for adopting the mixed objectives alternative as the "Preferred" plan. These reports are incorporated by reference in accordance with the tiering concept for environmental documents.

Engineering studies have confirmed that 70,197 acre-feet of long-term storage could be accommodated by modification of the existing Francis E. Walter Dam and Reservoir. The modification plan entails raising the top of the dam from 1474 to 1504 feet elevation NGVD; construction of a new spillway at elevation 1482 feet NGVD; and construction of 2,900 feet of new dikes and extension of 1,700 feet of existing dikes. A new intake tower with a selective withdrawal system is proposed for construction. Expansion of existing recreational facilities is called for, ultimately including facilities for winter sports activities, horseback riding, primitive camping, hiking, boating, fishing and picnicking. The final design may include changes in the new tower to accommodate run-of-river hydroelectric power in the future if plans to build a hydropower plant are approved.

Environmental impacts on the environment were assessed and measures to mitigate adverse impact were developed. Creation of the larger reservoir pool will create a thermally stratified reservoir. In order to protect downstream Lehigh River water quality a selective withdrawal tower is included in the modification plans. The tower will mix waters from the upper and lower layers to moderate temperature and dissolved oxygen concentrations in the discharge waters. The minimum release from the reservoir will be increased from 50 to 63 cubic feet per second to comply with Commonwealth of Pennsylvania regulations. This will protect downstream water quality and aquatic habitat during low flow periods.

The expanded reservoir pool will accommodate an excellent fishery and provide improved habitat for fish. The selective clearing plan for the reservoir provides for a shallow water fishery habitat zone in the reservoir. Overall, the enlargement of the reservoir will benefit fish and waterfowl. There will be a loss of terrestrial wildlife habitat including a loss of 601 acres of Deciduous Forest and 586 acres of transitional vegetation habitats. Adverse effects to terrestrial wildlife can be fully mitigated by implementing recommended habitat improvements on lands adjacent to the reservoir.

Vegetation communities and land forms in the project area are sensitive to disturbance. Construction activities must be confined to specified areas to avoid unnecessary disturbance to forested areas. Restoration procedures have been developed to mitigate construction impacts.

Several cultural resource sites have been identified that may be affected by the proposed Francis E. Walter Dam modification. Detailed investigation of the sites will be completed prior to inundation as part of the modification plan. If warranted, cultural resources will be recovered from these sites and may be displayed for interpretive purposes.

Increased demand for fire and police protection is anticipated due to an increase in recreational users. Arrangements with the local fire and police departments may be required.

The modified project may cause an increase in property values of surrounding lands. Some increase in residential development may be induced by the project with corresponding increases in municipal services demands. Land purchase requirements of the Modification Plan will result in reduced tax revenues for affected municipalities. However, this is expected to be totally offset by State payments to the communities from federal funds provided for tax compensation purposes, and from induced revenue to the local economy from the project.

B. Areas of Controversy and Unresolved Issues

#### 1. Minimum Release

The subject of the minimum flow release from the modified project surfaced as an area of controversy between several government agencies. Corps studies propose a minimum release of 63 cubic feet per second. The Pennsylvania Department of Environmental Resources concurs with this proposal. The U.S. Fish and Wildlife Service and the Pennsylvania Fish Commission have recommended higher releases to enhance the downstream fishery. Higher release levels proposed by the Fish Commission and the Fish and Wildlife Service would require a new sponsor for water storage specifically intended for downstream fishery enhancement. The storage releases require for the higher minimum release rate could seriously compromise the principal purpose of the modification, which is to provide water storage for flow augmentation needed to repulse salinity in the Delaware Estuary.

# 2. Habitat Impacts

In order to assess the anticipated fish and wildlife habitat impacts from the modification, and to develop a mitigation plan for the terrestrial losses, a Pennsylvania Modified Habitat Evaluation Procedure (PAMHEP) was performed. The PAMHEP participants were representatives from the Corps, the U.S. Fish and Wildlife Service, the Pennsylvania Game Commission, and the Pennsylvania Fish Commission. The result was the development of a preliminary plan to mitigate terrestrial habitat impacts that would result from the project.

The mitigation plan, however, has since been modified because, through the recommendations of the PAMHEP team the new dike and section of Bear Creek Road were realigned further to minimize wetland impacts. During a final review conducted after completion of the initial PAMHEP study, the team discovered that the originally-selected alignment (Over-the-hill-A) would impact wetlands both near the dike alignment and near the summit. Through coordination with the PAMHEP teams, the Corps developed 3 alternatives to the original Over-the-Hill alignment so that the wetland impacts resulting from the road realignment would be avoided.

The dike alignment was shifted so that, at the expense of the open water snag pond, the impacts to the more valuable forested wetland on the opposite side of the dike would be avoided. This change resulted in the mitigation recommendations by the PAMHEP team that an acreage equivalent to that lost in the snag pond be excavated adjacent to the pond. The result would be that the pond's configurations would change but the surface acreage would remain the same. The wetlands at the summit have been avoided. Similar modification in the project plans that require concomittant changes in the mitigation plan will be coordinated with the PAMHEP team.

During construction of the project, it will be necessary to reduce the existing lake level to the run-of-river condition which existed in this portion of the Lehigh River prior to placement of the original dam. The warm water fishery in the present pool will be mostly lost downstream. Upstream cold water trout fisheries, presently outside the existing lake level, will be unaffected. A mitigation plan for clearing the proposed reservoir has been formulated, as part of the PAMHEP investigation. The plan designates that vegetation be retained within the new pool for fishery habitat. This plan is expected to result in a more productive and manageable fishery in the new stabilized lake than presently exists.

# 3. Recreation

Recreation facility selection and design concepts are based on retention of the passive, scenic and sensitive qualities of the site and to address present public uses which are combatible with that precept. Location of the facilities was determined by terrain restraints and an attempt to provide even distribution for uncongested quality usage.

The issue of recreation has been divided in the local communities surrounding the project. The issue locally, is almost geographic. One side of the project is opposed to the project and is concerned with the increased activity generated by recreation; especially, vehicular traffic. The other side is a proponent of the project and would like recreation expanded. As far as physically practical, the recreation concepts have been changed to reflect their respective desires. The selected recreational development concept is a compromise two-stage plan which reduces or eliminates those problems while continuing to meet design and environmental criteria.

### 4. Cultural Resources

Potential temporary inundation of locally historic structures in the Stoddartsville area has been recognized. While potential inundation would not be excessive or of long-term, alternative protective measures considered included structural flood proofing, dikes, building relocation and documented demolition. The selected alternative provides the local association the opportunity of relocating the building within the environs of other unaffected associated structures.

Archeological continuity investigations are focusing on potential sites which will be inundated by the new pool. Findings to date indicate that some sites identified as having significant potential have been unproductive or are of little more than interesting links in an emerging pattern of highly mobile and intermittent migratory usage by early inhabitants. Sites within the proposed lake will be investigated during construction prior to filling the lake. The remaining sites can be investigated in post-construction years.

# 5. General

The highly scenic falls at Stoddartsville, on the Lehigh River, will remain unaffected by the new pool. Infrequent flood pool evevations will temporarily cover those rapids. Scenic rapids along Bear Creek, known locally as Kanar Falls, will be partially inundated by the new pool. The present rapids effect will be reduced. The aesthetic resources of the area will be partially compromised.

Buttermilk Falls which are higher falls along a tributary entering Bear Creek farther upstream, will not be affected by the modification.

Shorelines exposed by existing pool drawdown during construction, or as a result of new pool fluctuations, will be unattractive, could be dangerous to hikers, and potential mosquito breeding sites. The nature of soils at the Walter site indicate that, if well drained, they will quickly dry and be firm underfoot. The unattractiveness of the bare areas will be of short-term, eventually hidden beneath the new pool. Fluctuations will be minimal and of short-term. The size of the lake will better absorb and minimize the affects of the more frequent smaller releases

C. Relationship to Environmental Protection and Other Environmental Requirements

Table 1 indicates the status of the proposed Modification of the Francis E. Walter Dam and Reservoir with respect to federal, state, and local environmental protection requirements.

Full compliance with environmental quality protection statutes and other environmental review requirements will be met with distribution of this Environmental Impact Statement for review and possible comment, except for the following cases.

- 1. Full compliance with the National Environmental Policy Act will be achieved after circulation of this Final Environmental Impact Statement and completion of a Record of Decision Statement.
- 2. Full compliance with archaeological-historic preservation statutes will be achieved through investigation of the potential sites prior to inundation. Any culturally significant resources encountered will be recovered in accordance with federal requirements.
- 3. Fish and Wildlife Coordination Act compliance will be met upon receipt of a final Fish and Wildlife Coordination Act (2b) report prior to completion of the Record of Decision.

# Table 1

# COMPLIANCE WITH ENVIRONMENTAL QUALITY PROTECTION STATUTES AND OTHER ENVIRONMENTAL REVIEW REQUIREMENTS

Archaeological-Historic Preservation Acts	Full	Compliance
Clean Air Act		N/A
Clean Water Act	Full	Compliance
Coastal Zone Management Act		N/A
Endangered Species Act	Full	Compliance
Estuary Protection Act		N/A
Fish and Wildlife Coordination Act	Full	Compliance
Marine Protection Research and Sanctuaries Act		N/A
National Environmental Policy Act	Full	Compliance
River and Harbor Act		N/A
Watershed Protection and Flood Prevention Act	Full	Compliance
Wild and Scenic Rivers Act		N/A
EO 11988, Floodplain Management	Full	Compliance
EO 11990, Protection of Wetlands	Full	Compliance
Delaware River Basin Comprehensive Management Plan	Full	Compliance
Pennsylvania Dam Safety and Encroachments Act	Full	Compliance
Pennsylvania Department of Transportation Act No. 120	Full	Compliance
Luzerne County Comprehensive Development Plan	Full	Compliance
Carbon County Comprehensive Development Plan	Full	Compliance

EO - Executive Order

N/A - Not Applicable

EIS-6

# SECTION II

# NEED FOR AND OBJECTIVE OF ACTION

#### A. STUDY AUTHORITY AND SCOPE

Congressional authority for construction of the existing Francis E. Walter Dam (formerly Bear Creek Reservoir) is contained specifically in Section 10 of the Flood Control Act of 1946 (Public Law No. S-26-79, 2nd Session). The purpose of the original project was for flood protection along the Lehigh River, Pennsylvania. The existing dam was completed in 1961. Secondary recreational uses have been developed since 1961 by the Corps. Refer to Section 1 of the main report for further discussion of project location and authorization.

The Corps of Engineers report, <u>Comprehensive Survey of the Water Resources of</u> the Delaware River Basin, recommended improvements for flood control, water supply, and other purposes and was adopted in August 1962 (House Document 522-87-2). The study recommended that 19 major control projects and 39 small control projects be adopted. Eight of the 19 major projects recommended for construction were authorized by the Federal Flood Control Act of 1962 (Public Law 87-874). One of the eight projects is the modification of Francis E. Walter Dam and Reservoir to provide water storage for augmentation of low flows in the Delaware River.

The Delaware River Basin Commission (DRBC) was created in late 1961 with the adoption of the Delaware River Basin Compact by the states of Pennsylvania, New York, New Jersey, and Delaware and the Federal government. On March 28, 1962 the DRBC adopted a Comprehensive Plan that was basically an update of the Corps' 1962 "Comprehensive Study".

In response to changed conditions affecting the Comprehensive Plan, the DRBC performed the Level B study, to reevaluate that plan for the Delaware River Basin. This study was completed in 1981. The study provided a basis for the coordination of plans by federal, state, and local governments and the private sector. It also provided the basis for updating the Delaware River Basin Commission's Comprehensive Plan; included an Environmental Impact Statement for the Level B Study's Preferred Plan; and considered federal and state environmental laws and resource plans.

The three alternatives developed in the Level B study and the preferred alternative include recommendation of modification of the Francis E. Walter Dam. The purpose of the modification proposal is to add water supply and recreation to the existing flood control project. Refer to Section 1 of the main report and Appendix A (Study Area) and Appendix B (Formulation) for further discussion of focus on modification of the F.E. Walter Dam.

# B. PUBLIC CONCERNS

Public involvement in the Walter Dam modification planning process has included information bulletins and newsletters; workshop and explanatory forums; meetings with local governmental agencies, including those at both county and township level; various local planning agencies; organizations and individuals; and the circulation of the Draft Environmental Impact Statement and General Design Memorandum for review and comment. State and Federal agency coordination is incorporated into the appropriate environmental discussions related to agency interest. A complete background of problem array, coordination efforts, cooperation, may be found in Sections 2, 3, and 7, and Supplement a of the main report.

# C. PLANNING OBJECTIVES

The modification of the Francis E. Walter Dam is proposed to provide flow maintenance for consumptive use makeup for the Delaware River Basin during drought periods. The modified project, as proposed, will have the capacity to supply 264 cubic feet per second (cfs) of flow augmentation. This objective will be accomplished by increasing the available storage capacity of the reservoir by approximately 70,000 acre feet.

The Francis E. Walter Dam currently provides temporary storage of flood waters for the protection of the Lehigh River Valley downstream of the dam. This flood control capability will remain unchanged.

Recreation facilities are proposed to accomodate compatible public use of the larger reservoir pool that would be created by the project and to permit use of federal lands surrounding the reservoir currently owned and proposed for purchase. The recreation facilities are proposed to preserve and enhance the aesthetic and natural resources and sensitive environmental posture of the area.

The proposed outlet and recreation facilities have been designed to accommodate hydropower if it is added as a project purpose in the future. The design of the modification assumes that hydropower plans will not result in significant changes in storage allocation or project design.

No facilities integral to the modified project are provided for the withdrawal, or conveyance of the stored water for municipal and industrial (M&I) water supply purposes. At this time, no releases have been identified for such purposes.

Refer to Sections 2 and 3 of the main report and Book 2, Appendix D (Formulation) for further details regarding plan objectives.

# SECTION III

#### ALTERNATIVES

# A. PLANS CONSIDERED IN FORMULATION OF PROJECT MODIFICATION

Alternatives to the modification of F.E. Walter Dam are discussed in the Environmental Impact Statement produced as a result of the DRBC Level B studies; the subsequent "Good Faith Negotiations"; and the 1983 Comprehensive Plan for the Delaware River Basin. Integral to that final plan is the modification of F.E. Walter Dam. The reports cited are incorporated by reference in accordance with the tiering concept for environmental documents set forth in part 1508.28 of the CEQ Guidelines implementing the National Environmental Policy Act. See also Section 1 of the Main Report and Book 2, Appendices A and D.

The modification plan authorized by the Federal Flood Control Act of 1962 set certain developmental goals which required reevaluation due to the passage of time and possible changes in needs. That reevaluation produced an array of modification alternatives as outlined below.

- 1. No action.
- 2. Other structural and non-structural measures.
- 3. Variations in sizing the impoundment;
  - a. Major structural element sizing dam, spillway, outlet works
  - b. Relocations access and peripheral roads
  - c. Volume of water released from reservoir.
- 4. Environmental Protection Alternatives fishery, wildlife, construction philosophy, cultural resources, aesthetic resources, socio-economic compatibility, and recreation development levels.
- 5. Compatibility with possible future hydropower by others.

Each of these alternatives are discussed in detail in Section 3 of the main report and Book 2, Appendix D (Formulation). A resume' of those discussions including emphasized environmental considerations in each category follows.

1. No Action Alternative

This alternative entails maintaining the existing project. No flow maintenance would be provided in the Delaware Estuary; no raising of the dam and permanent pool elevation would be performed. An improved warm water fishery in the larger pool would not be possible. Clearing of 290 acres of existing forested area would not be required for the permanent pool.

Recreation facilities would not be expanded at the reservoir. The opportunity to meet some regional recreational demand goals would be lost.

The minimum release from the reservoir would be maintained at 50 cfs. Dilution of acid mine drainage in the Lehigh River, prevention of sedimentation and protection of aquatic habitat during low flow/drought periods would not be afforded through low flow augmentation and increased minimum releases.

Under the no-action alternative the benefits derived by low flow augmentation would not be realized. The DRBC established interim and ultimate salinity standards for the Delaware River at Trenton in order to protect the quality of the Potomac-Raritan-Magothy water supply aquifer in Southern New Jersey. The salinity standards also provide some protection for industrial users of the Delaware River and protection of the Philadelphia Torresdale water supply intake.

Based on the results of hydrological investigations and projected water demands, the no-action alternative would result in significant adverse socioeconomic impacts within the Delaware River Basin.

### 2. Non-structural Alternatives

The primary non-structural methods for providing the needed water in the Delaware River Basin are groundwater pumping; interconnections of existing municipal and utility sources, treatment plant and distribution systems; and conservation measures.

The Level B Study, includes an analysis of the potential for use of groundwater contained in glacial drift deposits to augment river flows. It was found that approximately 108 square miles of "highly productive" glacial deposits could yield as much as 1220 cfs. However, additional studies are needed to determine the feasibility and environmental consequences of such a plan.

Interconnections are planned and others are being considered by the states, utilities, and local communities. This will insure full flexibility and utilization of existing sources in the Basin in dealing with local droughts and emergencies.

Conservation measures can reduce in-basin depletive uses and out of basin exports which in turn reduce the need for water storage. The DRBC Level B Study developed and analyzed alternative conservation strategies. In addition, groundwater pricing could be employed as a means of controlling water usage. It may prove advantageous to develop municipal and industrial rate structures that would take advantage of the flexibility of some water uses in response to pricing.

A goal of 15 percent reduction of depletive uses during critical drought periods and development of interconnections are included in the DRBC Comprehensive Plan. The required implementation schedule for the F.E. Walter Dam, to achieve the year 2000 salinity standard at Trenton assumes that the conservation goals and interconnections will be achieved in addition to the four structural projects which include the modification of Walter Dam.

- 3. Variations in Sizing the Impoundment
  - a. The existing F.E. Walter Reservoir provides 107,915 acre-feet & storage for flood control in the Lehigh River basin. An ditional sediment reserve storage of 1,793 acre-feet is also

provided. The proposed modification includes an equivalent flood storage capacity of 107,745 acre-feet, 3,183 acre-feet of sediment reserve, and 70,197 acre-feet of storage for low flow augmentation. Section 3 in the Main Report presents a detailed analysis of the formulation of the Walter Dam project.

The additional 70,000 acre-feet for water supply storage is provided by raising the existing dam; thereby, increasing the available storage within the reservoir. Since flood control capability of the dam is to remain unchanged, the increased reservoir necessitates also raising the spillway. A new spillway is therefore required to maintain proper spillway frequency and discharge capacity. The existing intake tower requires modifications or replacement to accommodate the increased reservoir elevation and selective withdrawal capability in order to maintain downstream temperatures and quality. A dike is provided in one low area in order to contain the increased reservoir during flood stages.

The spillway and dam modification selection process included investigating four methods for raising the dam, three separate spillway locations, three types of spillways, two outlet structure modifications, and dikes. Where more than one scheme for modifying a component is considered, advantages and disadvantages of the schemes, including a cost comparison, is used to determine the selected scheme.

Some flexibility within the framework of engineering considerations is available for each component however, each component is designed to accommodate the function of all other components. Detailed descriptions of each component alternative are in Section 3 of the main report and in Book 2 Appendix D (Formulation). Inherent in the iterative selection process are environmental impact judgements which, when possible, can shape or limit the component. An example being the location and size of the outlet works and spillway cuts to reduce aesthetic intrusion, removal of forest cover and fishery effects downstream. The result of these individual decisions determines the pool elevations which most effectively meet the project goals.

b. Bear Creek Road, on the west side of the reservoir, will be partially inundated by the larger pool and will require relocation. Two basic alignments were initially considered: a route following an abandoned railroad bed and a route higher on the adjacent hill called the over-the-hill alignment. Subsequent to the development of these basic routes, 3 alternatives to the over-the-hill alignment were developed to avoid impacts to wetlands (Figure 1).

Cuts required to place a road, meeting state design criteria, on the railroad alignment that would meet state design criteria would produce severe disfigurement of the hillside both above and below the railroad bed. Construction costs would be much greater than the selected alignment. Several routes on the hillside were studied. Difficult terrain conditions, special



EIS-12

wildlife areas, wetland areas, continuity of surface drainage patterns serving downstream bogs and waterways, and weathered rock either constrained or made the alignments difficult. These constraints increased construction costs.

An over-the-hill alignment that avoids wetland impacts was selected as the preferred alternative. Alternative B was removed from further consideration because of Game Commission concerns with wildlife habitat encroachment. The farther west the road is placed, the greater the division of wildlife habitat. The over-the-hill alignment, which was the original preferred alternative, was eliminated because of its direct wetland impacts. Alternative D was dropped from consideration because of the required construction efforts and attendant impacts. Alternative C was selected because it avoids impacts to the wetlands, and has less construction impacts then Alternatives B and D. Refer to Section 4 in the main report and Appendix H in Book 4 for details regarding relocation of Bear Creek Road.

Internal park roads and access road alignment analysis has included preservation of wetlands, maintenance of surface water continuity and avoidance of or meandering through forested areas. Internal roads need not follow State Department of Transportation criteria and therefore can be more sensitive to land features by avoiding extensive cuts and fills and long sight distances needed in higher speed roadways.

c. Inherent in determining the component major structural dimensions and ultimate lake size are extensive hydrologic and hydraulic studies to determine the availability and capacities for storage of water to meet all authorized purposes of the reservoir. Hydrologic analyses were applied to all of the structural iterations noted in paragraph 2a above. One product of those studies is determination of the optimum volume of water to be released under normal day-to-day operating conditions. Environmental considerations included downstream impacts on the fishery and the capacity of the stream bed and banks to contain the flow without erosion. Water temperature and oxygen content are factors which can be managed by multilevel selective outlet portals in the intake tower. An increase in the present minimum volume of water released will help alleviate some detrimental effects of acid mine drainage and sedimentation which become a problem in the Lehigh River during periods of low flow.

There remains a difference in the rate of the minimum flow to be sustained by the new project and minimum flow desired by the Pennsylvania Fish Commission and the U.S. Fish and Wildlife Service for optimal fishery enhancement purposes. Since the projected modification was not requested for fishery enhancement by the project sponsor and no potential sponsor has requested that it be considered, the matter was not considered further. Refer to Sections 2 and 4 in the main report for further discussions. Also refer to supplement a, responses to the U.S. Department of Interior and U.S. Environmental Protection Administration.

# 4. Environmental Protection Alternatives

Project modification will impact environmental elements including the short term impact on lake fishery, wildlife habitat that will be lost through inundation, cultural and aesthetic resources, and socio-economic compatibility in the locale.

- a. Plans to salvage lake fish during the drawdown for construction purpose were found to be infeasible. Mitigation for the loss includes a carefully devised in-lake clearing scheme to provide excellent fishery habitat. Aided by projected increased pool level stability, it is anticipated that the fishery will be greatly improved over the present condition.
- b. The loss of approximately 1150 acres of wildlife habitat can not be avoided. Plans to replace habitat in-kind elsewhere were found to be impractical. A mitigation plan was developed with the use of the Pennsylvania Modified Habitat Evaluation Procedure (PAMHEP). About 170 acres of land will be managed for increased habitat value. Refer to paragraph V-A<sup>4</sup> of this FEIS for a further discussion of PAMHEP.
- c. The locally historic hotel at Stoddartsville will be subject to temporary basement or first floor flooding in the event of maximum flood control pool utilization. Structural floodproofing, protective dikes, elevation of the structure, and relocation plans were all considered. Federal purchase of the properties in fee title with salvage rights of the owner, was found to be the best way to address this situation and satisfy local interest in preserving the structure. This will permit the opportunity for local interests to relocate the buildings within the general environs.
- d. The aesthetic and soils sensitivity of the project area was recognized early in the planning process. The necessity to preserve the terrestrial and landscape elements of the region motivated development of a design and construction philosophy directed at avoidance of those features wherever possible. Intrusions on them, where necessary, were designed in the most delicate way. The results have been changes in concept and design where possible; consideration of construction contract language such as requiring use of non-forested accesses; priority in using borrow areas below the future permanent pool; reclamation of above-pool borrow sources; avoidance of scenic features by roads or recreational structures; and the reduction of clearing forested areas for parking or roads by utilizing existing clearings and meandering roads.
- e. Project compatibility with local socio-economic needs is the result of the iterative coordination with effected interests to find equitable solutions to prospective problems. Traffic result and adjustment of recreational facility locations and espacities have reduced that concern. Discussions regarding

Corps policy in arrangements for various services, such as fire and police, and the partial availability of state funding allocations to compensate for some tax-base loss has reduced that concern. Continuing efforts include flexible postconstruction lake management practices applicable through benefits derived from selective withdrawal ports to control downstream water temperature and oxygen levels and the development of an excellent warm water fishery by habitat control and a stabilized pool.

### 5. Hydropower as a Project Purpose

There are two hydropower efforts involving the Walter Dam site: the "F.E. Walter Hydropower Feasibility Study", by the Borough of Weatherly, PA; and the "Lehigh River Basin Hydro-electric Power Study," by the U.S. Army Corps of Engineers, Philadelphia.

The Borough of Weatherly has reapplied to the Federal Energy Regulatory Commission (FERC) to develop a 5-megawatt run-of-river hydroelectric facility at F.E. Walter Dam. Separate environmental assessment documents would be prepared by FERC to be reviewed in accordance with the National Environmental Policy Act. Should that facility be approved for inclusion at Walter Dam, some design accommodation to outlet works for the modification project would be necessary. Engineering analysis of pertinent systems to accommodate a runof-river hydroelectric facility determined that only minor design alternations to the intake tower would be more efficiently included at this time. These alterations are not costly. Any additional construction required to implement hydropower, such as tunnel renovation, pressure grouting to seal the tunnel, power house, and diversion structure construction can be performed when hydropower is installed.

The Lehigh River Basin Hydroelectric Power Study is a separate investigation of hydroelectric power alternatives throughout the Lehigh River Basin including F.E. Walter Dam. That study, and any other hydropower studies, will be the subject of separate environmental documents which would then have to discuss impacts of any selected hydropower alternative related to F.E. Walter Dam as modified. Refer to Section 3 of the Main Report for a detailed discussion of hydropower.

# B. SELECTED PLAN

# 1. Description of Proposed Modifications

The congressionally authorized modification entails transformation of the existing single purpose flood control project to a multi-purpose project. The plan adds water supply and recreation to the existing flood control project. The level of flood control will remain the same. Long-term water storage will be sufficient to augment June to September Delaware River flows at Trenton during drought periods by 264 cubic feet per second. The proposed modification plan includes two-stage development of recreation facilities for fishing, picnicking, boating, hunting, hiking, cross-country skiing, horseback riding, and primitive camping.

The proposed modification plan will accomplish authorized plan objectives by raising the dam from an elevation of 1,474 feet to 1,504 feet and increasing the normal pool elevation from 1,300 feet to 1,427 feet. The permanent pool area will be expanded from 90 acres to 1,290 acres. The reservoir would extend from the dam 7.0 miles up the Lehigh River and 4.0 miles up Bear Creek. A detailed description of the selected project is in Section 4 of the main report.

# 2. Construction Sequence

The modification scheme of Francis E. Walter Dam includes constructing a new spillway, raising the existing dam and constructing a new tower upstream of the existing one. Construction of the dam and ancilliary features is expected to last approximately four to six years, and consists generally of two separate phases to be performed concurrently: 1) raising and extending the dam and dike and construction of the new spillway; 2) construction of the intake tower. In order to protect the existing project and downstream areas, a sequence of construction is required and is described in Section 4 of the main report. Construction of the other facilities such as operation buildings, recreation facilities, wildlife mitigation, etc. will be itemized within the construction schedule to maximize developmental sequencing and efficiency.

Prior to raising of the pool elevation, a number of preparatory actions will be performed throughout the project impact area. These include: clearing of timber below the permanent pool elevation (1,400 feet NGVD); removal of downed or floatable timber and debris from 1,427 to 1,448 feet; removal of three residential buildings, three recreational buildings, and the dam maintenance and residence buildings; clean-up and removal of septic systems; plugging of wells; and removal of fencing, signs and other similar miscellaneous items. Construction of mitigation features will be concurrent with other project features. Refer to Section 4 of the Main Report for construction scheduling details.

# C. ALTERNATIVE ACTIONS WHICH AVOID ONE OR MORE ENVIRONMENTAL IMPACTS

The DRBC's Level B Study identified the Modification of Walter Dam as having the least environmental impact with relatively low costs per cfs of net water yield. Multiple designs were investigated on how to modify the dam for the desired purposes. Reduction of adverse environmental impacts was a consideration in selection of alternatives for each component/feature such as the intake tower, spillway, dike and new roadway alignments, and potential borrow sites (for fill material).

A thermal study of the planned reservoir was performed and concluded that stratification of temperature and dissolved oxygen concentration would occur in the proposed deeper reservoir. In order to maintain downstream Lehigh River water quality, the proposed design of the intake tower includes a selective withdrawal system that can take water from several levels between the surface and bottom reservoir waters. This flexibility provides not only protection but desired changes (improvements) to downstream resources.

Three basic solution alignments and design schemes were examined in detail. The selected time provides a more direct path for the discharge of flows to the Lehigh for the will minimize the extent of adverse environmental impact by preventing the spillway flow from crossing the ridge line and extending erosion over a wider area. This alignment also keeps most of the flow on existing government lands and reduces the land area required for acquisition. The spillway design is an ogee crested passive spillway. This design is more reliable and requires no manipulation of equipment and no personnel are required for operation.

Alternative schemes were investigated for alignment of the dike extension on the far right (northwest) of the dam. The selected alignment was positioned to avoid maximum impacts to a black spruce wetland with a mitigatable loss of less than 0.1 acre and about 0.7 acre in a ponded area on the opposite side.

In order to minimize impacts associated with fill excavation for dam and dike construction, suitable material extracted from spillway construction will be used for the dam raising, dam extension, and the dike. Additional material will first be excavated from borrow sites located below the 1,427 feet elevation contour on lands to be permanently inundated by the long term storage pool. If borrow sites below the 1,427 foot contour become exhausted, previously used borrow sites at the project area will be utilized before additional new sites are utilized. If use of the new site is required, the PAMHEP team will be consulted as necessary for site rehabilitation purposes. Search for these additional sites will be done in consultation with the resource agencies.

A segment of Bear Creek Road (LR 40041) must be relocated. Two basic alternatives were analyzed. The railroad alignment generally follows an old railroad bed. The over-the-hill alignment was developed as a more direct route to the intersection with the present road. Refer to Figure 1. During the initial screening process, the over-the-hill alignment was selected as the preferred alternative because the railroad alternative requires massive cuts through uphill rock faces and soil terraces and extensive fills on the downhill side to widen and stabilize a roadbed. These construction requirements would result in excessive destruction of 43 acres of the forest habitat, creation of large scars mostly immune from reforestation, excessive construction costs, and the loss of a unique variable-use trail which could accommodate the disabled. These aliengment alternatives were investigated by the PAMHEP team and are further discussed on page EIS-35 and in Appendix H in Book 4. Both reports are included in Appendix E, Book 3.

Subsequent to the development of the initial over-the-hill alignment (overthe-hill-A) three variations of this alignment (over-the-hill-B through D) were developed so that a route could be chosen that would avoid impacts to the wetlands at the summit of the hill (Figure 1).

Alternative C was selected because it provides for wetlands avoidance, reduced construction impacts, least wildlife habitat encroachment and least cost. Table 2 summarizes the screening of the road realignment alternatives.

	<b>.</b>								
	ALTERNATIVE	Cut Volume (YDS <sup>3</sup> x 1000)	Fill Volume (YDS <sup>3</sup> x 1000)	Total material moved (YDS <sup>3</sup> x 1000)	Road Length (mi)	Surface Area Disruption (Ac)	Wetlands 1	Co; \$M <sup>2</sup>	at 2
	Railroad	220	900	1120	3.1	43	None	\$ 16.	.0
	A	240	310	550	2.7	32	Impacts to Scrub/ Shrub, and Sedge Wetlands	11.	.5
	В	310	340	640	2.8	33	None	14	•5
ΕI	C (Selected)	220	320	540	2.7	32	None	12	•5
S-18	D	330	280	610	3.0	34	None	15	.4

# TABLE 2

# SUMMARY OF SCREENING PROCESS FOR THE BEAR CREEK ROAD ALTERNATIVES

1/ All alternatives require the crossing of Bear Creek.

2/ Costs include estimate for engineering and design (E&D) and for supervision and administration (S&A). Cost is given in millions of dollars

)

#### SECTION IV

### AFFECTED ENVIRONMENT - SIGNIFICANT PROJECT AREA RESOURCES

This section presents a summary description of existing environmental conditions, relevant to the modification of the F.E. Walter Dam project area. The project area includes the existing reservoir and dam, the area to be inundated by the proposed long term storage pool and the short term storage pool (flood control); and surrounding areas that may be affected by the projects.

# A. GEOLOGY AND SOILS

# 1. Physiography and Geology

The Francis E. Walter Dam and Reservoir are located in the Pocono Plateau section of the Appalachian Mountain Physiographic province. This section contains the portion of the Lehigh River Basin above White Haven, and consists of a high rolling plateau dissected by numerous narrow and steep-walled stream valleys. Elevations range from 1,200 to 2,000 feet.

Surficial deposits such as boulder fields, stream terraces, and unconsolidated till, deposited during the Wisconsinan glacial episode, are scattered over these bedrock formations. Glacial till overlies the bedrock in areas of higher elevation and glacial outwash occupies the river valleys and adjacent terraces. The majority of these deposits are believed to have been associated with the Woodfordian advance, occurring 12,500-22,000 years ago. Recent alluvium overlies the outwash deposits along the valley floors.

The principal mineral resources located in the proposed reservoir consist of: (1) sand and gravel concentrated in the terrace adjacent to the left abutment; and possibly in other areas (2) sandstones which outcrop throughout the area and (3) clays which also occur in the reservoir. Sands and gravels of the quality equal to those available in the reservoir area are available at other locations in the study area to supply local needs in the foreseeable future. The deposits located at the dam site are generally underwater and this fact, together with availability of like materials elsewhere, makes it economically infeasible to use these materials for commercial purposes.

Commercial use of the sandstone available in the area is not likely for similar reasons.

The clay materials, although present in various deposits, occur generally as a portion of a heterogenous mixture of clay through boulder size material. Use of the clay portion would require its removal from the other soil materials, an expensive process. Because of this, exploitation of the clays for construction or industrial purpose is considered infeasible.

There are no known deposits of peat within the area of proposed inundation.

2. Soils

The soil types surrounding the project area can generally be described as stony or channery <sup>1</sup> silt loams. They are derived from surficial glacial deposits and as a result, are relatively infertile and acidic, exhibit slow

Containing flattened stones.

permeability, and have a seasonally high water table. Refer to Section 4 of the main report for further discussions on geology and soils.

Surface soils range from a predominantly mineral composition of sand, gravel, and various size stone to a thin organic forest litter cover over and around rock. Occasional pockets of deeper loamy organic soils occur in isolated swales or upland flats. Ancient glacial activity scoured this land, removing or redepositing much of the surface soil, and created deep cuts of exposed rock and boulder-strewn areas of gentler grades. Over time the deeper pockets accumulated a finer soil cover from ground water erosion.

# B. HYDROLOGY

#### 1. Surface Water

The Francis E. Walter damsite is located on the Lehigh River, approximately 75 miles upstream of its confluence with the Delaware River in Easton, Pennsylvania. The Lehigh River Basin above the dam drains an area of 288 square miles. The major tributaries to the reservoir are the Lehigh River, Tobyhanna Creek and Bear Creek. There are three USGS gages in the watershed. Mean annual discharge of the Lehigh River at Stoddartsville is 188 cubic feet per second (cfs); mean annual discharge at Tobyhanna Creek is 261 cfs. Below the dam the mean annual discharge of the Lehigh River at the White Haven gaging station is 617 cfs. <sup>1</sup>

# 2. Groundwater

Groundwater flow is controlled by bedrock discontinuities such as bedding planes and fractures, and by previous overburden. However, because surficial deposits of glacial debris restrict infiltration and permeability, groundwater can become locally perched.

#### C. WATER QUALITY

The Francis E. Walter Reservoir, the Lehigh River and it tributaries, and Drakes Creek in Carbon County (below the dam) are listed as High Quality-Cold Water Fisheries in Pennsylvania Chapter 93 Water Quality Standards. These waters have special protection for the maintenance and/or propagation of fish species including trout and additional flora and fauna which are indigenous to a cold water habitat.

At Walter Dam, water quality sampling stations have been regularly sampled as part of the Corp's Operation and Maintenance (O&M) activity. An O&M stratification monitoring program was initiated on the lake to establish any relationship of thermal stratification to chemical stratification.

The data analyses have indicated the water quality at the reservoir to be from good to excellent. The test parameters have generally remained in conformance with the water quality criteria established by the U.S. Environmental Protection Agency and the Pennsylvania Department of Environmental Resources. However, nutrient levels have been low and as a consequence,

The period of precord for these flows are as follows: Lehigh River at Stoddartsville (#3-1983); Tobyhanna Creek at Blakeslee Corners (1961-1983); Lehigh River below Walter Dam (1957-1983).

little aquatic plant life exists at the project. Moreover, some test parameters have exhibited deviations which may be linked to the extreme fluctuations in pool elevations at Walter Dam. The topography of the impoundment area is such that small changes of inflow can cause large changes in pool elevations.

The pH of the lake has generally been acidic, particularly after a heavy rainfall, and occasionally neutral. Bear Creek has consistently produced low pH readings, some as low as pH 4.4. Many of these low pH values are below the state standards. Alkalinity measurements show a naturally low buffering capacity and the low pH measurements are not considered unusually. The water quality and stratification monitoring programs will continue in the modified reservoir. Refer to Sections 2 and 4 of the main report for a detailed hydrology discussion including the configuration of water quality portals in the intake tower.

#### D. AQUATIC ECOLOGY

Aquatic habitat cover types in the project study area were delineated and evaluated with use of the Pennsylvania Modified Habitat Evaluation Procedure (PAMHEP). The PAMHEP aquatic procedure was performed by an interagency team of biologists from the U.S. Army Corps of Engineers, the Pennsylvania Fish Commission, and The U.S. Fish and Wildlife Service. The results were published in a report prepared by the U.S. Fish and Wildlife Service (Chezik and Edmunds, 1984), and is included in Book 3, Appendix E.

The PAMHEP aquatic team identified three habitat types in the existing impoundment and two habitat types in the existing stream reaches. Approximately 40 acres of Limnetic, Hard Bottom habitat type are found in the permanent reservoir pool. This habitat type is the stratum of water between a depth of 15 feet and the lakebed to a depth of 40 feet. This is potential trout habitat but is limiting for trout in the existing reservoir due to the lack of thermal stratification, which would create low temperatures in this zone.

Areas less than 15 feet deep in the reservoir with a substrate of cobbles, boulders, and gravel are classified as Littoral, Hard Bottom cover type and account for 27 acres of aquatic habitat.

Almost 90 acres of Rapids/Riffle habitat, consisting of stream segments with a substrate of algae-covered cobbles, boulders, and sand, are found in Bear Creek and the Lehigh River within the study area. Approximately 70 acres of Riffle/Run/Pool habitat are also found in these streams in the project area.

Evaluation of existing aquatic habitat determined that low alkalinity and pH, and lack of deep pools limit fishery productivity in the streams. Low alkalinity and low pH limit fishery productivity in the reservoir.

# E. TERRESTRIAL ECOLOGY

The U.S. Fish and Wildlife Service (USFWS, 1982, in U.S. COE, 1983) delineated habitat types for the areas to be inundated by the raising of the water level
of the reservoir to 1,427 feet NGVD (Figure 2). Major habitat types and their relative percentage of total affected land are as follows: deciduous forest (81.3%), mixed forest (9.4%), mines/borrow pits (3.3%), and wetlands (2.9%). Oaks, maples, beech, and birch dominate the deciduous species in the mixed forest canopy. A diverse but sparse understory is found in these systems. The USFWS identified three wetland habitat types: palustrine forested broad leaved deciduous wetlands, palustrine forested needle leaved evergreen wetlands, and palustrine scrub-shrub wetlands. Betz-Converse-Murdoch. Inc. identified and described 8 wetland tracks as part of their Environmental Assessment (1981) of the project. The three most significant wetland areas in the project are the Cider Run system (East Bank-both sides of access road feeding from the wetlands to the stream paralleling the road into the reservoir); the Bear Creek Road relocation system (West Bank - feeding from top of hill down to the pond at the new road and access road intersection and southward to ponds and marshes off site); and the wetland between the new road and dike, and the reservoir. The latter wetland and the Cidar Run system will be major features in natural history recreational use plans. All of these major wetlands systems will be avoided and continuity retained during and after construction. No rare or endangered plant species are known to occur in the project study area although the ranges of 3 species identified by the Western Pennsylvania Conservancy, a private citizen organization, as rare or endangered in Pennsylvania, may extend into the study area.

Mammals common to the area include whitetail deer, black bear, fox, rabbit, snowshoe hare, raccoon, oppossum, woodchuck, muskrat, mink, beaver, and weasel. Wild turkey, pheasant, Canada geese, quail, and grouse are among the many bird species present at the site. Although the reservoir is within the historic range of the federally endangered bald eagle and peregrine falcon, the Lehigh River Basin has not been designated as critical habitat for either species.

#### F. LAND USE

The predominant land use classification in the reservoir watershed is forest. Seventy-five percent of the land is forested and 13 percent is under water or wetlands. About 2 percent of watershed lands are in agriculture but there are no agriculture lands in the project area. A little more than 3 percent of project lands are inactive borrow areas. Local active quarries are located in the watershed. The project area is largely undeveloped land with most of the land being used for recreational purposes. Luzerne and Carbon counties, which surround the project site, are largely undeveloped and heavily wooded. However, "second" homes and recreational facilities have been developed in the surrounding communities.

#### G. CULTURAL RESOURCES

Preliminary surveys of historic and prehistoric cultural resources in the area of the proposed pool inundation were conducted by Heite (1981 & 1984) and Rasson and Siegel (1983). Heite conducted archival research, interviewed

refer to Se ... NI herein.



residents and scholars, and conducted walkover surveys to locate potentially significant cultural resources.

Resources of local historic interest were identified at Stoddartsville, and include an occupied 19th century hotel and ruins of a sawmill, gristmill, barn, and two bear trap lock navigation structures. Heite concluded that these latter resources may be considered important to the industrial and navigational development history of the region.

By applying general historical and archaeological land/resource use models in various time periods and comparing them to soil types and topography, Heite (1981) determined areas of likely prehistoric settlement. Rasson and Siegel (1983) performed limited subsurface shovel test pits at six of these likely sites and found prehistoric artifacts at four of these sites. Angler's Mount. a rockshelter, was found to be severely disturbed and not archaeologically significant. The three other sites, Acahela Flats, Tobyhanna Flats, and Porter's Run were open and contained significant prehistoric archaeological resources. Cultural remains at these three sites may provide information on the archaic period and the settlement of the larger Delaware River catchment area. Other flats and floodplains and the area for relocation of Bear Creek Road deemed likely to contain archaeological resources were investigated by Heite (1984). That report farther substantiated that many of the floodplain sites were not archaeologically significant but denoted intermittent and migratory usage. Further, more intensive investigation of the Acahela, Tobyhanna, and Porters Run sites was recommended. That work is planned to be accomplished prior to refilling the reservoir.

#### H. SOCIO-ECONOMICS

Historically, the coal industry has had the greatest impact on population trends in the project area. Coal production peaked in the early 1900s and began to decline by the late 1920s. Emigration followed this decline in coal production, and not until after World War II did new industries begin to move into the region to slow down the population decline. The major industries are the garment, shoe, machine and assembly, metal, chemical, and recently tourist industry. About one third of Monroe County's population is seasonal, and during winter weekends and summer months, Carbon County's population can triple.

There are scattered local quarry operations located throughout the Pocono region but none within the project area. Those which are operational (appear to be sufficient to meet demands without new plants even though resources are plentiful. There are no other minable resources of commercial value on the project site.

The economic trends in the study area indicate that there will be steady declines in mining and manufacturing; steady increases in services, trade, finance, insurance, and real estate; and mixed results in construction and transportation, communication, and utilities. Refer to Sections 3, 5, and 7 of the main report for an expanded socio-economic discussion.

## I. TRANSPORTATION NETWORK

Interstate Route 80, located south of the Francis E. Walter Dam, provides access to the Project Site from the east and west. Access is provided from the eastern I-80 approach via the Blakeslee interchange and route 940 west to

the dam access road. From the west, I-80 can be taken to the Pennsylvania Turnpike Northeast Extension north to Bear Creek Road which intersect the dam access road. Access from northern Pennsylvania is by Interstate Route 81 to the Pennsylvania Turnpike Northeast Extension and State Highway 115 south to Bear Creek Road. ţ

 $\left( 1 \right)_{i \in I}$ 

1

į i

1

ł

. 1

. 1

; 1

## J. HEALTH AND COMMUNITY SERVICES

Following is an inventory of community facilities and services for each county in the study area.

## Monroe County

Monroe County has four public school systems and one county vocationaltechnical school. There are five private school systems with a total of 52 classrooms. The Colonial Northampton Intermediate Unit 20 based at the Arlington School, Stroudsburg leases ten schools within the school system and is responsible for special education programs. The only college in Monroe County is East Stroudsburg State College.

There are two police networks operating in Monroe County, the Pennsylvania State Police and the municipal police. The Pennsylvania State Police have three stations: Fernridge, Swiftwater, and Lehighton. There are ten municipal police patrols concentrated in the densely populated boroughs and townships. Lastly, the Bureau of Criminal Investigation serves Stroud Township and East Stroudsburg Borough in conducting criminal investigations.

Monroe County has seven ambulance associations and three back-up ambulances in Blairstown, Bouldsboro, and Portland. The Monroe County Search and Rescue Unit consists of fifteen volunteers and one military type ambulance.

There are twenty fire companies in Monroe County with the Gouldsboro and Tobyhanna Military Depot fire companies as back-up. In addition, the Pennsylvania Department of Environmental Resources, Bureau of Forestry maintains a fire capability with about 22 vehicles and 511 volunteers for forest fires and wild fires.

#### Lackawanna County

Lackawanna County has thirty municipalities which have police departments with a total of 267 full time employees. The three largest municipalities, Scranton, Dunmore, and Carbondale have paid firemen. All other municipalities in Lackawanna County have volunteer fire departments. Dunmore and Carbondale have combined volunteer and professional fire employees.

## Luzerne County

There are twenty school districts in the Luzerne County Intermediate Unit and three vocational schools. Wilkes College is a Junior College of Bucknell University. King's College is a liberal arts college. Pennsylvania State University has two campuses in Luzerne County. Luzerne County Community College serves 3,000+ students in Nanticoke.

Luzerne County has a Sheriff's office.

The County does not have a board of health. There are three State Department of Health Centers: Wilkes-Barre, Hazelton, and Pittstown. Voluntary hospitals include: Wilkes-Barre General, Mercy, Wyoming Valley, Nesbitt Memorial, Pittstown, and St. Joseph. State owned and operated general hospitals are Hazleton State and Nanticoke. There is a Veterans Administration hospital in Wilkes-Barre Township. The Pennsylvania Department of Welfare operates the Retreat Mental Hospital in Hunlock Creek for short term patients. There are sixteen nursing homes as of 1975 in the county.

## Carbon County

Carbon County has 26 fire stations.

The county jail is in Jim Thorpe. There is no county police force but regional law enforcement protection is provided by the Pennsylvania State Police and local police departments in the majority of communities.

The Hoovan Building houses the County Superintendent of schools and the Offices for Child Welfare and Special Education. The County Home (for the care of the elderly) is in Lehigh Township. The school system has been recently upgraded. Three new high schools have been built; Palmerton Area, Lehighton Area, and the County Vocational-Technical High School. Jim Thorpe Area High School has been enlarged.

#### K. RECREATION

۱

ł

ł

ŧ

Regional recreation facilities, both private and public, are extensive in the area adjacent to the reservoir. At the reservoir there is fishing, hunting, boating, picnicking, and hiking. In addition, the region nearby offers state game lands, skiing, and parks for public recreation. The 32.8 mile stretch of the Lehigh River from the dam to Jim Thorpe is designated as a "scenic" river segment under the Pennsylvania Wild and Scenic Rivers program. White water rafting is popular on the Lehigh River below the Francis E. Walter Dam. Periodic releases of water from the dam enhance this activity.

#### L. AESTHETICS

The project area has three major cover types, the reservoir pool, the forested area, and the area between the permanent pool (elevation 1350) and elevation 1392 that is characterized by standing dead timber and transitional vegetation. This latter area is the result of prolonged inundation for water supply storage during recent drought periods and has the lowest aesthetic value of the three cover types.

Two falls are located on Bear Creek upstream of the existing permanent pool. The falls located closest to the existing reservoir is called Kanar Falls. There are rapids and falls on the Lehigh River farther from the existing reservoir at Stoddartsville.

The climate, water bodies, and the terrain combine to provide the aesthetic character in the project area. Escarpments, rock outcrops, wetlands, springfed streams, specialized species of vegetation, and climate induced foliage color changes reflect the glacial influence on the land. There is an overwhelming sense of ruggedness and continuity in confronting the elements of this landscape. The inclusion of the viewer as an intergral part of the greater landscape permits individuals to comprehend the smallest components of that landscape, and to become aware of the natural subtleties which combine to be the aesthetic definition of the project.

## M. AIR QUALITY

Air quality in the study area is generally good due to the low density of area residential development, low traffic congestion, and lack of heavy industry.

. .

1

1

#### SECTION V

#### ENVIRONMENTAL EFFECTS

#### A. AUTHORIZED PLAN - IMPACTS ON PROJECT AREA

The environmental impacts of the Modification, itself, on the region (Delaware River Basin) were assessed as part of the DRBC "Level B" Study and included in that Environmental Impact Statement (EIS). Portions of this are incorporated in the subject EIS by reference. Refer to Sections 1 and 2 of the Main Report.

## 1. Geology and Soils

## Short Term Primary Impacts

During construction, soils in the immediate area will be subject to erosion. These conditions will be temporary (approximately 3 years). Erosion control measures during construction should be adequate protection for soils in the project area. Erosion and sedimentation control measures are described in Section 4 of the main report.

#### Long Term Primary Impacts

Material for dam, spillway, and dike construction will require development of borrow areas. Soil removal and erosion impacts will be mitigated by location of these borrow areas below the elevation 1,427 feet. If there is not sufficient material available below this elevation the old borrow area west of Bear Creek Road will be utilized. Other sites will be used only as a last resort. If material must be extracted from areas above elevation 1,427. These areas would be restored by application of topsoil and stabilized with permanent vegetative cover. These areas could then be utilized to partially fulfill the U.S. Fish and Wildlife Service requirement fore wildlife management plots.

General construction, vehicle activity and later uses, coupled with harsh climate, will influence the capability of thin rocky soils to sustain vegetation. Careful siting of haul or access roads for construction vehicles and over-use restraints for recreational users will be considered in contractural specifications and operational park management policy.

Pool level fluctuations could inhibit vegetative growth along the reservoir banks. This may result in an increase in bank erosion and loss of soils. Fluctuation limits should be maintained within the requirements of mandated dam operating procedures. Shoreline erosion and stabilization problem areas should be monitored.

The plan calls for maintenance of the reservoir water level at an elevation of 1,427 feet during nondrought periods. Increases in water level elevation up to 1,482 feet, the elevation of the proposed spillway would be possible as a result of storm events. However, flood retention waters would be released as soon as possible following the period of flood hazards thereby minimizing damage to vegetation above elevation 1,427.

## 2. Surface Water

## Short Term Primary Impacts

The modification of Francis E. Walter Dam requires a plan for care and diversion of water during construction. This plan is described in detail in Section 4 of the Main Report. Under the proposed plan the existing pool would be drained from its present level of 1,300 feet to the thalweg<sup>1</sup> (approximately 1,245 feet). The drawdown of the reservoir (which may last over two years) will result in lower stream levels, which in turn will probably result in the erosion of sediment from within the original stream channels. This erosion may create a short term high turbidity flow into the reservoir. Additional erosion from stormwater runoff may occur due to exposure of the unstabilized reservoir bed and due to vegetation clearing in preparation of the bed of the raised reservoir pool. Excavation for borrow materials may also result in soil erosion and sedimentation impacts. The water quality of the Lehigh River must be maintained to protect aquatic life. Erosion control plans to be submitted by contractors are subject to State permit and will provide for sediment retention before it reaches flowing waters. Sediment storage in the reservoir is accounted for in storage allocations.

(

1

÷,

.

During drawdown, some water may be trapped in flat upland areas or pockets. Unvegetated river banks will be exposed. Mud and trapped pools can become mosquito breeding sites. On drying, the exposed soils could be a dust source under windy conditions. Exposed banks will not be aesthetically attractive.

Practices to prevent vector problems, erosion, sedimentation, turbidity, and aesthetic impacts at the project site during construction should include the following:

- Employment of a clearing plan which minimizes vegetation clearing and soil exposure in order to meet water quality and fishery habitat protection goals.
- 2) Slow drawdown of the reservoir to prevent rapid sediment influx into the reservoir.
- 3) Location of borrow areas will be restricted to below elevation 1,427 (within the new bed of the permanent pool) or to the existing old borrow areas west of Bear Creek Road.
- 4) Haul roads will utilize existing road networks and/or remain outside forested areas.
- 5) Pools of trapped water will be graded or channeled to drain.
- 6) Excessive flat bank exposure areas resulting from pool drawdown will be selectively seeded.

The line following the deepest part of the reservoir.

EIS-30

#### Long Term Primary Impacts

The most significant alteration of existing conditions resulting from the modification of Walter Dam will be the increased water storage capacity. Raising the pool level from 1,300 feet to 1,427 feet will increase the capacity from 1,793 acre-feet to 73,380 acre-feet. This increase in reservoir volume will provide the water supply for a 264 cfs release to augment low flows in the Delaware River Basin.

The minimum release rate from the proposed Reservoir will be increased from a current 50 cubic feet per second (cfs) to 63 cfs. This minimum flow will be maintained during periods of low flow in order to protect fish and other aquatic life and to protect water quality in the Lehigh River. During normal operating periods the reservoir will be maintained at a constant level and inflow to the reservoir will equal outflow unless inflow is less then 63 cfs, then 63 cfs would be released. During droughts when more water is required for salinity control in the Delaware River, additional releases will be made to the stream. This increase in the minimum release and additional releases during drought period constitutes a beneficial impact to the aquatic environment and water quality in the Lehigh River and Delaware River.

The investigation of water quality impacts of dam modification is presented in Section 4 of the Main Report. The conclusions and recommendations of this study are presented below.

The increase in reservoir volume will increase retention time from 1.7 days under present conditions to 58 days. The maximum depth of the permanent pool will be increased from 55 feet to 182 feet. These new conditions will result in thermal stratification in the pool. The chief issue associated with thermal stratification relates to the distribution of dissolved oxygen. The probability of an anoxic hypolimnion and violation of state standards is high during dry and average years. Depending on the degree of anoxia (predicted to last about a month in the summer), a sag in dissolved oxygen may occur downstream. The lower dissolved oxygen level in the reservoir would especially be felt during the transition time when vegetation inundated by the raised waters begins to decompose. To reduce this impact vegetation except in the fishery habitat areas, will be cleared away prior to raising the water level. The selective withdrawal system to be installed at the dam will allow the quality of the water discharged downstream to be controlled by mixing of water from different depths in the reservoir. In addition, the waters will be reaerated in the shallow, fast moving trailwaters, downstream of the dam.

Anoxia in the hypolimnion could cause nutrients, heavy metals, and other substances to go into solution from the bottom sediments, increasing their concentrations in these waters (Loar and Hildebrand, 1980). Thus these nutrients could become available to the upper water layers during normal spring and fall lake turnover periods and concentrations may exceed state standards. Careful monitoring of the reservoir during these times and appropriate water releases to relieve the potential anoxia conditions are part of reservoir regulation procedures and water quality monitoring program inherent in reservoir management plans.

Apart from potential impacts of thermal stratification, raising the pool elevation is not expected to have any lasting deleterious effects on the water quality. Low pH of the reservoir waters will persist. There will probably be no problem with fecal coliforms. The lake is expected to be oligotrophic and not contain excess nutrient concentrations or have excessive algal growth.

The raised pool level could create a larger cleared shoreline where wave action, rainfall, and ice action can erode the soils increasing the suspended sediment concentration entering the reservoir. Bank slope stabilization, utilization of the PAMHEP clearing plan and reservoir fluctuation control will minimize this problem. The larger pool volume will allow for greater variations in water capacity with smaller fluctuations in water elevations. In addition, a longer residence time will cause a greater percentage of the sediments to settle. Sedimentation could reduce water storage capacity. It is estimated that 3,170 acre-feet of reservoir capacity will accommodate this storage need over the 100-year life of the project. The project has been designed to accommodate this deposition while maintaining flow augmentation storage and flood storage capacities.

Construction of the dike extension on the west bank will require that continuity of a stream, presently draining 100 acres into Pine Creek downstream of the dam, remain constant to maintain Pine Creek water quality and ecosystem function.

### 3. Groundwater

## Short Term Primary Impacts

During the transition period during and immediately following inundation, the increased hydraulic head at the reservoir could cause reservoir water to enter the aquifers nearby. However, this influence is not permanent and only affects the aquifers within 1 to 1 1/2 miles of the reservoir. There are very few wells near enough to the reservoir to show any rise in water level. Eventually when equilibrium has been reached the water will again flow from the aquifers to the reservoir.

1

. .

### Long Term Primary Impacts

The long term effect on the groundwater of raising the dam will be to raise the level of the water table along the reservoir and the upstream creeks. This is not expected to have any significant long lasting primary impacts due to the overall lack of existing development in the project area.

#### Secondary Impacts

Land development along the reservoir or upstream creeks has experienced septic system failures in the past. Continuation of these failures may significantly contaminate the local groundwater. Because septic system failures are already a problem in the area, development of the surrounding forest land has been guite slow. Future developments will probably be of low density or will be required to develop on-site septic systems that take into account the soils and water table conditions. Pennsylvania effluent standards will enforce these and, if development ever reaches great proportions, a regional sewerage system would eventually be warranted.

## 4. Terrestrial and Aquatic Ecology

## Short Term Impacts

)

#### Vegetation Clearing Plan

A vegetation clearing plan was developed for the proposed modification plan. The clearing plan incorporated recommendations of the U.S. Fish and Wildlife Service (USFWS) and Corps of Engineers reservoir operational requirements.

The USFWS recommended that existing trees and brush be retained in the shallow areas of the proposed long-term storage pool (elevation 1,427) to provide fishery habitat. Complete clearing below this zone was recommended. Complete clearing in deeper waters would reduce the potential for floatable debris to interfere with boating and operation of the reservoir. This clearing would also mitigate water quality impacts of oxygen-consuming decomposition of organic matter.

Operation of the reservoir requires clearing to protect structures such as the intake tower, and to preserve water quality. Clearing to accommodate recreation areas and roads is also necessary.

Figure 3 graphically shows the clearing plan for the majority of the proposed reservoir pool area. Detailed clearing plans are shown in the Main report as Plates 1-11 through 1-17. Complete clearing is called for up to elevation 1400. Removal of only the downed, or floatable, timber and debris is required between the complete clearing zones and elevation 1448. Elevation 1448 represents the flood pool having a 5-year recurrence interval. This criterion is used to reduce operational and potential safety and health hazards. This type of limited clearing will also provide a fishery habitat zone between elevation 1400 and 1427 in the long-term storage pool.

Complete clearing will be required up to elevation 1,427 plus 3 feet in the operational zone, which extends from the dam and intake structure up both Bear Creek and the Lehigh River for approximately 1/2 miles, respectively. Additional selective clearing may be required in ice skating and boat launch areas.

In all, approximately 370 acres of complete clearing in the reservoir area is required, which includes the zone of dead timber between elevation 1,350 and 1,392. Approximately 780 acres of upland clearing of only downed timber is planned. Refer to Section 4 of the main report for clearing details.

Unnecessary disturbance of existing vegetation should be avoided to the maximum extent possible above elevation 1,400 in the reservoir pool area. Disturbance of vegetation outside of the operational area and beyond the area where clearing is required for spillway, dike, dam, and roadway construction should be avoided. Haul roads should utilize existing road networks and/or remain outside existing forested areas.

In order to provide supplementary native plants and topsoil for areas to be landscaped, consideration should be given to removing suitable shrubs and topsoil from areas where complete clearing will occur. Shrubs should be heeled in and kept watered. Topsoil could be stockpiled and erosion control



procedures, such as seeding of the stockpiles or placement of hay-bale erosion barriers in drainage ways, should be implemented. Construction erosion control plans will be developed, and are subject to State Permit by the contractor prior to construction.

#### Vegetation Restoration

The goals of the landscaping plan for the proposed modification are to preserve and enhance aesthetic and wildlife values and to prevent soil erosion and sedimentation. The soils in the study area are sensitive to disturbance, because of steep slopes, high acidity and shallow topsoil, and do not revegetate easily. Topsoil stripped from cleared areas should be stockpiled and regraded prior to vegetation reestablishment. Native trees and shrubs should be utilized in new plantings to increase plant survival. As previously mentioned, where practicable, plants should be salvaged from cleared areas for replanting.

Planting to provide edge transitions from forest to clearings, from scrub areas to wetlands and from upland areas into water-edge mud flat zones will be accomplished. These types of plantings will provide a natural continutiy to vegetative patterns, blend structural improvements into the forest cover, offer diversified wildlife habitat and be ecologically correct for the further appreciation of natural history recreational visitors.

Spillway construction will require clearing of approximately 70 acres of forest land. The spillway floor will be landscaped following final grading with native shrub species. Lowbush blueberry, wild azalea, sheep laurel, and other low shrubs will be utilized. The spillway walls will be hydroseeded with weeping lovegrass or other pendulous clump grasses.

Pockets, clefts, or benches in the walls may be conducive to hand planting small rhododendron, laurel or fern seedlings. Advantage should be taken of any surface of spring water seepage which may come from the spillway walls. If sufficient flow is available, a minor waterfall feature could be developed or specialized rock plantings in these semi-aquatic conditions could become mitigative features.

New recreational roads will be designed to meander through the forest to minimize cuts and fills. These roads will be paved with compacted stone chips as presently used in picnic areas. Recreation roads extending into open or cleared areas will be landscaped to blend with adjacent forests. Parking area locations will be intermittent and dispersed into small pull-off areas, using existing open areas in the forest, where possible. Thinning of forest cover in the view zone at promitory overlooks will be accomplished by individual selection of plants or plant parts to be removed after the structure is in place.

#### Long Term Primary Impacts

t

١

Ĵ.

#### PAMHEP Evaluation

An evaluation of fish and wildlife habitats, project effects, and mitigation needs for the proposed modification of F.E. Walter Dam was performed by an interagency team of biologists from the Corps of Engineers, Pennsylvania Game Commission (for terrestrial PAMHEP), the Pennsylvania Fish Commission (for aquatic PAMHEP), and the U.S. Fish and Wildlife Service (Chezik and Edmunds, 1984). The evaluation employed the Pennsylvania Modified Habitat Evaluation Procedure (PAMHEP). In conjunction with this effort, the U.S. Fish and Wildlife Service has mapped the vegetative cover in the entire project area. Both reports are included in Appendix E, Book 3. In the PAMHEP procedure, baseline or existing habitat conditions for representative species are assessed and expressed as habitat units, a measure of habitat quantity and quality. Future with-project conditions are likewise assessed and contrasted with the baseline. The resulting changes, either increases or reductions in habitat units, constitute fish and wildlife impacts. Mitigation opportunities are then evaluated leading to formulation of an appropriate mitigation plan. Finally, future with-project mitigation conditions are assessed, again using habitat units; to determine the effectiveness of the mitigation plan.

The Francis E. Walter Aquatic and Terrestrial PAMHEP teams differentiated five types of aquatic (fish) habitat and twelve types of terrestrial (wildlife) habitat. Habitats for aquatic species provide 284 habitat units now and would provide 719 habitat units after the reservoir is enlarged, a net gain of 435 habitat units. Habitats for terrestrial species provide 13,648 habitat units currently and would provide 11,724 units after the reservoir is enlarged, a net gain, a net loss of 1924 habitat units.

As part of the modification proposal terrestrial habitat unit losses will be fully offset by implementing recommended habitat improvements on lands adjacent to the enlarged reservoir. These improvements, primarily clearings in the forest and selective plantings both in the clearings and, possibly, in formerly used borrow sites, will significantly improve the cover and food for wildlife species most adversely affected by the project.

Table 3 is a summary of habitat units within the Francis Walter project area of three conditions: existing (baseline), with-project, and with-project/mitigation.

The preliminary mitigation plan includes habitat improvements at three sites. Each site is discussed below:

1) One site is a pond (palustrine open water) located 1 mile north of Francis E. Walter Dam adjacent to the new dike (Figure 1). Existing habitat values for wood duck and green heron are low. The wood duck is limited by a lack of den trees. The green heron is limited by lack of clumps of shrubs or trees for feeding and breeding. To raise baseline values, 14 wood duck nesting boxes will be installed and maintained within and around the pond. A band of alder shrubs will be established around the perimeter of the pond. These measures will increase habitat suitability indices for wood duck and green heron and will result in a net gain of approximately 15 habitat units of Resource Category II (wetlands).

1

2) Three borrow sites were created during construction of the existing project. Two of these sites are located 1 mile north of the dam and a third is located about 1/2 mile south of the dam (Plate 1-18). These areas are characterized by flat or gentle slopes, extensive bare ground and very poor vegetative diversity. Existing wildlife values are uniformly low. The Pennsylvania Gross Commission (PGC) reclaimed part of one borrow site by planting grass legumes, and shrubs. Because of currently low wildlife

## Table 3

Summary of Habitat Units (HU's) at Francis E. Walter Reservoir Project

	Existing HU's (Fall 1984)	HU's 25 Years After Modifica- tion of Project, Without Mitiga- tion	HU's Gained or Lost due to Modification Without Mitiga- tion	HU's 25 Years After Modifica- tion of Project, With Proposed Mitigation	HU's Gained due to Proposed Mitigation
Aquatic Habitats					
Limnetic (15' - 40')	4.0	30.0	+26.0		
Littoral, hard bottom	57.7	672.0	+615.3		
Littoral, soft bottom	4.2	17.0	+12.8		
Rapids/Riffle	89.0	0	-89.0		
Riffle/Run/Pool	130.2	0	-130.2	-	
Subtotal	284	719	+435		
Terrestrial Habitats					
Herbaceous rangeland	27.2	19.4	-7.8	19.4	0
Shrub & brush rangeland	279.4	347.9	+68.5	347.9	0
Deciduous forest	10535.8	9213.4	-1322.4	10781.4	1568.0
Mixed forest	670.0	603.2	-66.8	603.2	0
Palustrine wetland (pond)	27.8	25.9	-1.9	40.8	14.9
Palustrine wetland					
(scrub/shrub)	30.6	30.6	0	30.6	0
Palustrine wetland					
(forest)	459.0	453.0	-6.0	453.0	0
Lacustrine, limnetic	49.0	503.2	+454.2	503.2	0
Lacustrine, littoral	5.0	45.0	+39.0	45.0	0
River near forest	269.7	181.1	-88.6	181.1	0
River near transition	108.2	0	-108.2	0	0
Transition	1186.6	302.1	-884.5	700.6	398.5
Subtotal	13648	11724	-1924	13707	1981

Source: Chezik and Edmunds, USFWS, State College, PA., 1984.

EIS-37

values and the PGC's previous reclamation success all three sites could probably be greatly improved for wildlife.

To raise the baseline values, each site could be planted with a variety of conifers, small fruiting trees, fruiting shrubs, legumes, and grasses. Several rock piles and numberous logs could be placed within each compartment. If this is accomplished, the sites will provide optimum food and cover for deer, raccoon and ruffed grouse, and reptile denning will be improved. The result would be combined gain of 389 habitat units.

3) Deciduous forest covers 70 percent of the study area and comprises over 4700 acres. Existing wildlife values are only moderate due to limited habitat diversity and cover. To improve wildlife values the mitigation plan provides for 17 carefully spaced 10-acre clearings to be created within the deciduous forest and that the clearings be planted with a variety of conifers, small fruiting trees, fruiting shrubs, legumes, and grasses. Rock piles will also be placed within each clearing. Figure 4 shows the proposed design for each clearing. The total worth of the clearings will be 1904 habitat units.

In order to achieve these benefits, the following restrictions must be followed:

- a. Each clearing must be within 1/4 mile of a stream, river, or wetland in order to maintain optimum life requisites for raccoon.
- b. Each clearing must be no closer than 1/4 mile to the reservoir, mixed forest or forested wetland. This restriction will create optimum influence for deer within a 160-acre area surrounding the site.
- c. Each clearing must be in the upper 1/3 of the flood pool (above 1464' NGVD) or outside of it altogether. This restriction will minimize impacts to the vegetation associated with frequent flooding.
- d. All the duff must be removed from each clearing in order to discourage reestablishment of undesirable volunteer species.
- e. Each clearing will be treated with 1 to 2 tons of lime and 300 lbs. of 15-10-10 fertilizer per acre.

In addition to these restrictions, the PAMHEP team also recommended certain general guidance in locating the clearings:

a. Steep slopes should be avoided, since establishment and maintenance (mowing) of desired vegetation would be difficult.

١

1

b. Clumping of the clearings (no closer than 1/2 mile) is desirable, since this would reduce the amount of clearing activity for road access.

In order to comply with these location guidelines established by the PAMHEP team, most of the clearings will have to be located within 2-3 miles of the dam where significant tracts of land in existing or proposed Federal ownership.

EIS-38

660'

65

1-10 ACRE PLOT--112 HABITAT UNITS TYPICAL TEN ACRE PLOT (NO SCALE)

HERBACEOUS -Switchgrass, Deertongue, Weeping Lovegrass, Birdfoot Trefoil

SHRUBS - 4'x4': interspersed: Barberry, Grey Dogwood, Autumn Olive, Tatarian Honeysuckle, Blackhaw Viburnum (can be mixed)

- () ) SMALL FRUIT TREES 8'x8': Crabapple, Hawthorn (can be mixed)
- CONIFERS 6'x6': White Spruce, White Pine, Scotch Pine, Norway Spruce, single species in row, 10 rows.

NOCK PILE

HEP TEAM RECOMMENDATIONS 17 plots plus Alder planting at pond. Preserve groups of trees 13° DBH or larger and groups of snags 10° DBH or larger. Clear 33' band around perimeter of plot

#### FIGURE 4

660'

HEP TEAM WILDLIFE MITIGATION ANALYSIS F.E. WALTER DAM (MODIFIED)

54' 24' 16'

exist. The PAMHEP team suggested that the peninsula area between the confluence of the two arms of the reservoir could be utilized for the mitigation effort. The long arms of the proposed reservoir may provide some clearing opportunities, but steep topography and lack of access are expected to limit their number. Mitigation site selection will be coordinated with the PAMHEP team as necessary.

During field investigations of terrestrial habitat in the project area the PAMHEP team identified a turkey vulture nesting site located about a half mile from the dam on the Lehigh River arm of the existing reservoir. The team recommended additional study of this area. At Corps request, John S. Coleman of the Pennsylvania Vulture Project surveyed the site on May 31, 1984 (written correspondence, June 21, 1984). He estimated that 4-10 pairs of turkey vultures nest in the Walter Dam area. He concluded that the raised water level will impact some potential nest sites and may reduce the suitability of other nest sites and loafing areas but that previous high water has eliminated potential sites in that zone and the proposed modifications will not significantly affect vultures in the area. The turkey vulture is not on the Federal list of endangered or threatened wildlife species. Refer to Section 4 of the Main Report and Appendix E, Book 3 for PAMHEP details.

During a field visit conducted as part of an interagency coordination meeting on 24 July 1984, the wetland impacts that would result from the construction of the over-the-hill alignment were determined to be greater than originally anticipated. As a result, the PAM-HEP team conducted a reevaluation of the Bear Creek Road realignment on 29 October 1984. This reevaluation also resulted in the development of 3 variations of the over-the-hill alignment, all of which avoid direct wetland impacts. With these additional alternatives, the PA Game Commission set their order of preference beginning with the most preferred as the railroad bed, Alternative D, Alternative C, Alternative B, and Alternative A. While Alternative C would result in more loss of deciduous habitat then the other over-the-hill alignments, it would result in the least disruption to habitat continuity. The wildlife impacts of Alternatives A, B, and C are generally the same.

The realignment will result in several impacts. The road will pose a permanent impediment to wildlife movement between the divided forest tracts and will result in automobile/wildlife encounters. In addition, the ground occupies by the road will be removed from wildlife habitat. These impacts are accounted for in the proposed mitigation plan. Other mitigation efforts will include subsurface explorations, which will ensure that the road will not impact groundwater. Also, culverts will be installed to maintain the drainage pattern of the nearby wetlands.

## 5. Land Use

## Long Term Primary Impacts

The proposed long term storage pool will require land purchase in fee of a total of 3,551 acres. This total fee purchase includes 2,625 acres of new fee purchase of lands for which a flowage easement is now held. To accommodate the short-term, flood storage pool, an additional 624 acres of flowage easement purchase is required. This land is predominantly woodland and about 15 percent transitional, early successional vegetation.

## Secondary Impacts

The increase in recreational resources provided by the project should not cause a significant increase in the rate of commercial and residential development in the region. During the spring of 1984 the Philadelphia District U.S. Army Corps of Engineers surveyed local officials in the area surrounding Beltzville Lake in Carbon County, Pennsylvania and Blue Marsh Lake in Berks County, Pennsylvania to determine the impact, if any, that these projects have had on their respective communities. At the time Beltzville Lake opened in 1972, much second home development was occurring in the area due to a general "boom" which occurred in the Poconos during the 1970's. There was a definite increase in residential development during the 1970's and it is difficult to separate the development due to the "boom" and the development if any, that occurred because of the lake. It is reasonable to assume that the lake had some influence on the amount and location of development but cannot be credited for all the development that exists in the area today. Home values in the area have increased significantly.

Commercial development has been very minor and, as with residential development, it is quite likely that another influence, the turnpike interchange, spurred some of the commercial development that exists. This development is in the form of marinas, gas stations, and restaurants. Virtually everyone surveyed reported that the project has been a benefit to their communities.

Enforcement of local master plans that dictate where and how growth should occur should serve to restrain undesirable changes in land use in the vicinity of the proposed expansion of the existing Reservoir.

## 6. Cultural Resources

#### Historical Resources

Culturally notable sites at Stoddartsville include the ruins of an old gristmill, an old sawmill, an old barn, and an occupied existing building which was once a hotel (Heite, 1981). The gristmill, sawmill, and cowbarn ruins are affected by pool levels of the 8 year, 4 year, and 66 year storm, respectively. The hotel's foundation wall is affected by the 50 year storm pool level, however, the first floor elevation is about one foot above the proposed spillway crest elevation of 1,482 feet. Two bear trap navigation dams at Stoddartsville may be subject to erosion by the flood storage pool. Protection alternatives for these resources were found to be economically and aesthetically undesirable. Alternatives for addressing the disposition of the historical structures were considered. Tentatively, it is expected that a combination of purchase, flowage easements, and private salvage rights will assure continued integrity of the locally historic complex by moving structures impacted within the existing environs. Final determinations will be negotiated following receipt of authorization and funding for real estate transactions. The Stoddartsville mill village and navigation works could, in the future, be documented and excavated where necessary to preserve viable historical and industrial information. The significance of these structures on local development will be illustrated in interpretive displays at the park.

#### Archaeological/Prehistoric Resources

Heite (1981) reviewed the area subject to inundation by the proposed long term and short term reservoir pools and identified possible culturally sensitive areas represented by shading on Figure 4. Six of these areas where examined further by Rasson and Siegel (1983) and they recommended that additional investigations should be performed at three of these sites, Acahela Flats, Tobyhanna Flats, and Porter's Run (Figure 5). Nine other sites within the long term storage pool inundation area were examined (Heite 1984) to establish their significance for subsurface testing. All sites recommended for subsurface testing will be investigated prior to inundation by the modified pool and a final determination of significance and disposition will be made.

Cultural resource investigations suggest that historic and archaeological sites may have national significance. Those evaluations will be made after receipt of guidance by the State Historic Preservation Office. Both types of sites are recognized at least for their local and regional significance and will be preserved wherever possible and be graphically presented in an interpretive feature at the park. A model of the Stoddartsville complex and explanatory tablets at an existing rock shelter are envisioned.

Final investigation reports and preliminary conclusions will be coordinated with the Pennsylvania State Historic Preservation Office and their suggestions for appropriate action will guide the final disposition of the cultural resources. It is anticipated that local historical agencies will be involved in these activities.

## 7. Socio-economic

#### Short Term Primary Impacts

During construction there would be a temporary loss of tourism due to the loss of the reservoir as a recreational facility. Construction activity will provide additional jobs for the local labor force.

Another immediate effect would be the loss of revenue from taxes paid on the land located within the reservoir property boundaries that would be acquired. In time, revenues would probably return to local governments as tax revenues increased from new second home dwellers and new businesses and from state funds provided by Federal programs designed for tax relief subsidation on Federal lands and from increased development and business activity due directly and indirectly from the lake.

## Long Term Primary Impacts

The presence of an additional recreational resource in the area, the proposed project, could help spur local economy and businesses but probably not significantly. With the exception of park food concessions and small boat and recreation supplies outlets, no other businesses have developed at either Beltzville or Blue Marsh Lakes.

The increased volume of reservoir users should not significantly increase policing and fire fighting requirements. A 1984 Corp's of Engineers survey of police and local officials at Beltzville and Blue Marsh Lakes showed no



increase in crime and no fires recorded at either park. The Corps traditionally arranges with local police and fire departments to provide their services to the reservoir and would continue this practice at the modified Walter Reservoir. At Beltzville and Blue Marsh this has resulted in the need for additional police patrols for crime watch and traffic control but no increase in police personnel.

Ambulance services would be needed more often for such things as heat exhaustion, heart attack, cuts and bruises, and other health related problems. The Beltzville-Blue Marsh survey indicated no need for increased trash services. Local officials at these lakes stated that they feel no additional stress on their services because of the projects, and all feel the projects have been beneficial to their communities.

It should be noted that both Beltzville and Blue Marsh Lakes were developed for more intense recreational use including swimming and high-speed boating. Visitation and usage impacts are compared only for an extreme upper limit comparison on potential impacts. In reality, impacts are expected to be much less at the larger Walter Lake.

A 1984 Corps of Engineer's traffic analysis indicated that traffic will probably increase twofold with the modification. This increase will be noticed mainly on the roads surrounding the project, Routes 940 and 115, during the peak season (summer). In comparison, the skiing industry generates the same amount of traffic during its season (winter). The local residents will see no more traffic during the reservoir's summer peak season than they already see during the ski resort's winter peak season.

#### Secondary Impacts

ł

ŧ

The presence of a recreational resource could spur a small amount of second home development. If growth occurs, it would be felt in Tobyhanna and Kidder Townships. Unimproved but subdivided property, as well as other private land holdings in the surrounding area, may increase in value soon after completion of the Modification.

An increased pressure for seasonal home development could place burdens on the region's local government to provide a full range of services. The modification of Walter Dam will be another incentive, among many, for additional home development and the need for related services. Other developmental inducements include the skiing industry, State parks, and major hotel and resort facilities. Federal regulations regarding lakeside development and flood control pool requirements provide a buffer and controllable public use of Federal impoundment shorelines.

## 8. Transportation Network

The Pennsylvania Department of Transportation (Penn DOT) requires that roadways and low steel for bridges be set above the 50 year flow level. For compliance with this requirement relocation of the state Route LR 40041 (Bear Creek Road) and raising of Tobyhanna Township Road T553 is included in the modification plan. Penn DOT Act No. 120, Circular 2912 and its exhibit B, outline environmental guidelines regarding impacts of new road construction. Those guidelines area addressed within this assessment or in the main report. Five routes were investigated for relocation of a 3 mile segment of Bear Creek Road. The "Railroad Alignment" follows an abandoned railroad right-of-way. The other four are variations of an alignment which goes "Over-the-Hill.

The selected Over-the-Hill Alignment provides the best combination of wetlands avoidance, reduced construction impacts, and the least wildlife habitat encroachment. The Over-the-Hill Alignment crosses the railroad right-of-way north of the west bank borrow area before rising to the crest of the hill, that follows a previously undisturbed wooded area, dropping down to a bridge over Bear Creek, then returning to the existing road. The existing Bear Creek Road will remain open during construction of the relocated road to minimize traffic disruption, and will subsequently become an (interrupted) abandoned road within the park. Refer to Section 4 of the main report for relocation construction details.

The selected Over-the-Hill alternative C alignment passes through a forested area but avoids a palustrine wetland. Design of the roadway includes measures such as surface drainage systems to mitigate hydrologic water quality impacts to the wetlands and downhill aquatic systems. Measures to mitigate long term ecological impacts due to habitat removal are described in Section 4 of the main report.

Raising of the first 900 feet of Tobyhanna Township road T553 is also required. This dirt and gravel road is 3.5 miles in length and runs northeast from Route 115 (LR 169) to LR 45039. No significant environmental impacts are anticipated from this roadway construction. 1

ίŧ.

1

i.

1

ŧ

Soil erosion and sediment control procedures will be employed during roadway construction to mitigate adverse impacts. Slopes will be topsoiled, seeded, and mulched. Segments of Bear Creek Road to be abandoned and not needed for project use may be broken up, topsoiled, and seeded.

The existing access road crossing the reservoir will probably be replaced; thereby continuing direct vehicular access from opposite shore recreation facilities. Final determination cannot be made until detailed design of the dam, dike and spillway. Refer to Main Report Section 4. Hikers will definitely have access across the dam top. Access for most reservoir users, residents of Philadelphia, New York, North Jersey regions, is currently from the southeast via Interstate 80 or the Pennsylvania Turpike and Route 940. This will remain the same.

Under the requirements of Pennsylvania Act 120, the Pennsylvania Department of Transportation is required to consider the effects of transportation routes on 23 parameters. These parameters were screened for applicability and significance of impact for all the Bear Creek Road Realignment Alternatives. Fourteen parameters were determined not to be applicable or to be of insignificant impact. These parameters are the following  $\frac{1}{:}$  (1) Residential and neighborhood character and location; (2) Replacement housing; (3) Displacement of families and businesses; (4) Civil defense; (5)

 $\frac{1}{1}$  Many of these parameters, while not applicable to the road relocation, are discussed in this EIS as related to the project as a whole and will be elaborated on the Real Estate Design Memorandum.

Economic activity; (6) Employment; (7) Fire protection; (8) Public Utilities; (9) Religious institutions; (10) Government financing, tax base, and social service costs; (11) Natural and historic landmarks; (12) Education; (13) Multiple use of space; and (14) Use of existing roads during construction.

The remaining 9 parameters are summarized in Table 4 to allow comparisons of impacts among the realignment alternatives. Many of these parameters are discussed in more detail in other sections of the project documents, which are also referenced in Table 4.

## 9. Health and Community Services

## Short Term Primary Impacts

Because local construction workers will most likely be employed from four to six years, it is expected to have some impact on the local health and fire services. Current arrangements for state and local police and fire fighting support will probably continue.

#### Long Term Primary Impacts

With the return of tourism, following the completion of dam modification, there may be need for local police patrols and coordination especially during the summer months. The U.S. Army Corps of Engineers will continue established arrangements with the local and state police departments to provide services to the proposed facilities as needed. In addition, the Pennsylvania State Forest Service and local fire companies will provide forest fire fighting services to the reservoir project area.

## Secondary Impacts

The 1984 Corps of Engineers survey at Beltzville and Blue Marsh Lakes indicated that additional service needs were minimal. Refer also to the discussion in Section 7 of this EIS.

## 10. Recreation

The modification plan for Francis E. Walter Dam includes provision for additional recreational facilities. On the west bank of the reservoir, ultimate developmental proposals include a picnic area, trails, boat launch sites, bank fishing access, nature areas, sports fields, provisions for winter sports uses, and a visitor center (Figure  $\delta$ ).

On the east bank, ultimate developmental proposals include trails, a camp area, a boat launch area, scenic overlooks, sports fields, winter sports uses, horseback riding concession, and a visitor center are proposed. Refer to Section 2 and 4 of the main report for a detailed description and construction sequence of recreational facilities.

## TABLE 4

## COMPARATIVE IMPACTS SUMMARY OF ROAD REALIGNMENT ALTERNATIVES

	Railroad		Over-Th	e-Hill		
	Bed	A	В	C	D	References
Impacts						Book (Section)
Conservation:						
Erosion Potential	High	Low	Low	Low	Moderate	1(6), 5
Wildlife Habitat (AC)	43	32	33	32	34	3(E)
Habitat Continuity	Low	High	High	High	Moderate	3(E)
Wetland Impacts	None	High	Potential Indirect	. None	None	3(E)
Pollution:						
Air	Low	Low	Low	Low	Low	1(6)
Noise	Low	Low	Low	Low	Low	1(6)
Water (Wetlands)	None	High-	High-	Low-	None	1(6), 4(H)
		Road	Road	Road		
		Salt	Salt	Salt		
Multiple Use of Space						
Parks & Recreation	High	Moderate	Low	Low	Low	-1(2-3), 2(D)
(Potential impacts to)			•	•	• -	1/()
Aesthetics (impacts to)	High	Moderate	LOW	LOW	LOW	
Public Safety Requirements	High	LOW	Low	LOW	Moderate	4(H) 2(D)
Efficient Transportation	Low	High	Moderate	High	LOW	3(E)
Property Values	Same	Increase	Increase	Increase	Increase	1(4)
Engineering:						
Complexity	High	Moderate	Low	Low	Moderate	1(3,4),2(D),4(H)
Construction Costs	High	Low	Moderate	Low	Moderate	1(3,4),2(D),4(H)
Total Material Moved	High	Low	Low	Low	Low	1(3,4,6),2(D)
O&M	High	Low	Low	Low	Moderate	1(3,4),2(D)
Nee of Fristing Roads						

Use of Existing Roads During Construction

1 The number outside the parenthesis indicates the book number. A number inside designates the section of the main report. A letter inside the parenthesis designates an appendix.

EIS-48

1



-----

EIS-49

During construction there will be a loss of most recreational facilities around the reservoir near the dam. This impact will be short term.

In the long term, because the reservoir pool elevation will be raised there will be a loss of stream fishing segments and private hunting land. The impact will be low because few people are affected. These impacts will be offset by provision of a warm water fishery in the reservoir.

A portion of the Jack Frost Ski Area will be located in the flood control pool and could be subject to very infrequent floods. This will be addressed in the final design and real estate plans.

A portion of the Boy Scout Camp Acahela waterside facilities will become inundated with the raising of the pool, but the camp will still have enough waterside facilities available to satisfy the demand. No permanent existing structures will be affected.

The increase in lake surface area will provide more opportunities for boating and sailing. In addition, the new facilities for picnicking, hiking, sports, and fishing will help satisfy the increasing regional demand for recreational facilities.

## 11. Aesthetics

The proposed increase in the permanent reservoir pool will flood all of the area of dead timber and transitional vegetation that borders the existing reservoir. This will result in a positive impact on aesthetics. Additional acreage of forest covertype will be converted to lake covertype, altering the aesthetics of the project area but not having a negative impact.

Kanar Falls, a highly scenic area on Bear Creek, will be partially inundated by the new permanent pool. While presently a low falls, the inundation will reduce the falls to a rapid. The aesthetic impact of the area will be partially affected by the modification. The rapids at Stoddartsville, on the Lehigh River, will not be affected by the new permanent pool. Low frequency flood pool elevations will temporarily cover these rapids.

Impacts associated with vegetation clearing for spillway construction will be mitigated by selection of the optimum spillway alignment that reduces clearing requirements. Additionally, the spillway will be landscaped as described in Section V-A of this FEIS.

Aesthetic impacts from construction of the relocated LR 40041 (Bear Creek Road) and other proposed modifications will be reduced by minimizing the area to be cleared, use of existing roadways for construction vehicles, and by the additional of new landscape planting and seeding.

Alignments of recreation roads have been selected to blend into the existing topography thereby reducing aesthetic impacts. Access to several promitory overlooks will be provided as part of the recreation plan. Placement of structures has been coordinated with topographical surveys to eliminate the need for forest clearing.

1

To reduce long-term aesthetic impacts of new borrow sites development during construction of the dam and dikes, suitable material derived from spillway construction will be used as fill. Additional material will be first excavated from sites located below the 1427 feet permanent pool elevation. If additional fill material is required, previously used borrow sites at the project area will be utilized before additional new sites are sought. Improvement of habitat value at these previously used borrow sites and any new borrow sites, by revegetation, transitional grading and plantings, will be incorporated into the final modification design.

### 12. Air Quality and Noise

Potential sources of air pollution during construction include construction equipment emissions and dust from wind erosion of soils. Construction equipment emission are regulated by Federal and state standards and should not cause negative air quality impacts. Federal regulations on noise emissions will serve to reduce the noise impacts from construction equipment. Implementation of soil erosion control measures including soil stabilization should control dust generation. The low population density of the area also reduces the significance of noise and air quality impacts.

### Long Term Impacts

No point sources of air pollution are included in the project design. Traffic studies and recreational facility design has reduced the potential for automobile related air quality impacts. Recreational development will be associated with low intensity and passive uses, in keeping with the existing character of the region.

B. RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

Modification of the Francis E. Walter Dam and Reservoir will result in conversion of 79 acres of land to non-wildlife habitats due to dam, spillway, and roadway construction. Overall, there will be a net loss of deciduous forest (601 acres) and transition cover type (586). Of these two cover types the deciduous forest habitat has the highest existing value for vegetation and wildlife productivity. The habitat impact mitigation plan is designed to compensate for the loss of terrestrial wildlife by increasing the productivity of adjacent forest areas.

A substantial increase in lacustrine (lake) aquatic habitat is projected (1,253 acres). There will, therefore, be a substantial increase in aquatic community productivity. The clearing plan will allow for maintenance of vegetation in the shallow areas of the proposed long term storage pool to improve fish habitat. Approximately 197 acres of stream aquatic habitat will be lost.

#### C. IRREVERSIBLE IRRETRIEVABLE COMMITMENT OF RESOURCES

Construction of the dam, spillway, and relocated Bear Creek Road will result in the loss of 79 acres of predominantly scrub/shrub and forest habitat. As described above, terrestrial habitat and aquatic riverine (stream) habitat will be converted to lacustrine habitat. The construction operation will be energy consumptive. The potential for the project to be converted for hydroelectric power generation serves to offset this commitment of energy resources.

D. EVALUATION OF POTENTIAL ENVIRONMENTAL IMPACTS

Potential environmental impacts of modification of Francis E. Walter dam are summarized in Table 5 and Table 6. Potential significant adverse impacts will be offset by the mitigation plans described in this document.

## Table 5

## SIGNIFICANT ENVIRONMENTAL QUALITY EFFECTS (SELECTED PLAN)

1

1

1

ł

1

Significant Resource	Effects on EQ Attributes Ecological, Cultural, Aesthetic	Notes
Geology and Soils	Adverse soil erosion im- pacts from dam, dike, spill- way and roadway construction and borrow site excavation	Net beneficial results by employing soil erosion and sedimentation con- trol techniques; locate borrow sites below the permanent pool elevation, 1427 feet. Use additional landscape, seeding, and sen- sitive construction techniques and erosion controls.
Water Quality	Potential adverse effects on downstream water quality due to reservoir thermal stratification, pool dewater- ing during construction and release volume.	Net beneficial effect by a selective withdrawal in- take tower to moderate temp- erature and dissolved oxygen concentrations in discharge water; pool increase from 80 to almost 1300 acres offers more stable conditions; 25% increase in minimum flow in- creases present downstream acid mine drainage dilution and fishery habitat zones.
Aquatic Ecology	Adverse effect on reservoir fishery during construction. Impairment of 32 acre wetland from road and dike construction.	Net beneficial effect on fishery by limited reservoir clearing to increase lacustive habitat. Selection of road and dike alignment alterna- tives to avoid wetlands.
Terrestrial Ecology	Adverse effect on 1150 acres of terrestrial forest and trans- itional vegetation wildlife habitat due to inundation by permanent pool and dam mod- ification facilities construc- tion.	Net beneficial effect by increasing wildlife value of existing habitat through construction of planted and intensly managed 175 acres; minimize area to be cleared and restore vegetation in spillway and on roadsides.

# Table 5 (Cont'd)

Significant Resource	Effects on EQ Attributes Ecological, Cultural, Aesthetic	Notes
Cultural Resources	Adverse effect on local historic structures which may be inundated by low frequency floods; archaeo- logical sites may be inundated by permanent pool.	Coordinate with local agencies to develop protection agree- ments for local historic sites; excavate and preserve artifacts from prehistoric sites prior to inundation. Continue in- vestigations, plan artifactual display. Net effect slightly beneficial.
Recreation	Potential adverse effects from expansion of recreational facil- ities at the dam and reservoir.	Net beneficial effect from development of two-stage con- struction plan cognizant of environmental sensitivity. Reduction of ultimate capacity.
Aesthetics	Adverse effect of forest clearing for construction; flooding Kanar Falls; excavation for spillway.	Net beneficial effect by minimizing area of vegetation clearing for facilities con- struction; landscape spillway, facilities, borrow areas, and roadsides.

EIS-54

ŧ

Types of Resources	Authorities	Measurement of Effects
Air quality	Clean Air Act, as amended (42 USC 1857n-7 et seq.)	No change in state of air quality classifications
Areas of particular concern within the coastal zone	Coastal Zone Management Act of 1972, as amended (16 USC 1451 et seq.)	Not present in planning area.
Endangered and threat- ened species	Endangered Species Act of 1973, as amended (16 USC 1531 et seq.)	No critical habitat affected
Fish and wildlife habitat	Fish and Wildlife Coordination Act (16 USC Sec. 661 et seq.)	Loss of impounded fishery during construction replenished by development of larger pool habitat zones and stocking. Net loss of 197 acres of stream habitat. Loss of 1150 acres of wildlife habitat balanced by inclusion of 175 acres of intensive management wildlife habitat areas.
Floodplains	Executive Order 11988, Floodplain Mgmt.	No reduction in 100-year floodplain
Historic and cultural properties	National Historic Preservation Act of 1966, as amended (16 USC Sec. 470 et seq.)	Locally historical buildings (of potential NR eligibility) may be inundation by low frequency floods. Archaelogical sites will be covered by the permanent pool. Cultural resource investigations and coordination with the SHPO continue.
Prime and unique farmland	CEQ Memorandum of August 1, 1980: Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing the National Environ- mental Policy Act	No prime unique farmland gained or lost.
Water quality	Clean Water Act of 1977 (33 USC 1251 et seq.)	No change in state water quality classifications.
Wetlands	Executive Order 11990, Protection of Wet- lands Clean Water Act of 1977 (42 USC 185the-7, et seq.)	Alternative alignment of road relocations and dike construction avoided most wetlands. Minimal fringe losses will be mitigated.
Wild and scenic	Wild and Scenic Rivers Act, as amended	Not present in this planning area.

(16 USC 1271 et seq.)

TABLE 6

EFFECTS OF THE RECOMMENDED PLAN ON NATURAL AND CULTURAL RESOURCES

EIS-55

rivers

### SECTION VI

#### LIST OF PREPARERS

1. The EIS was prepared with the consulting firm of:

Princeton Aqua Science 165 Fieldcrest Ave. CN 7809 Edison, NJ 08818

The responsible individual preparers from that firm were:

### Individual

Christine Papageorgis, Ph.D., Project Director Ph.D. Ecology and Evolutionary Biology B.A. Biology

Stephen Posten, Project Manager M.S. Geography B.S. Environmental Science

Amy S. Greene, Associate Project Manager M.S. Ecology B.A. Biology

Jacqueline Delu, Environmental Scientist M.S. Geology B.S. Geology B.S. Animal Science

M.S. Environmental Engineering Sciences

Mark DeMaio, Environmental Scientist

work incorporated into the EIS were:

Environmental Impacts Assessment

Responsibility

Overall Project

Overall Project

Overall Project

Environmental Impacts Assessment

B.S. Environmental Studies SciencesAdditional consultants directly and recently involved in environmental

Edward Heite P.O. Box 53 Camden, Delaware 19934

Cultural Resource Investigations

Judith Rasson Wilkes College Cultural Resource Investigations Wilkes-Barre, PA 18766

Betz, Converse, Murdoch, Inc. Environmental Assessment One Plymouth Meeting Mall Plymouth Meeting, PA 19462

EIS-56

3. Philadelphia District, Corps of Engineers elements and individuals provided scopes of work for consultants and editorial revision of draft submittals. Primary individuals were:

Paul Gaudini, P.E. M.S. Civil Engineering

Roy E. Denmark, Jr. M.S. Biology

i

1

J. Jeffrey Radley B.S. Landscape Architecture Project Manager 14 years engineering analysis Role-critical review coordination and comment

Chief, Environmental Resources Branch 10 years environmental analysis, EIS preparation and assessment. Role-Technical review and comment, intra-agency and technical coordination.

EIS Coordinator 20 years EIS preparation, environmental assessment and analysis. Role-Scope preparation, critical review and comment, intra-agency coordination.

John Forren M.S. Wildlife Biology

Richard Hassel B.S. Fisheries Science PAMHEP coordinator 3 years wildlife ecology Role-PAMHEP team member, technical review.

PAMHEP 6 years fishery ecology Role-PAMHEP team member, technical review.

#### SECTION VII

## PUBLIC INVOLVEMENT

## A. PUBLIC INVOLVEMENT PROGRAM

## Introduction

The public involvement program discussed in this section was designed to establish effective communication between the planner and the many "publics" during the conduct of the study. The term "public" is defined as "any affected or interested non-Corps of Engineers entity." This includes other Federal, State, and local government agencies as well as public and private organizations and individuals.

Several methods were utilized for informing and coordinating with the public during this planning and engineering phase. While these elements individually addressed different levels of public interest, collectively they contributed to an overall public involvement program which satisfied the program objectives set forth earlier. These methods are discussed below.

#### Newsletters and Information Bulletins

A mailing list of interested public and private agencies and interested citizens was developed. A newsletter was published entitled <u>Update</u> to allow the Corps of keep the public informed about the study on the Francis E. Walter Dam and Reservoir Modification Study. An <u>Information Bulletin</u> was also published by the Corps designed to provide more detail on specific items discussed in the newsletter.

## Public Meeting

Notice of the two public meetings were distributed to the public on July 7, 1983 and May 30, 1985, respectively. The first public meeting on the proposed Francis E. Walter Dam Modification was held on July 26, 1983 in Kidder Township and the second meeting was held in Wilkes-Barre on June 13, 1985. At the meetings, U.S. Army Corps of Engineers, Philadelphia District, personnel described the status of the study and the initial concepts, and the opportunity for public comment prior to continuing further with planning and engineering studies. Technical aspects of the Walter project were also presented at the July 1983 meeting in order to impart to the public a better understanding of the proposed modification prior to the August, 1983 Delaware River Basin Commission (DRBC) meeting. This DRBC meeting discussed the Comprehensive Plan for the Delaware River Basin, including the proposed modification of Walter Dam.

Prior to and during the same time that the Corps was coordinating with the public in the early stages of the current AE&D investigation, the Delaware River Basin Commission (DRBC) was continuing a public involvement program which they had begun in 1977 which included the Modification of Walter Dam. During the process of reevaluation of the Basin Plan through the Level B Study, the DRBC conducted more than 12 major public workshops and six public meetings. This process, similarly, continued with the "Good Faith Negotiations" (SFN). Since the original GFN recommendations in 1982, there have been many public meetings, seven of which were held in 1983 solely on the

recommended amendments. Public meetings and hearings had the objective of gathering public feedback to the Basin's needs and non-structural and structural solutions considered, including the modification of Walter Dam.

#### Workshops

Workshops were conducted in an informal, communicative atmosphere. The Corps solicited and responded to comments from meeting participants regarding technical and environmental impact aspects of the plan. Workshops were the most effective dialogue tool in dealing with small segments of the public. Refer to Section 7 and Supplement a of the main report for an expanded discussion of coordination efforts.

## B. REQUIRED COORDINATION

Interim products of the planning and engineering study for the Francis E. Walter Dam have been continuously submitted to appropriate agencies for review and comment. The following agencies/organizations will be requested to respond to the DEIS. Refer to Sections 3, 5, and 7 of the main report for coordination history. Comments and letters received on the DEIS and Corps' responses to those comments are in Supplement a of the Main Report. Comments were received from agencies marked by an asterisk.

## Federal Agencies

Environmental Protection Agency, Region III\* Department of the Interior\* Advisory Council on Historic Preservation Highway Administration Department of Agriculture\* Department of Energy Energy Regulatory Commission Emergency Management Agency Department of Health and Human Services Department of Housing and Urban Development\* Department of Commerce\*

#### Inter-State and Regional Agencies

Delaware River Basin Commission\* Delaware Valley Regional Planning Commission Economic Development Council of Northwestern Pennsylvania

## State Agencies - Pennsylvania\*

Fish Commission Game Commission Department of Transportation Historical and Museum Commission Department of Environmental Resources Intergovernmental Council (State Single Point of Contact)

#### County Agencies

Monroe County Planning Commission Monroe County Commissioners
Carbon County Planning Commission Carbon County Commissioners Luzerne County Planning Commission Luzerne County Commissioners

Mayors and/or municipal managers - all population centers (city, borough, township) within Monroe, Carbon, and Luzerne Counties.

#### Business Interests

Blue Ridge Realty Co. Pocono Mountain Vacation Bureau Area Motel, Restaurant, and Recreational Establishments

#### Organizations

Northwestern Lehigh Citizens Coalition The Stoddartsville Association Bear Creek Association Lehigh River Citizen Committee Boy Scouts of America Lehigh River Preservation, Protection, and Improvement Foundation Sierra Club Tri Boro Sportsmen Carbon County Sportsmen Federation Carbon County Bassmaster Association Jim Thorpe River Adventures Pocono Whitewater Rafting, Ltd. L and L Sportsman Club Lower Toby Sportsman Club, Inc. Luzerne County Federational Sportsmen Pocono Mountain River Tours Northeast Wilderness Waterways, Inc. Whitewater Challengers, Inc. Summit Hill Rod and Gun Club Beltzville Boating Assoc. Bowmanstown Rod and Gun Club Tri Valley Outdoor Club Jim Thorpe Sportsmen Assoc. Silver Ridge Hunting Club Summit Hill Fishing Assoc. Lehigh Outfitters Mauch Chunk Rod and Gun Club Beaver Run Rod and Gun Club Palmerton Rod and Gun Club Citizens Choice Coalition PA. Federation of Sportsmen

Note: Many comments were received from County, business interests, organizations and individuals, all of which are noted in Supplement a of the Main Report.

This listing is a resume of more than 1300 agencies, firms, organizations, individuals, and news media establishments identified as having an interest in the Walter Model Coation project.

#### C. PUBLIC VIEWS AND REFERENCES

)

The Delaware River Basin Level B Study and Environmental Impact Statement (DRBC, 1981) includes discussion of regional issues relating to the proposed modification of the Francis E. Walter Dam and Reservoir. The public involvement program conducted for the present project, for the most part, raised local issues. Comments received from numerous organizations, governments, and private citizens have been reflected in the developmental plans proposed herein.

#### SECTION VIII

## EVALUATION OF SECTION 404(b)(1) GUIDELINES

Table 7 presents a Section 404(b)(1) evaluation with appropriate responses relative to the proposed project. The contents of the form are specified in 40 CFR 230, Federal Register, December 24, 1980, "Guidelines for Specification of Disposal Sites for Dredged of Fill Material" and "Testing Requirements for the Specification of Disposal Sites for Dredged or Fill Material".

#### Table 7

#### FRANCIS E. WALTER DAM AND RESERVOIR MODIFICATION SECTION 404 (b)(1) EVALUATION

I. PROJECT DESCRIPTION

a. Location

1

- b. General Description
- c. Authority and Purpose

Francis E. Walter Dam and Reservoir are located on the Lehigh River and Bear Creek in Carbon and Luzerne Counties, Pennsylvania.

Raising the top of the existing dam will require deposition of fill in the Lehigh River below the dam. Construction of a new intake tower in the pool is also planned.

Modification of the F.E. Walter Dam and Reservoir is recommended in the USCOE <u>Comprehensive Survey</u> of the Water Resources of the Delaware River <u>Basin</u>, Adopted by Congress in August 1962 (House Document 522-87-2). The project purpose is to expand the permanent pool to provide water storage for augmentation of low flows in the Delaware River.

d. General Description of Fill Material

- (1) General Characteristics
- (2) Quantity of Material

Materials will consist of clean silts, clays, sands, rocks, and gravels; intake tower will be concrete formed in the dry.

2,723,000 cubic yards will be required to raise the dam and erect the outlet works; a portion of this will be deposited in the Lehigh River. Less than 1 acre of wetlands will be encroached upon by dike construction.

The material will come from the excavation of the spillway, borrow sites located below the new permanent pool, elevation, and, if required, from previously used upland borrow sites on Federal property.

- e. Description of the Proposed Discharge Site(s)
  - (1) Location Map

See Figure 1-2 in the Main Report.

(2) Size (acres)

Lehigh River in vicinity of dam - less than 1 acre.

EIS-63

(3) Source of Material

Table 7 (Cont'd)

- (3) Type of Site
  (4) Habitat Type
  (5) Timing and Duration
  (5) Timing and Duration
  (6) Timing and Duration
  (7) Fill placement; Lehigh River Riverine Reservoir Pool - Lacustrine, limnetic hard bottom. Blaciated pools - vegetated wetland.
- (5) Timing and Duration
   of Discharge
   Project construction will take approximately
   six years. Dam extension will take place early
   in this period. The dam outlet will be extended
   prior to dam extension.

None anticipated.

- f. <u>Description of Disposal Method</u> earthmoving equipment.
- II. FACTUAL DETERMINATIONS (Section 230.11)
  - a. <u>Physical Substrate Determinations</u> (consider items in sections (230.11(a) and 230.20 Substrate)
    - (1) Substrate Elevation and Slope

Gently sloping river bottom for dam extension; tower construction will be in the reservoir bed, dike in glaciated rock soils.

f

ţ

ŧ

ŧ

Ξ.

1

1

1

(2) Sediment Type

Lehigh River - gravel and rock bottom; Reservoir bed - coarse to fine grained sediment. Shore - coarse to fine grained soils, rock, gravels.

- (3) Dredged/Fill Material Movement
- (4) Physical Effects on Benthos

Lehigh River benthos will be covered in dam extension; Reservoir benthos will be adversely impacted by reservoir lowering for tower construction.

(5) Actions Taken to Minimize Impacts (Subpart H) The dam outlet will be extended prior to fill placement for dam extension; the dam extension will be stabilized as soon as possible after fill placement. Following tower construction and project completion the reservoir will be expanded providing increased habitat area for lacustrine benthos. Road/dike alignment, adjusted for maximum avoidance. Table 7 (Cont'd)

- b. Water, Circulation, Fluctuations, and Salinity Determinations
  - (1) Water, (refer to sections 230.11(b), 230.22 Water and 230.25 Salinity Gradients; test specified in Subpart G may be required). Consider effects on:
    - (a) Salinity.
    - (b) Water Chemistry (pH, etc.). (c) Clarity.
  - (2) Current Patterns and Circulation (consider items in sections 230.11 (b), and 230.23). Current Flow and Water Circulation.
  - (3) Normal Water Level Fluctuations (tides, river stage, etc.) (consider items in sections 230.11 (b) and 230,24).
  - (4) Salinity Gradients (consider items in sections 230.11(b) and 230.25).
  - (5) Actions that will be taken to minimize impacts (refer to Subpart H. fringe habitat plants.
- Suspended Particulate/Turbidity c. Determinations
  - (1) Expected Changes in Suspended Particulates and Turbidity Levels in the Vicinity of Disposal Site (consider items in section 230.11 (c) and 230.21).
  - (2) Effects (degree and duration on Chemical and Physical Properties of the Water Column (consider environmental values in section 230.21, as appropriate).
    - (a) Light Penetration.

(b) Dissolved Oxygen.

Not applicable. No significant impacts. No significant impacts.

No significant impacts.

Tower construction will require temporary lowering of the reservoir. Project completetion will enable raising of the reservoir pool above the existing elevation.

Not applicable.

Planting of aquatic vegetation and other

Temporary increase in Lehigh River turbidity due to erosion from dam fill.

Temporary, minimal.

Not significant.

EIS-65

Table 7 (Cont'd)

N/A

- (3) Effects on Biota (consider environmental values in sections 230.21, as appropriate).
  - (a) Primary Production, Photosynthesis.

Not significant.

- (b) Suspension/Filter Feeders. Temporary, minimal.
- (c) Sight Feeders.

Temporary, minimal.

Stabilize dam extension.

(4) Actions Taken to Minimize Impacts (Subpart H).

d. <u>Contaminant Determinations (consider</u> requirements in section 230.21(d). Only clean fill will be utilized for the dam extension. No excess contaminant levels anticipated.

1

- e. Aquatic Ecosystem and Organism Determinations (use evaluation and testing procedures in Subpart G, as appropriate).
  - (1) Effects on Benthos.
  - (2) Actions to Minimize Impacts (refer to Subpart H)
- f. Proposed Disposal Site Determinations
  - (1) Mixing Zone Determination (con- N/A sider factors in section 230.11 (f)(2))
  - (2) Determination of Compliance with N/A Applicable Water Quality Standards (present the standards and rationale for compliance and non-compliance with each standard)
  - (3) Potential Effects on Human Use N/A Characteristic

EIS-66

#### IX. FINDINGS OF COMPLIANCE

a. No significant adaptations of the guidelines were made relative to this evaluation.

b. No feasible alternative options for placement of dam fill or outlet works concrete exist for this project. The only alternative is no action, which is rejected.

c. The proposed filling operations will not violate any applicable State water quality standards, with the exception of turbidity. Application for a State of Pennsylvania Water Quality Certification Permit for this project will be made prior to construction. The materials placement operations will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

d. Use of the selected disposal sites as proposed will not harm any endangered species or their critical habitat.

e. The disposal of fill material as proposed, will not result in significant adverse effects on human health and wlfare, including municipal and private water supplies, recreational and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be adversely affected in the longterm. Significant long-term effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic and economic values will not occur.

f. Appropriate steps to minimize potential adverse impacts of the discharge on aquatic systems includes alternate road relocation alignment to avoid or minimize wetland fills, tower and dam construction in the dry to reduce downstream turbidity, erosion control planting on exposed soils, creation of aquatic and terrestrial habitat replacement areas.

g. On the basis of the guidelines, the proposed disposal site for the discharge of fill material is specified as complying with the requirements of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse affects on the aquatic ecosystem.

#### REFERENCES

- Anderson, J.R., E.E. Hardy, J.T. Roach, and R.E. Witmer. A Land Use and Land Cover Classification System for Use with Remote Sensor Data. U.S. Geological Survey Professional Paper 964. U.S. Gov't Printing Office. 1976.
- Barker, J.L. Water Quality Assessment of Francis E. Walter Lake. USGS Water Resources Investigation Report 83-4032. June 1983.
- Betz Converse Murdoch Inc. November 1981. Environmental Assessment of the Francis E. Walter Dam. Prepared for the U.S. Army Corps of Engineers, Philadelphia District. June 1983.
- Camp, Dresser & McKee. Daily flow Model of the Delaware River Basin. Philadelphia District, U.S. Army Corps of Engineers in Cooperation with the Pennsylvania Department of Environmental Conservation and the U.S. Geological Survey. September, 1981.
- Carbon County Planning Commission/Candeub Cabot and Assoc. Summary Report -Carbon County Comprehensive Plan. 1976.
- \*Chezik, M.T. and P.H. Edmunds. Planning Aid Report, Evaluation of Fish and Wildlife Habitats, Project Effects and Mitigation Needs for the Proposed Modification of Francis E. Walter Reservoir, Lehigh River, Pennsylvania. Department of the Interior Fish and Wildlife Service in cooperation with the Pennsylvania Game Commission and USCOE. May, 1984.

1

- Conant, R. A field guide to reptiles and amphibians of easter and central North America. Houghton Mifflin Co., Boston, Mass. 1975.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. Classification of Wetlands and Deepwater Habitats of the U.S. U.S. Fish and Wildlife Service, Office of Biological Services - 79/31. U.S. Gov't Printing Office. December, 1979.
- "Heite, Edward F. Archaeological Assessment Francis E. Walter Dam and Reservoir. U.S. Army Corps of Engineers. 1984.
- Heite, Edward F. Historical and Archaeological Assessment in Connection with Proposed Modifications of the Francis E. Walter Dam and Reservoir, Carbon, Luzerne, and Monroe Counties, PA. Philadelphia District, Corps of Engineers. Prepared for Betz-Converse-Murdoch, Inc., 1981.
- Lear, J.M. and S.G. Hildebrand. A Comparison of Environmental Issues Related to Development of Sawmill Hydropower Resources at New Versus Existing sites, In: Proceedings of the Third Miami International Conference on Alternative Energy Sources, Miami Beach, Florida. 1980.

EIS-68

#### REFERENCES (Cont'd)

- Pennsylvania, Commonwealth of. Title 25. Rules and Regulations, Part I Dept. of Environmental Resource, Article III, Water Resources, Chapter 93. Water Quality Standards. 1979.
- PA DER, 1981. Pennsylvania Department of Environmental Resources. Personal Communication from W. Billings to Betz-Converse-Murdoch, Inc. September 24, 1981.
- Pennsylvania Power and Light Company. Arrowhead 138kV Transmission Line Environmental and Engineering Study. n.d.
- \*Rasson, Judith A. and Peter E. Siegel. A Cultural Resources Report on Selected Areas in the Vicinity of the Proposed Modification at F.E. Walter Dam. October, 1983.
- Rogalsky, Geoffrey A., Christine O'Brien, and Thomas Lloyd, Betz-Converse-Murdoch, Inc. Preliminary Environmental Evaluation of Lehigh Basin Small Hydropower Projects. October, 1981.
- Schrabisch, Max. Aboriginal Rock Shelters and Other Archaeological Notes on Wyoming Valley and Vicinity. Wilkes Barre. 1926.
- Sevon, W.B. Geology and Mineral Resources of the Hickory Run and Blakeslee Quadrangles, Carbon and Monroe Counties, Pennsylvania. U.S. Geological Survey. 1975.
- U.S. Army Corps of Engineers, Philadelphia District. Southern New Jersey Water Resources Study. Internal Document No. 2. March, 1977.
- U.S. Army Corps of Engineers, Philadelphia District. Environmental Assessment of Francis E. Walter Dam (Modified). 1978.
- U.S. Army Corps of Engineers, Philadelphia District. Francis E. Walter Dam and Reservoir Water Quality Reports. 1976-1984.
- U.S. Army Corps of Engineers, Philadelphia District. Recreation Resource Management Survey, 1981.
- U.S. Army Corps of Engineers, North Pacific Division, Portland Oregon. Hydropower Studies at F.E. Walter Project, Lehigh River Basin, Pennsylvania, Technical Report. September 1981.
- U.S. Department of Commerce, Bureau of Census. 1960, 1970, 1980.

- \*U.S. Department of Interior, Fish and Wildlife Service. Fish and Wildlife Resources in the Vicinity of the Francis E. Walter Dam and Reservoir, Luzerne County, PA, Planning Aid Report. January, 1982.
- U.S. Department of Interior, Geological Survey. Water Resources Data for Pennsylvania. PA07501 through PA-81-1. 1975-1981.
- U.S. Environmental Protection Agency. Quality Criteria for Water. Washington, D.C. 1976.
- U.S. Forest Service. Wetlands Inventory of Pennsylvania. 1977.
- Western Pennsylvania Conservancy. Rare and Endangered Vascular Plant Species in Pennsylvania. 1979.
- Zimolak, 1979. "The Anthracite Region of Northeastern Pennsylvania" from <u>The Philadelphia Region: Selected Essays and Field Trip Itineraries</u>, 1979.

\* Included in the Environmental Notebook, copies of which accompany the Main Report to agencies involved in environmental coordination. The Notebook is generally available to the public in the Philadelphia District Library; at local depositories which have been established for the project; or may be purchased. Other references are available through the author/agency cited.

#### 7. PUBLIC INVOLVEMENT

The public involvement program was designed to establish effective communication with Federal, State, and local government agencies as well as public and private organizations and individuals during the investigations and development of the selected plan. Several methods were utilized for informing and coordinating with the public during this planning and engineering phase. These methods are discussed in the following paragraphs.

\* <u>Newsletters and Information Bulletins</u>. A newsletter entitled UPDATE was published to allow the Corps to keep the public informed about the study on the Modification of Walter Dam. The purpose of the newsletter was to maintain a steady flow of information to the public about the study; to provide the Corps with the opportunity to obtain public input; and to exchange ideas as the study progresses. An INFORMATION BULLETIN was also published by the Corps. It was designed to provide more detail on specific items discussed in the newsletter. The main emphasis in all the publications was on informing the reader and encouraging response.

• <u>Workshops</u>. Informal workshops were held with special interest groups to discuss specific problems and with groups having mixed interests to discuss conflicts. Throughout the study the Corps issued an open invitation to all interest groups to encourage participation at such workshops.

• <u>Public meetings</u>. Public meetings were formally organized, announced, and recorded. The initial public meeting on the proposed Francis E. Walter Dam Modification as part of the Advanced Engineering and Design (AE&D) effort was held on July 26, 1983 in Kidder Township. At the meeting, Corps of Engineers personnel described the status of the study and the initial concepts. The meeting afforded the opportunity for public comment prior to continuing further with planning and engineering studies. Technical aspects of the Walter project were also presented in order to give to the public a better understanding of the proposed modification prior to the August, 1983 Delaware River Basin Commission (DRBC) meeting. This DRBC meeting discussed the Comprehensive Plan for the Delaware River Basin, including the proposed modification of Walter Dam.

A list of selected items of coordination which have occurred since the initiation of Advanced Engineering and Design is presented in Table 7-1.

## TABLE 7-1

## SELECTED ITEMS OF COORDINATION

	Date	Group 1/	Туре	General Purpose
25	April 1981	CORPS	Notice	Walter Study Initiation notice sent.
21	May 1981	PA Fish Commission	Letter	Expressed support of project.
1	June 1981	CORPS/USGS	Coordination meeting	Discussion of water quality investigations done by USGS Walter Dam.
15	July 1981	CORPS/DRBC	Coordination meeting	Initial coordination with DRBC about the project.
24	July 1981	CORPS/DRBC	Coordination meeting	Coordination on the DRBC Level B Study which recommends Walter Modification.
	August 1981	CORPS	Newsletter	Public notice of Study initiation. Introduced the Corps'
	August 1981	CORPS	Information Bulletin	planning process, and issues raised.
	September 1981	CORPS/FWS	Correspondence	Letters regarding questions raised by the FWS concerning proposed project.
7	December 1981	CORPS/Representative Nelligan	Letter	Discussion of impact of Walter project on Boy Scout Camp Acahela.
	December 1981	CORPS/FWS	Correspondence	Letters regarding studies to be conducted by FWS on Walter Dam.
11	January 1982	CORPS/Bear Creek Township	Initial meeting	Bear Creek Township was briefed on proposed project.
19	January 1982	CORPS/DRBC	Coordination meeting	Discussion of the role of the Walter Modification in the overall Basin Water Management Plan and AE & D. $\frac{2}{-1}$
28	January 1982	CORPS/interested Agencies (State and Local)	Coordination meeting	White water releases from Walter and the impact of the proposed modification.

- (

## SELECTED ITEMS OF COORDINATION

	Date	Group 1/	Туре	General Purpose
1	February 1982	CORPS/DRBC	Coordination meeting	Discussion of initial concept, cost allocations.
8	February 1982	CORPS/DRBC	Coordination meeting	Discussion of AE & D schedule. $\frac{2}{}$
20	July 1982	CORPS/FWS	Coordination meeting	General coordination between Corps' and FWS. Fish and wildlife investigations discussed.
27	July 1982	Public	Public meeting conducted by DRBC	"Good Faith Negotiations" public meeting. Recommenda- tion for the modification of Walter Dam included.
27	July 1982	PA Fish Commission	Statement	Opinion of Fish Commission with regard to "Good Faith Negotiation" recommendations with main emphasis on reservoir modifications and releases, including Walter Dam.
30	September 1982	CORPS/FWS	Letter	FWS stated the effects of releases and draw downs of the Walter Modification on fish and wildlife in the area.
19	October 1982	DRBC	Coordination meeting	Discussion of water resources program, including the Walter Modification.
25	October 1982	CORPS/FWS, state agencies	Coordination	Discussion of design factors of Walter and other meeting concerns.
18	November 1982	CORPS/FWS	Coordination meeting	Discussion of scope of planning being provided by FWS.
26	November 1982	CORPS/FWS	Letter	Request by Corps for comments on proposed minimum releases to be provided by Walter.
10	December 1982	CORPS/PADER	Letter	Discussion of proposed minimum reservoir releases from Walter Dam.
23	December 1982	CORPS/FWS	Letter	FWS expressed concern over minimum releases from Walter.

## SELECTED ITEMS OF COORDINATION

	Date	Group 1/	Type	General Purpose
13	January 1983	CORPS/PADER/ interested agencies and associations	Coordination meeting	Discussion of proposed modification included in meet- ing primarily covering drought warning/emergency conditions and white water releases for 1983.
20	January 1983	CORPS/Sierra Club	Workshop	Present status of project and initial concepts, answer questions, and obtain input.
1	February 1983	CORPS/PA Game and PA Fish Commissions	Coordination meeting	Discussion of potential effects of the proposed mod- ification on wildlife and the surrounding habitat.
10	February 1983	CORPS/Sierra Club	Participation in PA Executive meeting	Club was briefed on current operations, proposed plans, the AE & D, and findings to date.
15	February 1983	PADER/PA Fish Commission	Letter	Discussion of minimum reservoir releases from Walter Dam.
18	February 1983	CORPS/PADER	Coordination meeting	Coordination on preliminary recreation concepts.
18	February 1983	CORPS/PADER	Coordination meeting	Coordination on recreation concept for the modification.
23	February 1983	CORPS/District Forester	Letter	Discussion of recreational access and corridor for trails.
11	March 1983	CORPS/FWS	Letter	Classification by Corps of proposed releases from the Walter Modification.
	April 1983	CORPS	Newsletter	Recreation questionnaire. Summary of comments and response. Notification of 2nd information bulletin.
	April 1983	CORPS	Bulletin	Discussed problems arising from conflicting demands on limited water supply.
13	April 1983	CORPS/FWS	Letter	Further questions from FWS on proposed minimum releases.

1

## SELECTED ITEMS OF COORDINATION

	Date	Group 1/	Type	General Purpose
15	April 1983	CORPS/Local recreational concerns (ski lodges	Workshop 3)	Dicussion of recreation possibilities and benefits; group expressed support of project.
22	April 1983	PA Fish Commission/ DRBC	Letter	Discussion of flow releases established by the Commission which pertain to the modification.
3	May 1983	DRBC	Publication	Proposed Amendments to the Comprehensive Plan. The plan published included the modification of Walter Dam.
3	May 1983	CORPS/PADER	Letter	Discussion of Corps participation in PA Recreation Action Program which including discussion of recre- ation at Walter.
11	May 1983	WRA/DRBC	Meeting and conference	Water supply for the 1990's and beyond was dis- cussed which included discussion of the Walter Modification.
23 2 <b>-3,</b>	May; June 1983	DRBC	Public hearing	Level B/Good Faith public hearing. Included recommendation for modifying Walter Dam, status of the work to date, and discussion of selected design features.
24	June 1983	CORPS/DRBC	Coordination meeting	Discussion of cost-sharing concepts, schedule, and flood control for Walter Dam.
28	June 1983	CORPS/Bear Cr. Township Supervisors	Workshop	Township Supervisors were briefed on the modif- ication of the reservoir for water supply.
30	June 1983	CORPS/Senator Specter	Informational meeting	The Senator was briefed on projects within the state including the Walter Modification.
6	July 1983	CORPS/Senator Specter	Informational meeting	Informed the Senator about projects within the state of PA, including Walter.

7-5

## SELECTED ITEMS OF COORDINATION

	Date	Group 1/	Type	General Purpose
26	July 1983	CORPS/general public	Workshop and public meeting	Initial general workshop and public meeting to present the status of the proposed project, the initial concepts, and obtain feedback from the public.
3	August 1983	DRBC	Public hearing	Wilkes Barre, PA. Discussion of drought-pre- paredness recommendations and reservoir proposals one of which was the Walter Dam modification.
4	August 1983	DRBC	Public hearing	Honesdale, PA. Same purpose as above.
9	August 1983	DRBC	Public hearing	Walton, N.Y. Same purpose as above.
11	August 1983	DRBC	Public hearing	DRBC headquarters, West Trenton, N.J. Same purpose as above.
	September 1983	CORPS	Newsletter	Notice of transcript of 26 July public meeting.
29	September 1983	CORPS/Local Residential group	Workshop	Discussion of private properties in Stoddartsville involved in the modification project.
29	September 1983	CORPS/White Haven Borough	Workshop	Corps answered questions and addressed concerns and misconceptions of the residents of White Haven Borough.
29	September 1983	CORPS/Kidder Township	Workshop	Corps answered questions and addressed concerns and misconceptions of the residents of Kidder Township.
30	September 1983	CORPS/Senator Specter	Letter	Discussion of the impact of the Walter Modification on local property owners.
3	October 1983	CORPS/Buck Township	Workshop	Corps answered questions and addressed concerns and misconceptions of the residents of Buck Township.

7-6

1

# SELECTED ITEMS OF COORDINATION (CONT'D)

	Date	Group 1/	Type	General Purpose
4	October 1983	CORPS/Tri-Boro Sportsmen Club	Workshop	Presented project status and concepts. Discussed questions and concerns; and received feedback.
7	October 1983	CORPS/FWS, PA Fish and PA Game commissions	Coordination meeting	Corps coordination between agencies on the Walter Modification.
14	October 1983	CORPS/Stoddartsville Association	Workshop	Expressed concern over the effects of the Walter Modification on the value and well being of the Stoddartsville Old Mill.
17	October 1983	CORPS/PADER	Letter	Discussion of development and operation and main- tenance of recreation facilities at Walter.
19	October 1983	CORPS/Lower Tobyhanna Sportsmen Association	Workshop	Exchange and clarification of information and a presentation of the Association's concerns.
1	November 1983	CORPS/PA House of Representatives	Coordination meeting	Meeting with members of the House whose Districts were directly affected by the Walter Modification
2	November 1983	CORPS/PADER	Letter	Corps reported common areas of concern that local communities had which the Corps learned during workshop meetings for the Modification.
2	November 1983	Luzerne County Commissioners	Resolution	Opposes the Walter Modification.
14	November 1983	CORPS/PADER	Letter	Corps comments on Commonwealth Recreation Action program as requested by PADER.
21	November 1983	CORPS/EDCNP	Coordination meeting	Briefing on AE & D and status and discussions, primarily on the projects impacts on flood control and real estate relocations.
2	December 1983	CORPS/PADER	Coordination meeting	Presentation of proposed recreation concept plan for comment and further definition.

## SELECTED ITEMS OF COORDINATION

	Date	Group 1/	Type	General Purpose
12	January 1984	CORPS/Carbon County Sportsmen's Association	Workshop	Presentation and status of AE & D and a discussion of proposed boating, fishing, hunting, and general recreational facilities and activities with representatives of various sportsmen's and boating clubs in the county.
25	January 1984	CORPS/DRBC	Presentation at Scheduled Meeting	Briefing on AE & D and status of project to the DRBC commissioner, staff and public; emphasis of discussions was on recreation and its impact.
25	January 1984	CORPS/Senator Specter	Letter	Discussion of the Walter Modification and its role in meeting future water resources needs.
2	March 1984	CORPS/PADER	Letter	Draft contract between U.S. government and state of Pennsylvania for recreation at Walter.
5	March 1984	CORPS/PADER	Coordination meeting	Discussion of drought contingency plan for the Delaware River Basin.
22	March 1984	EDCNP	Resolution	Supports the Walter Modification but at a reduced permanent pool level.
27	March 1984	CORPS/PADER	Letter	PADER gave estimates of Walter recreation operation and maintenance costs.
17	April 1984	CORPS/DRBC	Letter	Letter discussing allocation of costs, cost- sharing, and study schedule.
24	April 1984	CORPS/DRBC	Coordination meeting	Discussion of financing, safety, and hydropower associated with the proposed project.
25	April 1984	DRBC	Resolution	DRBC adopted resolution concerning temporary emergency storage at basin dams, including Walter.

(

## SELECTED ITEMS OF COORDINATION

	Date	Group 1/	Туре	General Purpose
20	June 1984	CORPS/PADER	Letter	Discussion of types of recreational development at Walter Dam.
26	June 1984	CORPS/DRBC	Coordination meeting	Discussion of benefits, water supply alternatives, and cost allocation.
26	June 1984	CORPS, DRBC, and NJ and PA DER	Coordination meeting	Corps presented an update of the Walter project and discussed additional issues with the agencies.
10	July 1984	CORPS/PADER	Letter	Discussion of the impact of releases from Walter Dam for white water rafting.
23	July 1984	CORPS/local rec- reational facil- ities owners	Coordination meeting	Discussion of the Walter modification's impact on existing private recreational facilities and their plans for future facilities.
24,	, 25 July 1984	CORPS, FWS, PADER, PENNDOT, PA Game Commission.	Coordination meeting	Discussion of proposed plans prior to continuing with further engineering and design.
24	September 1984	CORPS/DRBC	Coordination meeting	Discussed cost allocation and financing for the Walter Modification.
1	October 1984	CORPS/DRBC	Letter	DRBC confirmed the Trexler project as a viable alternative to the Walter Modification, but emphasized its focus on the four projects scheduled for construc- tion before the year 2000, one of which is the Modification of Walter Dam.

)

#### SELECTED ITEMS OF COORDINATION

	Date	Group 1/	Type	General Purpose
2	October 1984	CORPS/PA Game Commission	Letter	Request by PA Game Commission that alternative Bear Creek Road alignments be investigated to avoid wetlands impacts.
	November 1984	CORPS/FWS, PA Game Commission	Correspondence	Coordination on alternative alignments of Bear Creek Road.
	April 1985	CORPS	Newsletter	Announce availability of draft report. Recreation and relocation changes.
30	May 1985	CORPS	Invitation	Invitation to the second public meeting.
12 .	June 1985	CORPS/General Public	Workshop	Workshop to discuss concerns on an individual basis.
13	June 1985	CORPS/General Public	Workshop and Public Meeting	Workshop. Same purpose as above. Public Meeting to describe changes in the project and collect public comment for the record.
June-	July 1985	Agency/Public coordination	Responses to review of draft GDM/EIS	Public input to draft GDM/EIS, public workshops and public meeting (included in Supplement a, General Issues and Public Comment).
Augus	t 1985	Corps	Newsletter	Notice of transcript of 13 June 1985 public meeting.

1/ CORPS - U.S. Army Corps of Engineers DRBC - Delaware River Basin Commission EDCNP - Economic Development Council of Northeastern Pennsylvania FWS - U.S. Fish and Wildlife Service PADER - Pennsylvania Department of Environmental Resources PENNDOT - Pennsylvania Department of Transportation WRA/DRB - Water Resources Association of the Delaware River Basin

 $\frac{2}{1}$  AE&D - Advanced Engineering and Design

ſ

## UTILIZATION OF DRBC PUBLIC INVOLVEMENT

Prior to and during the same time that the Corps was coordinating with the public to obtain input regarding the current AE&D investigation, the Delaware River Basin Commission (DRBC) was continuing a public involvement program which they had begun in 1977 which included the Modification of Walter Dam. During the process of reevalution of the Basin Plan through the Level B Study, the DRBC conducted more than 12 major public workshops and six public meetings. This process, similarly, continued with the "Good Faith Negotiations" (GFN). Since the original GFN recommendations in 1982, there have been many public meetings, seven of which were held in 1983 solely on the recommended amendments. Public meetings and hearings had the objective of gathering public feedback to the Basin's needs and the non-structural and structural solutions considered, including the modification of Walter Dam.

#### PUBLIC ISSUES

This AE&D investigation utilized all the information gathered by the DRBC in identifying the interested publics and the issues which had been raised. The public involvement program and the identification of investigations to be conducted were built upon this Level B and GFN public input. Additional issues arose during the Corps public involvement program.

These issues have been addressed through the UPDATE's and INFORMATION BULLETINS, return correspondence, workshops, public meetings, and private meetings with individuals. The strategy was to provide the best response that was available at the time and qualify it whenever necessary. Then, as the study progressed and more information became available, more definite or updated responses were presented, usually through the newsletters and bulletins. The most commonly raised issues are presented in Supplement a.

## PUBLIC COMMENT ON DRAFT REPORT

Comments were received as the result of the coordination of the draft General Design Memorandum including the Draft Environmental Impact Statement and accompanying public involvement. Public involvement included a newsletter, public meeting notice, two general public workshops and a public meeting. The comments and responses are presented in Supplement a.

Rev Aug 85

## 8. RECOMMENDATIONS

## RECOMMENDATIONS

DESIGN MEMORANDUM. It is recommended that this design memorandum be approved as the General Design Memorandum for F. E. Walter Dam and Reservoir project and that features of the work requiring further analyses be reported upon in future detailed design memoranda.

CONSTRUCTION PROGRAM. It is recommended that the schedules for design and construction given in Section 4 of this report be approved.













-----





DELAWARE RIVER BASIN LEHIGH RIVER, PA. MOD. OF F.E. WALTER DAM AND RESERVOIR SPILLWAY WEIR AND WALL DETAILS DRAWING NUMBER PLATE SCALE: AS SHOWN PATE: SHEET





Ľ







FREET

SCALE: AS SHOWN DATE:





EXISTING CLEARING EL. 1350				
COMPLETE CLEARING EL. 1430				
ED HABITAT ZONES	EL.1430			
	EL.1410			
DOWN TIMBER CLEARING EL.1458				
SENERAL CLEARING EL.1487				


















N366,000	000
75	
	DELAWARE RIVER BASIN LEHIGH RIVER, PA. MOD. OF F.E. WALTER DAM AND RESERVOIR RELOCATED LR 40041
	GENERAL PLAN DRAWING NUMBER PLATE  BCALE: AS SHOWN DATE:  PLATE 1-20



PLATE 1-21





BCALE :	AS	SHOWN	Гь
		00	



. ---







U.S. ARMY

# General Issues and Public Comment

# Supplement a

#### INTRODUCTION

Many issues arose during the meetings, correspondence, and general coordination which were a part of the Corps' public involvement program for the Walter study and the Delaware River Basin Commission's public involvement for the Level B Study and the Good Faith Negotiations. Throughout the Walter Study, in newsletters and information bulletins, the Corps has been responding to these issues with the best answers available at the time. This supplement first presents a summary of the most commonly raised issues (and subsequent, updated responses) up to the coordination of the Draft General Design Memorandum (GDM). The second section contains all written comments (and responses) received on the Draft GDM including the Draft EIS, the accompanying General Public Workshops and Public Meeting, and the newsletter and notice announcing these. 

#### TABLE OF CONTENTS

#### CONTENT

.

PAGE

ISSUES PRIOR TO DRAFT GDM

Needs	a-l	
Recreational	a-2	
Historie and Cultural	a-3	
Economic	a-4	
Environmental	a5	
Design	a-5	
General		

COMMENTS TO DRAFT GDM & EIS AND RESPECTIVE PUBLIC INVOLVEMENT U.S. Soil Conservation Service U.S. Coast Guard Federal Emergency Management Agency Pennsylvania Intergovernmental Council U.S. Department of the Interior U.S. Department of Housing and Urban Development Pennsylvania Department of Transportation Pennsylvania Department of Environmental Resources U.S. Environmental Protection Agency Pennsylvania Game Commission Federal Energy Regulatory Commission Carbon County Planning Commission Dream Mile Club E & C Associates GFWC -Women's Service Club of Bear Creek Area Lehigh River Outfitters Association PENJERDEL Council Wesley James Peter Forte John Adams N. Postupack Mary G. Eyre Mrs. Pierce B. Day Pierce B. Day

COMMENTS TO DRAFT GDM & EIS AND RESPECTIVE PUBLIC INVOLVEMENT (CONTINUED)

Elizabeth S. Davis Mrs. Grayson G. Tabler Cdr. John L. Butler William J. Jeffers Glenn Babel E. Kent Clark Hayden Crilley T. G. Gayeski Mrs. V. Mislivets Joseph L. Stone, Sr. Mayor Wm. W. Yost William D. Haas

## ISSUES RAISED CONCERNING THE MODIFICATION OF F. E. WALTER DAM

#### BRIEF DESCRIPTION OF ISSUES

### CORPS REMARKS

#### Needs Issues

ł

Since the present impoundment is never full, need for a larger dam is not clear. The existing impoundment could accommodate low flow augmentation storage.

No comprehensive efforts have been developed or implemented to provide for effective conservation of current and future water usage throughout the Basin; especially New York City. In fact, construction of the Walter project would lessen pressure for conservation.

DRBC is pushing for the Walter modification to develop water supply for very special interests such as power companies, water companies, and the larger cities.

Even though the reservoir has been used for water storage during extreme drought emergencies, the existing reservoir is solely for flood control. The impoundment is reserved for flood waters. Dual use assures neither complete flood control nor water supply performance. During the 1981-82 drought emergency storage, stored water had to be released because of a potential storm, which ultimately veered off the coast just below the basin. That water was no longer available for the drought and the risk which had been taken by originally using part of the flood control pool was in vain.

Development of a conservation program for the entire Basin and New York City may be beyond the scope of this study. Existing or approved conservation plans being implemented by the responsible authorities will be used in computing residual needs. For example, the DRBC comprehensive Plan is based on an overall 15% depletive use reduction during droughts.

The project is designed to meet a regional water supply need. The project is one of a number of projects recommended by DRBC and the member states to help alleviate the region's water supply problems. The water is for consumptive use make-up no matter where it occurs throughout the Basin. The water will directly augment flows in the Lehigh and Delaware Rivers and will also indirectly improve the general or total pool of water supplies for the Basin. No need has been identified to draw or "pipe" water from the reservoir.

### BRIEF DESCRIPTION OF ISSUES

#### Recreational Issues

Because of budget limitations, Pennsylvania has in the past expressed an inability to fully participate in recreational development as proposed in the feasibility study. This may change or preclude recreational development.

Recreation visitation estimates are inflated. This may be due to the type of equipment being used.

The intensity of recreation development should be limited.

Observations indicate that the most desirable white-water boating is between 400 and 500 cfs. A new project should provide for these flows during the recreation season or for special weekend releases.

There will be problems with trash, traffic, and crime because of the recreation area.

#### CORPS REMARKS

The Commonwealth of Pennsylvania has continuously supported the project including recreation. The Delaware River Basin Commission will be sponsoring the entire project including recreation. Subsequent arrangement among the States comprising the Commission, which includes the Commonwealth, will undoubtably address this issue.

Because people use the road across the dam as a short cut, inflated counts have always been a problem. Because of the physical layout of the area, the traffic counters cannot accurately disaggregate the through traffic. Our most recent detailed counts and surveys which have been used in our current investigations were conducted during the time the pool was raised. The road was cut off; therefore, through traffic counts were eliminated.

The new recreation facilities will promote more nature-oriented activities rather than recreational such as swimming and high-speed boating. The attraction should be more for local and second-home residents; sportsmen and naturalists. Recreation is being planned and designed to complement and preserve the aesthetics and natural resources and sensitive environmental posture of the project area.

Releases for white-water boating are already being provided by the existing project to whatever extent possible. The modified project would continue the existing arrangement. The requests for releases are made by the Pennsylvania Department of Environmental Resources after coordination and negotiations with the various sportsman, boating, and fisheries interests.

(

1

A 1984 survey of local municipalities surrounding other Corps parks in the area indicates that the lakes have not caused any significant problems in these areas. Overall, the parks were rated as a tremendous benefit to their surrounding communities.

#### Historic and Cultural Issues

The project will adversely affect the historical community of Stoddards-ville.

#### CORPS REMARKS

Police logs show no increases in crime due to the lake. Additional patrols, which are the result of a Corps' contract with the local police, deter any crime that might occur. This contract results in additional patrols but no need for more police personnel.

Some townships surrounding Corps parks experience an increased amount of trash, but almost all report that it is easily taken care of and not a major problem.

With regard to traffic, the main problems at the parks surveyed stem from backed-up access roads to boat launch sites. All of these parks, however, have unlimited horsepower boating which generates a heavy demand. Walter Dam, on the other hand, would only permit low, 10 horsepower boating. This kind of boating attracts mainly fishermen and therefore, should not cause a traffic problem.

Additionally, a traffic analysis done for the Walter Dam area in 1984 indicated that the traffic generated during the park's peak season, summer, should be no greater than the traffic currently generated during the peak winter skiing season.

The permanent lake will not inundate the old Stoddardsville area; however, periodically, it could be subject to temporary indundation. The Old Hotel ruins, and remaining foundations lie within the extreme limits of the flood control pool. When very rare floods occur, it will be necessary to temporarily store flood waters at this pool level. Since these sites currently lie within the natural flood plain of the Lehigh River, they are already subject to flooding and the highly erosive currents resulting from flood waters rushing down the river valley. the pooling of flood waters by the reservoir will have a stilling effect and should not increase current suscepibility to erosion. Currently, the sites are not in any historic registers,

#### Economic Issues

How important is recreation at Walter and is recreation justifying the water supply purpose?

#### Environmental Issues

The aesthetics of dead and down trees at the existing reservoir is unacceptable.

When the permanent pool is filled, will the flooded timber be left standing for fish and waterflow habitat?

The Lehigh Falls at Stoddartsville would be inundated.

The Butter Milk Falls on Bear Creek above the dam would be inundated.

The increased pool would threaten the Boy Scout Camp, Acahela.

#### CORPS REMARKS

but historic investigations and documentation will continue. At this time, it is expected that real estate techniques such as a combination of fee title, easements and salvage purchases may be applicable in satisfying both local and Governmental concerns about implementing the project and addressing these cultural resources.

Each purpose of a multipurpose project has to be individually justified. The benefits of one purpose do not carry any other purpose. By combining several purposes in one project, the cost of each purpose is reduced, thereby making it more efficient than having separate projects for each purpose.

The trees currently downed are the result of long term storage for water supply during the 1960's and 1981-82 droughts. The existing dam was not intended or designed for this long-term storage. The proposed modification will include a properly designed permanent pool for water supply. The existing dead and down trees will be removed under the proposed modification. Any additional storage beyond this permanent pool would be temporary for flood control. It would be short-term and, therefore, not result in "tree kills".

Timber and vegetation clearing concepts have been coordinated with fish and wildlife interests. Improvement of fish and wildlife habitat has been incorporated into the plan along with other concerns such as safety, water quality, and maintenance.

At this time, it appears that the falls would be inundated only during periods of extreme flood events.

The Butter Milk Falls are located above both the permanent and flood control pools and, therefore, will not be inundated.

In the past, the Penn Mountain Council of the Boy Scouts of America were provided the best available information concerning the proposed modification. It appears that there should be no conflict with their existing or future facilities.

#### BRIEF DESCRIPTION OF ISSUES

Wildlife will be threatened by inundation.

The increase in minimum flow requirements from 50 cfs to 63 cfs would not provide a significant increase for downstream fisheries.

When using the project for water supply or even after collecting flood waters, lowering of the pool will cause mudflats or small pools creating a mosquito breeding ground.

#### Design Issues

The safety of increasing and maintaining the increased storage is a major concern. The integrity of a larger, earth-filled dam is highly questionable especially in light of previous disastrous Corps of Engineers projects in other states.

This area has been known for seismic activity every 300 years. Is this dam designed for that magnitude of earthquake?

#### CORPS REMARKS

Environmental studies by the Corps and other agencies indicate that wildlife will be impacted but these can be addressed with mitigative measures.

The Walter Modification does not have storage allocation authorized for enhancement of fisheries. However, because of the Modification, the fisheries would have more water than they do now. The augmented flow will reduce or almost eliminate periods of very low flows which historically and currently exist in the Lehigh River. There have been no scientific studies done on flow requirements for fisheries in the Lehigh even though the need for establishing such criteria was recognized more than ten years ago. Although such analyses were not scheduled or funded, the Corps did address this issue beyond what was required for impact analysis. The need for enhancement has not been established and a sponsor has not come forward to support and eventually pay for such measures.

There will be no marshy areas surrounding the project and any potential pockets will be treated and graded. Abnormal mosquito problems are not predicted and have not been a problem at any of the Corps other reservoirs in the Delaware River Basin.

There have been no failures of Corps dams. Corps design criteria is both stringent and proven. The stability of a larger earthfilled dam would be investigated under a variety of storage conditions to ensure a safe design. The most current design criteria and construction methods will be used.

The design of the dam would adhere to all earthquake criteria which are prescribed for the zone in which the project is located.

#### BRIEF DESCRIPTION OF ISSUES

The project will eliminate the access road across the dam disrupting local traffic flow.

Where will the traffic go when the Bear Creek Road is closed during construction?

The dam would be vulnerable to bombings or sabotage during war.

#### General Issues

Does the DRBC have complete control of the water behid the dam and the final say on water releases?

How much power would be generated from hydropower at Walter?

Because of the original legislation, Bear Creek Township, where the dam is located, cannot apply for a permit to study hydropower. Weatherly Borough has been given this permit.

#### CORPS REMARKS

The road was designed and constructed as access for the dam tenders and associated services. It was never meant to be a public through road.

Barring any unusual circumstances, the normal procedure is to maintain traffic during construction. Most of the new road would probably be constructed first, and later tied into the existing Bear Creek Road.

(

ł

1

` (

÷ŧ

1

ł

From World War II experience, an earthen dam is one of the most difficult structures to destroy. If such an incident were to occur, the Corps and downstream communities would then implement their dam failure emergency and evacuation plans which would be developed as part of the proposed modification.

The Corps strives to fulfull DRBC's requests since they are the potential sponsor and, therefore, purchaser of the water supply storage. There are preestablished operational, hydrologic, and environmental criteria, however, which have to be considered. The Corps must consider all these criteria before fulfilling DRBC's request; it is not merely a process of turning a "tap" on and off at will.

The Borough of Weatherly plans to install a 5.0 megawatt plant if they are granted a license. Studies by the Corps have shown that about 10 megawatts could be installed once the dam modification is completed.

The Corps has no jurisdiction over hydropower policies at the Walter Dam except to insure that any planned hydropower facilities do not conflict with the integrity of the project or its operation for the purposes for which it is built. All other matters concerning hydropower fall under the jurisdiction of the Commonwealth of Pennsylvania and the Federal Energy Regulatory Commission.

## COMMENTS TO DRAFT GDM & EIS AND RESPECTIVE PUBLIC INVOLVEMENT

1

Soil Conservation Service 228 Walnut Street, Room 850 Box 985 Federal Square Station Harrisburg, Pennsylvania 17108-0985

May 8, 1985

Mr. Nicholas J. Barbieri, P. E. Chief, Planning/Engineering Division Department of the Army Philadelphia District, Corps of Engineers Custom House - 2nd & Chestnut Streets Philadelphia, FA 19106

#### Dear Mr. Barbieri:

United States

Department of

Agriculture

We have reviewed the Draft Environmental Impact Statement for Modification of the Francis E. Walter Dam, Delaware River Basin, Lehigh River, Pennsylvania.

In making such a review, our two primary concerns are the impact of the project on agricultural activities, especially loss of prime farmland, and control of erosion and sedimentation resulting from project construction.

With regard to this project, there appears to be no impact on agricultural activities. However, a point of clarification may be warranted. The Environmental Appendix states in Table A-17 that 6.1 square miles of agricultural lands are present in the project vatershed. While this constitutes only two percent of the land area, it is still almost 4,000 acres. Based on the mapping used for the PAMHEP analysis, it appears that no agricultural land will be directly affected by the project. If this is the case, a simple statement to this effect in the DEIS would remove any question with regard to this issue.

2 While the impact of this project on agricultural activity is minimal, the potential impacts of erosion and sedimentation during construction are substantial. The DEIS does address this issue in general terms at several places. At this stage of design, this general discussion is all that can be expected. However, the lack of detail makes it impossible for us to truly evaluate the erosion and sedimentation impact of this project. We can only encourage you to be acutely aware of these inpacts as you finalize erosion and sediment control plans. Hopefully, current permitting procedures will insure that this issue is adequately addressed.

1. There are no agricultural lands in the proposed project. The FEIS has been annotated in appropriate sections to recognize agricultural land impacts.

2. Erosion and sediment control plans will become an integral part of detailed construction plans and contractual documents. Approval of those plans is subject to current permitting procedures.

Thank you for the opportunity to review this document. If there are any questions regarding our comments, please contact our office.

2

Sincerely,

Lower H Elson

Dames H. Olson State Conservationist

cc:

cc: Gary A. Margheim, National Environmental Coordinator, SCS, Washington, D. C. Richard Maculaitis, District Conservationist, SCS, Nanticoke, PA Eugene Sheard, District Conservationist, SCS, Jim Thorpe, PA Thomas Matticks, Acting Area Conservationist, SCS, Bloomsburg, PA

U.S. Department of Transportation United States Coast Guard

Commander (dpl) Third CG District Governors Island New York, NY 10004 (212) 668-7047

16475.2/3-85 9 May 1985

Mr. Nicholas J. Barbieri, P.E. Chief, Planning/Engineering Division Department of the Army Philadelphia District Corps of Engineers Custom House, 2nd and Chestnut Streets Philadelphia, PA 19106

Re: Modification of the Francis E. Walters  ${\tt Dam}$  and Reservoir, Main Report and DEIS

Dear Mr. Barbieri:

a-9

We have reviewed the subject document and have no comment on it. Thank you for the opportunity to review and comment on this project.

Sincerely, Wunkerler civis

Lewis D. Wunderlich Environmental Protection Specialist District Planning Office Third Coast Guard District By direction of the District Commander No response required.



## Federal Emergency Management Agency Region III 105 South 7th Street Philadelphia, Pennsylvania 19106

May 15, 1985

Mr. Nicholas J. Barbieri, P.E. Chief, Planning/Engineering Division U. S. Army Corps of Engineers 2nd & Chestnut Streets Phila. Pa. 19106

Dear Mr. Barbieri:

4

This is in reference to the February 1985 Draft General Design Memorandum for the proposed modification to the Francis E. Walter Dam and Resevoir. Providing that the present downstream 100 year flood discharge does not increase or decrease as a result of this modification, we have no comments to offer at this time.

Thank you for the opportunity to review and comment on this project.

Sincerely,

Harts Bach Walter P. Pierson Chief Natural and Technological Hazards Division

New hydrology and hydraulics were developed as part of this current study. The modification, in itself, does not change the flood control nor the protection. Pre and post Modification conditions are the same; therefore, the 100 year flood discharge remains the same. However, differences may exist between what FEMA and the Corps has computed as the existing 100 year flood discharge if, in fact, different data is being used.



Custom House - Second and Chestnut Streets Philadelphia, Pennsylvania 19106 Dear Mr. Barbieri:

Pennsylvania's Intergovernmental Review Process regarding the Main Report and Environmental Impact Statement and Modification of the Francis E. Walter Dam and Reservoir - Lehigh Valley River Basin, Pennsylvania. Copies of these materials were distributed to several of our reviewing agencies; these agencies do not wish to comment.

We appreciate the opportunity to review this document.

Sincerely,

Barbara

Barbara J. Gontz Project Coordinator Intergovernmental Review Process

BJG/abs

Strengthening Intergovernmental Relations and Public Decision-making in Pennsylvania

No response required.



### United States Department of the Interior

OFFICE OF THE SECRETARY MID-ATLANTIC REGION Custom House, Room 502 Second and Chestnut Streets Philadelphia, Pennsylvania 19106 May 20, 1985

95/562

Nicholas J. Barbieri Chief, Planning/Engineering Division Philodelphia District, Army Corps of Engineers Custom House, 2nd and Chestnut Streets Philodelphia, PA 19106

Dear Mr. Barbieri:

This responds to your letter of March 28, 1985 requesting comments on documents relating to the proposed modification of the Francis E. Walter Reservoir project, Luzerne and Carbon Counties, Pennsylvania. We have reviewed the Main Report, including the draft environmental impact statement (DEIS), the Environmental and Cultural Appendices that you sent to us, and the other ten appendices that District personnel sent on request to our Fish and Wildlife Service office in State College, Pennsylvania. Our comments on these documents are detailed below.

#### Main Report and Appendices

- Depletive (i.e., consumptive) use of water is a key concept for water management in the Delaware River Basin. Estimates of future depletive use are a partial basis for estimates of future water supply and flow augmentation needs. Such estimates appear throughout these documents (e.g., paragraph two on page 2-8, paragraph three on page 3-9, Table 2-1 on page 2-10, Table C-1 of Appendix C, Table A-2 and Figure A-5 of Appendix E). Unfortunately, the estimates are from the Level B Study Report of the Delaware River Basin Commission. As the Department pointed out in commenting on the draft of that report, those estimates of future in-basin depletive use are several times greater than predicted percentage increases in human population (see Tables 2 and 5 in the Level B Study Report). Neither the Level B Study Report nor your draft report has ony explanation for the dramatically increased per capita use of water that DRBC staff and your staff apparently expect to occur. Such excessive increases in per capita use of water is incompatible with the DRBC's claim that conservation is the cornerstone of Delaware Basin water management.
- The last sentence on page 2-15 states that the Borough of Weatherly's application for license (for hydropower development at Walter Dam) is currently under review by the Federal Energy Regulatory Commission (FERC). After your report was drafted, the FERC denied the application.
- The last paragraph on page 2-16, the first paragraph on page A-21 of Appendix E, and the second paragraph on page C-68 of Appendix C refer to an estimated 26 percent increase in Delaware Basin depletive use of water. As shown in Table 2-1, practically all of that estimated increase is due to an estimated increase of 80 percent in in-basin depletive use, with exports remaining at the level mandated by Supreme Court decree. The predicted 80 percent increase in in-basin depletive use seems unreasonable because it is
- 1. The comparison of total depletive water use projections with only population projections is misleading. As we know. the use of modern appliances such as air conditioners and garbage disposals are water intensive. The use of wet cooling towers by the electric utility industry uses far more water depletively than once-through cooling. Population projections are only one factor of many in projecting future depletive water use. As the footnotes to Table 5 in the Level B report indicate, "the projections to year 2000 will be subject to continuing review. The effects of the past economic slowdown and recent technology changes may cause a lessened growth of municipal, industrial, and steam electric depletive water use." The Commission is now preparing a depletive water use budget during which the previous projects will be reviewed. The Commission suspects that the industrial projections might be high, while the irrigation projections may be low.



## United States Department of the Interior

OFFICE OF THE SECRETARY MID-ATLANTIC REGION Custom House, Room 502 Second and Chestnut Streets Philadelphia, Pennsylvania 19106 May 20, 1985

ER 85/562

Nicholas J. Barbieri Chief, Planning/Engineering Division Philadelphia District, Army Corps of Engineers Custom House, 2nd and Chestnut Streets Philadelphia, PA 19106

Dear Mr. Barbieri:

This responds to your letter of March 28, 1985 requesting comments on documents relating to the proposed modification of the Francis E. Walter Reservoir project, Luzerne and Carbon Counties, Pennsylvania, We have reviewed the Main Report, including the draft environmental impact statement (DEIS), the Environmental and Cultural Appendices that you sent to us, and the other ten appendices that District personnel sent on request to our Fish and Wildlife Service office in State College, Pennsylvania. Our comments on these documents are detailed below.

#### Main Report and Appendices

- Depletive (i.e., consumptive) use of water is a key concept for water management in the Delaware River Basin. Estimates of future depletive use are a partial basis for estimates of future water supply and flow augmentation needs. Such estimates appear throughout these documents (e.g., paragraph two on page 2-8, paragraph three on page 3-9, Table 2-1 on page 2-10, Table C-1 of Appendix C, Table A-2 and Figure A-5 of Appendix E). Unfortunately, the estimates are from the Level B Study Report of the Delaware River Basin Commission. As the Department pointed out in commenting on the draft of that report, those estimates of future in-basin depletive use are several times greater than predicted percentage increases in human population (see Tables 2 and 5 in the Level B Study Report). Neither the Level B Study Report nor your draft report has any explanation for the dramatically increased per capita use of water that DRBC staff and your staff apparently expect to occur. Such excessive increases in per capita use of water is incompatible with the DRBC's claim that conservation is the cornerstone of Delaware Basin water management.
- 2 The last sentence on page 2-15 states that the Borough of Weatherly's application for license (for hydropower development at Walter Dam) is currently under review by the Federal Energy Regulatory Commission (FERC). After your report was drafted, the FERC denied the application.
- 3 The last paragraph on page 2-16, the first paragraph on page A-21 of Appendix E, and the second paragraph on page C-68 of Appendix C refer to an estimated 26 percent increase in Delaware Basin depletive use of water. As shown in Table 2-1, practically all of that estimated increase is due to an estimated increase of 80 percent in in-basin depletive use, with exports remaining at the level mandated by Supreme Court decree. The predicted 80 percent increase in in-basin depletive use seems unreasonable because it is

- 2 2. Weatherly's license application was denied by FERC on March 21, 1985 because the proposed hydropower project "is not designed to utilize fully the head, as Federally authorized, at the Corps' modified project... Licensing the power project as currently proposed would not be consistent with the comprehensive development of the river and would not be in the public interest." The Borough, however, filed an application for rehearing. FERC granted the rehearing on April 26, 1985 for the purpose of reviewing more fully the arguments raised. There is no time deadline placed on the completion of this review. The report has been revised to reflect this.
- 3 3. As indicated above, the DRBC is now formulating a depletive water use budget which can be used to limit future depletive use to that which can be allocated for use. but still maintain the chloride and sodium goals in the Delaware Estuary. Obviously the amount of water storage available now and in the future will influence the depletive water use budget. as well as future DRBC sodium and chloride standards for the estuary. The Level B Report recommended a chloride standard of 121 ppm instead of the present and less protective 180 ppm standard. Since the fifth reservoir. Hackettstown, recommended in the Level B Study Report could not be built, the recommended chloride standard was eroded. Even if the increase in depletive water use for the year 2000 doesn't occur as projected, the Francis E. Walter project is certainly needed to maintain a barrier against the 121ppm standard rather than allow excessive salinity.

-2-

grossly disproportionate to predicted increases in human population, as noted above. Moreover, it is misleading to treat these predicted increases in in-basin depletive use as inevitable. DRBC administrative apparatus is designed to regulate such use, and huge increases in depletive use of water will not come about unless they are authorized by the DRBC Commissioners.

and the provided project modification of the Walter Reservoir project (b) and the provided project modification of the Walter Reservoir project modification. That claim occurs elsewhere in your report (c) a, paragraph three on page C-69 of Appendix C) and in the draft EIS (e.g., last paragraph on page EIS-2). The claim is misleading at best. The Flood Control Act of 1962 (P.L. 87-874) authorized modification of the Walter Reservoir project (built solely for flood control) to occommodate recreation and water supply. The Act does not specify how the approximately 70,000 acro-feet of water supply at Walter should be used, and the DRBC has taken no formal action to establish priorities for use of water supply storage at the Walter project.

The first paragraph on page 2-18, the fourth paragraph on page 3-9, and the third paragraph on page D-27 of Appendix D state that recreation is a secondary purpose of the Walter Modification. We disagree with that notion. There is no basis in the authorizing legislation (Flood Control Act of 1962) or in subsequent actions by DRBC to differentiate primary and secondary purposes of the modified Walter project. The authorized purposes are flood control, recreation, and water supply.

There is a discrepancy between the clevations of the Zone III/Designated Hobitat Zone as described on page 4-4 (1400 NGVD to 1430 NGVD) and as shown on Plates I-11 to I-17 (1410\* NGVD to 1430\* NGVD). The Fish and Wildlife Service (FWS), with advice and concurrence of the Pennsylvanic Fish Commission (PFC), recommended that the zone extend upward from 1400\* NGVD to the normal lake surface elevation, then assumed to be 1425\* NGVD. That recommendation stems from the belief that fishes would benefit from the structural diversity of inundated brush and trees in depths of up to 25 feet where there will be adequate dissolved oxygen after the enlarged, infertile lake stabilizes. This matter should be clarified in the final report. If District staff is not disposed to accept the FWS/PFC recommendation, the final report should include the District's rationale for more extensive clearing.

Paragraphs four and eleven on page 4-8, as well as page J-271 of Appendix J and page 4 of Appendix K, indicate that the modified project's selective withdrawal system will be operated so that the temperature of water discharged from the reservoir approximates that of inflowing streams. Operation in that manner would make it very difficult, if not impossible, to achieve the PFC objective of establishing and maintaining a high quality trout fishery in the Lehigh River downstream from Walter Dam. The inflowing streams and the existing reservoir are too warm for trout during summer. To provide optimal conditions for growth and survival of trout, the temperature of water discharged during summer should be maintained at approximately 65 degrees Fahrenheit.

Pages 4-9 (paragraph four) and A-27 to A-30 of Appendix E mention that sandstone, sand and gravel are present at the dam site. However, except for the excavation of borrow material for project construction, mineral resources in the area to be inundated by the enlarged pool are not addressed. A 1977 Pennsylvania mineral industry map indicates that sand and gravel, clay, peat, sandstone, and crushed stone are produced in the vicinity of the proposed project. We suggest that final versions of these documents include a discussion of local mineral resources and production facilities to ensure that these matters are fully considered during the planning process. Potential impacts that 4. The Flood Control Act of 1962 (P.L. 87-874) authorized modification of the Walter Reservoir to accommodate recreation and supplies of water (water supply and flow augmentation for water quality control including both instream and salinity control). The Chief of Engineers in a letter to the Public Health Service dated 2 April 1962 and included in HD522 stated as follows:

> "Although monetary values were not assigned to possible pollution control benefits during the course of the survey, the planned program of operation for the water control measures will result in substantial low flow augmentation with attendant beneficial effects on water quality. It is recognized that to insure reasonable water quality in the basin, low-flow augmentation will be needed for the specific purpose of improving water quality by complementing, in future years, other measures designed to accomplish water quality goals. I hope that continuing water quality studies will provide the essential data upon which to base the timing and extent of any developments that may need to be added, eventually, to the plan for this purpose."

5. The request and subsequent initiation of the modification resulted from critical water supply needs. Recreation is included to take advantage of the "multipurpose" concept and its economies of scale to satisfy recreation needs. Water supply is the priority of the sponsor and recreation is secondary. The public has been made aware of this since the beginning of this investigation.

6. Elevation 1410 was understood as acceptable. Operational and safety requirements should allow this entire zone to be extended to 1400. In final design, the detailed plans will extend this zone to 1400. The report and EIS have been revised to reflect this.

a-14
- 2 -

grossly disproportionate to predicted increases in human population, as noted above. Moreover, it is misleading to treat these predicted increases in in-basin depletive use as inevitable. DRBC administrative apportus is designed to regulate such use, and huge increases in depletive use of water will not come about unless they are authorized by the DRBC Commissioners.

- 4 According to the fourth and fifth paragraphs on page 2-17, providing supplies of water for combating salinity intrusion by maintaining fresh water flows is the primary purpose of the Walter Reservoir project modification. That claim occurs elsewhere in your report (e.g., paragraph three on page C-69 of Appendix C) and in the draft EIS (e.g., last paragraph on page EIS-2). The claim is misleading at best. The Flood Control Act of 1962 (P.L. 87-874) authorized modification of the Walter Reservoir project (built solely for flood control) to accommodate recreation and water supply. The Act does not specify how the approximately 70,000 acre-feet of water supply at Walter should be used, and the DRBC has taken no formal action to establish priorities for use of water supply storage at the Walter project.
- 5 The first paragraph on page 2-18, the fourth paragraph on page 3-9, and the third paragraph on page D-27 of Appendix D state that recreation is a secondary purpose of the Walter Modification. We disagree with that notion. There is no basis in the authorizing legislation (Flood Control Act of 1962) or in subsequent actions by DRBC to differentiate primary and secondary purposes of the modified Walter project. The authorized purposes are flood control, recreation, and water supply.
- 6 There is a discrepancy between the elevations of the Zone III/Designated Habitat Zone as described on page 4-4 (1400 NGVD to 1430 NGVD) and as shown on Plates 1-11 to 1-17 (1410' NGVD to 1430' NGVD). The Fish and Wildlife Service (FWS), with advice and concurrence of the Pennsylvania Fish Commission (PFC), recommended that the zone extend upward from 1400' NGVD to the normal lake surface elevation, then assumed to be 1425' NGVD. That recommendation stems from the belief that fishes would benefit from the structural diversity of inundated brush and trees in depths of up to 25 feet where there will be adequate dissolved oxygen after the enlarged, infertile lake stabilizes. This matter should be clarified in the final report. If District staff is not disposed to accept the FWS/PFC recommendation, the final report should include the District's rationale for more extensive clearing.
- Paragraphs four and eleven on page 4-8, as well as page J-271 of Appendix J and page 4 of Appendix K, indicate that the modified project's selective withdrawal system will be operated so that the temperature of water discharged from the reservoir approximates that of inflowing streams. Operation in that manner would make it very difficult, if not impossible, to achieve the PFC objective of establishing and maintaining a high quality trout fishery in the Lehigh River downstream from Walter Dam. The inflowing streams and the existing reservoir are too warm for trout during summer. To provide optimal conditions for growth and survival of trout, the temperature of water discharged during summer should be maintained at approximately 65 degrees Fahrenheit.
- 8 Pages 4-9 (paragraph four) and A-27 to A-30 of Appendix E mention that sandstone, sand and gravel are present at the dam site. However, except for the excavation of borrow material for project construction, mineral resources in the area to be inundated by the enlarged pool are not addressed. A 1977 Pennsylvania mineral industry map indicates that sand and gravel, clay, peat, sandstone, and crushed stone are produced in the vicinity of the proposed project. We suggest that final versions of these documents include a discussion of local mineral resources and production facilities to ensure that these matters are fully considered during the planning process. Potential impacts that
- 7 7. The thermal studies for analysis and design for the selective withdrawal tower were to maintain natural conditions. The intent was to avoid inducing changes in temperature, whether warmer or colder. Inducing colder than natural conditions was not originally intended; however, a selective withdrawal tower provides flexibility. Since fisheries resource agencies referred to "maintaining" cold water fisheries, this was inferred as maintaining natural or existing conditions. Further coordination prior to final design and operations arrangements are warranted to provide sufficient flexibility.
  - 8. The report and FEIS have been revised to include a discussion on mineral resources. Pipelines and other utilities were addressed in sufficient detail to identify the requirements as reported. Further details are appropriate in final design.

would occur as a result of project implementation should be included in the EIS. We also note that several pipelines are present in the project area and proposed plans for relocation of the pipelines are included in the documents.

The Fish and Wildlife Service, with the advice and concurrence of the Pennsylvania Fish C ionission, recommended development of boat-launching facilities at three locations on the setting of reservoir: one on the Bear Creek arm, one near the dam, and one on the betting River arm near Tobyhanna Creek. The recommendation stems from the PFC intention to maintain the existing low horsepower limitation on boat motors and the desire to facilitate fishermen boating access to areas where fish habitat has been preserved by selective, rather than complete, clearing of vegetation. Pages 4-22 to 4-24 indicate that the FWS/PFC recommendation has not been apopted. Only one boat-launching facility near the dam is proposed for initial development, with another on the Bear Creek arm to be added at some unspecified future date. The rentative development plan includes no launching facility upstream on the Lehigh River arm; hence the best fishery habitat in the reservoir will be more than five miles from the hearst ramp (i.e., near the dam). Under these circumstances, we have reason to question the claim (seventh paragraph on page 4-22) that currently proposed recreation: development reflects "... the consideration of all government and public recreation interests and concerns."

10 One of the issues mentioned on page b-5 of Supplement b is that the proposed change of the minimum release requirement from 50 cfs to 63 cfs would not be a significant increase for fisheries downstream from Walter Dam. Your agency's response is, in part, that there is no water storage authorized for enhancement of fisheries. While we accept the fact that no water storage is specifically authorized for enhancement of fisheries, it is also true that no water storage is specifically authorized for salinity control, yet there are repeated assertions in the report that flow augmentation for salinity control is the primary purpose of the reservoir enlargement. It is water supply storage that is authorized. How the stored water should be used is not specified in the authorizing legislation (P.L. 87-874) or the Comprehensive Plan of the Delaware River Basin Commission, which (according to paragraph two on page 5-7) has assumed complete sponsor-ship of the modified Walter project.

Your agency's response on page b-5 goes on to state that the need for enhancement of fisheries has not been established. We disagree. Fisheries enhancement is logically related to fishing, which is recreation, one of three authorized purposes of the enlarged reservoir. The agencies with expertise and legal responsibility for fisheries management advised your agency that enhancement of the trout fishery comstream from Walter Dam is desirable and could be achieved easily by adjusting the cutify (i.e., temperature) and quantity of water released from the reservoir. Both the Fish and Wildlife Service and the Pennsylvania Fish Commission advised the Corps that a minimum release of 63 cfs was unreasonable and that two to three times that amount of frow was minimally necessary to assure good fishery habitat downstream from Walter Dam. Given the authorized purposes of the modified project, the modified project's capability for flow and water temperature modification, and the views of the FWS and PFC, the Department believes that fisheries enhancement is appropriate, and the need for it is well-established.

12 The fourth paragraph on page B-38 of Appendix B and the first paragraph on page A-46 of Appendix E state that thermal stratification in the existing esservoir creates a two-story fishery. Those statements are incorrect. There is no two-story fishery in the existing impoundment because thermal stratification is too weak and water temperature through9. The mix of recreational facilities originally determined for the park was predicated on serving the estimated annual visitor rate in the percentage of activity categories which are most in demand. Development of those facilities depended on terrain and property restraints and attention to potential area overuse. Public involvement related to facility locations established the desirability of a two stage development plan to delay some facilities until the need and operational function for them became apparent and locally acceptable.

Appendix D provides a detailed description of the evolution of decisions on the recreation plan. Page D-34, paragraph 4-02.10 provides a list of the varied and often competing recreation interests and those interests concerned with the integrity of the area with which we coordinated fully. The FWS and the PFC were fully included in this coordination. In fact, their recommendations for boating access were reflected in the original concepts. The decision to eliminate one access and defer another for future consideration reflects the strong desire of the citizens and officials of the municipality and county being impacted as expressed through the Pennsylvania Department of Environmental Resources. As with most projects of this scope, compromises often result in an inability to totally satisfy any single interest.

Recreational development can always be altered or expanded with full and open public involvement. Facilities are achievable in various ways other than initial development. These include facility additions by the original costsharing partners, other agencies, local governments and concessionaires. A Master Plan document to be developed in the near future will depict these options. The Lehigh River arm of the lake poses property and accessability restraints which make positioning of boat launching facilities difficult. When real estate boundaries are more firmly established the opportunity for development up the Lehigh River may be apparent and will be reflected in the Master Plan. would occur as a result of project implementation should be included in the EIS. We also note that several pipelines are present in the project area and proposed plans for relocation of the pipelines are included in the documents.

- 3 -

- 9 The Fish and Wildlife Service, with the advice and concurrence of the Pennsylvania Fish Commission, recommended development of boat-launching facilities at three locations on the enlarged reservoir; one on the Bear Creek arm, one near the dam, and one on the Lehigh River arm near Tobyhanna Creek. The recommendation stems from the PFC intention to maintain the existing low horsepower limitation on boat motors and the desire ta facilitate fishermen boating access to areas where fish habitat has been preserved by selective, rather than complete, clearing of vegetation. Pages 4-22 to 4-24 indicate that the FWS/PFC recommendation has not been adopted. Only one boat-launching facility near the dam is proposed for initial development, with another on the Bear Creek arm to be added at some unspecified future date. The tentative development plan includes no launching facility upstream on the Lehigh River orm; hence the best fishery habitat in the reservoir will be more than five miles from the nearest ramp (i.e., near the dam). Under these circumstances, we have reason to question the claim (seventh paragraph on page 4-22) that currently proposed recreational development reflects "... the consideration of all government and public recreation interests and concerns."
- 10 One of the issues mentioned on page b-5 of Supplement b is that the proposed change of the minimum release requirement from S0 cfs to 63 cfs would not be a significant increase for fisheries downstream from Walter Dam. Your agency's response is, in part, that there is no water storage authorized for enhancement of fisheries. While we accept the fact that no water storage is specifically authorized for enhancement of fisheries, it is also true that no water storage is specifically authorized for salinity control, yet there are repeated assertions in the report that flow augmentation for salinity control is the primary purpose of the reservoir enlargement. It is water supply storage that is authorized. How the stored water should be used is not specified in the authorizing legislation (P.L. 87-874) or the Comprehensive Plan of the Delaware River Basin Commission, which (according to paragraph two on page 5-7) has assumed complete sponsors ship of the modified Walter project.
- Your agency's response on page b-5 goes on to state that the need for enhancement of fisheries has not been established. We disagree. Fisheries enhancement is logically related to fishing, which is recreation, one of three authorized purposes of the enlarged reservoir. The agencies with expertise and legal responsibility for fisheries management advised your agency that enhancement of the trout fishery downstream from Walter Dam is desirable and could be achieved easily by adjusting the quality (i.e., temperature) and quantity of water released from the reservoir. Both the Fish and Wildlife Service and the Pennsylvania Fish Commission advised the Corps that a minimum release of 63 cfs was unreasonable and that two ta three times that amount of flow was minimally necessary to assure good fishery habitat downstream from Walter Dam. Given the authorized purposes of the modified project, the modified project's capability for flow and water temperature modification, and the views of the FW and PFC, the Department believes that fisheries enhancement is appropriate, and the need for it is well-established.
- 12 The fourth paragraph on page B-38 of Appendix B and the first paragraph on page A-46 of Appendix E state that thermal stratification in the existing reservoir creates a two-story fishery. Those statements are incorrect. There is no two-story fishery in the existing impoundment because thermal stratification is too weak and water temperature through-

10 10. PL 87-874 authorized development of supplies of water for the needs of the Delaware River Basin. The needs of the Basin which the proposed projects were to satisfy included in-stream flow maintenance and salinity repulsion. The Delaware River Basin Commission is the sponsor for the project. Their request for the Modification is the result of their Level B Study and Good Faith Negotiations which has identified a need for replacement of consumptive use to insure minimum flow and salinity repulsion for the year 2000. These are the purposes for the supplies of water which the DRBC is the sponsor.

On April 23, 1981 the PFC was sent a notification of the initiation of the Modification and requesting their input. A letter was received from the PFC on May 21, 1981. The letter listed three concerns or requests with which we have complied. There was no mention of the need or desire of increased flow for fisheries. After more than 1-1/2 years into the study, on January 20, 1983 the PFC first notified the Corps of their positions on increasing minimum flows. Subsequently, in numerous conversations and meetings with FWS and the PFC, storage for enhancement of fisheries was discussed. Corps representatives stated that neither this need nor desire had been brought to their attention nor had a request for such storage been received. The Corps stated that if the PFC wished to sponsor or seek a sponsor, the Corps would incorporate a request in its planning process. A sponsor is required since the cost of providing storage for fisheries enhancement is reimburseable to the Federal Government. A request was never received and a sponsor never identified.

11. Downstream recreation takes advantage of opportunities being provided by the project. Neither boating nor fishing in the Lehigh River has been allocated storage in the reservoir for their utilization. Downstream fisheries were viewed from an "impact" not "enhancement" perspective. The minimum flows and established selective withdrawal features of the tower resulted from such considerations. The objective was to avoid negative impact and any improvement - 3 -

would occur as a result of project implementation should be included in the EIS. We also note that several pipelines are present in the project area and proposed plans for relocation of the pipelines are included in the documents.

Letish and Wildlife Service, with the advice and concurrence of the Pennsylvania Fish and ission, recommended development of boot-launching facilities at three locations on the entarged reservoir: one on the Bear Creek arm, one near the dam, and one on the Lehigh River arm near Tobyhanna Creek. The recommendation stems from the PFC intention to maintain the existing law horsepower limitation on boat motors and the desire to facilitate fishermen boating access to areas where fish habitat has been preserved by selective, rather than complete, clearing of vegetation. Pages 4-22 to 4-24 indicate that the FWS/PFC recommendation has not been adopted. Only one boat-launching facility near the dam is proposed for initial development, with another on the Bear Creek arm to be odded at some unspecified future date. The tentative development plan includes no launching facility upstream on the Lehigh River arm; hence the best fishery habitat in the reservoir will be more than five miles from the nearest ramp (i.e., near the dam). Under these circumstances, we have reason to question the claim (seventh paragraph on page 4-22) that currently proposed recreational development reflects "... the consideration of all government and public recreation interests and concerns."

**10** One of the issues mentioned on page b-5 of Supplement b is that the proposed change of the minimum release requirement from 50 cfs to 63 cfs would not be a significant increase for fisheries downstream from Walter Darn. Your agency's response is, in part, that there is no water storage authorized for enhancement of fisheries. While we accept the fact that no water storage is specifically authorized for enhancement of fisheries, it is also true that no water storage is specifically authorized for salinity control, yet there are repeated assertions in the report that flow augmentation for salinity control, yet there is authorized. How the stored water should be used is not specified in the authorizing legislation (P.L. 87-874) or the Comprehensive Plan of the Delaware River Basin Commission, which (according to paragraph two on page 5-7) has assumed complete sponsor-ship of the modified Walter project.

Your agency's response on page b-5 goes on to state that the need for enhancement of fisheries has not been established. We disagree. Fisheries enhancement is logically related to fishing, which is recreation, one of three authorized purposes of the enlarged reservoir. The agencies with expertise and legal responsibility for fisheries management advised your agency that enhancement of the trout fishery downstream from Walter Dam is desirable and could be achieved easily by adjusting the quality (i.e., temperature) and quantity of water released from the reservoir. Both the Fish and Wildlife Service and the Pennsylvania Fish Commission advised the Corps that a minimum release of 63 cfs was unreasonable and that two to three times that amount of flow was minimally necessary to assure good fishery habitat downstream from Walter Dam. Given the authorized purposes of the modified project, the modified project's capability for filow and water temperature modification, and the views of the FWS and PFC, the Department believes that fisheries enhancement is appropriate, and the need for it is well-established.

12 The fourth paragraph on page B-38 of Appendix B and the first paragraph on page A-46 of Appendix E state that thermal stratification in the existing reservoir creates a two-story fishery. Those statements are incorrect. There is no two-story fishery in the existing impoundment because thermal stratification is too weak and water temperature throughobjective was to avoid negative impact and any improvement is considered a pleasant windfall. Optimization of downstream fisheries was never investigated or designed in the project.

Minimum releases in excess of the 63 cfs would utilize more storage going into a drought. This would result in less storage being available for the more critical stages; thereby resulting in less storage being available to the project sponsor (DRBC) for its intended purpose.

Downstream releases in excess of those calculated to accomodate the functional needs of lake management, are an enhancement for various purposes. Regulations by which the Corps must function permit enhancement functions only on a cost reimbursement basis with a non-Federal partner. No such participant has been identified to the present time. The stated rate of release is more than a 25 per cent increase in the minimum flow criteria under which the existing project has been operating since its construction. A multi-level outlet works will provide additional assurance of downstream water guality capability.

12 12. The referenced statements do erroneously state that thermal stratification creates a two story fishery. They have been corrected and other data included in appropriate appendices.

a-18

out the impoundment is too high (i.e., more than 70 degrees Fahrenheit) during summer to provide trout habitat. Water temperature data collected by Corps District personnel (e.g., during 1979) reflect the lock of temperature diversity, and it would be appropriate to include these data in Appendix E or Appendix K.

-4-

- **13** According to the fifth paragraph on page J-228 of Appendix J, no water will be released from the enlarged Walter impoundment when the water supply storage is exhausted. Although that condition will rarely occur, implementation of that proposed operational scheme would practically dewater many miles of the Lehigh River downstream from Walter Dam. What we expect to be an excellent trout fishery would be destroyed. We suggest an alternative operational scheme with less severe impacts on aquatic life: release as much water from the dam as is entering the impoundment in the three major tributaries (i.e., outflow equals inflow) until the inflow exceeds the normal minimum required release, then release the required minimum and impound the "excess" to restore the water supply pool.
- 14 The third paragraph on page 42 of Appendix Supplement K-1 states that the aquatic biological productivity at the Walter reservoir is limited by low concentrations of dissolved phosphorus. The last sentence on page 47 of the Supplement states that the reservoir's trophic status should improve due to a reduced phosphorus loading rate. The two statements are contradictory; trophic status cannot improve if a limiting factor is further reduced.

#### **Draft Environmental Statement**

- 15 The last paragraph on page EIS-2 states that minimum releases advocated by the Fish and Wildlife Service and the Pennsylvania Fish Commission "... would require a new sponsor for water storage specifically intended for downstream fishery enchancement." We disagree with the statement. Page 5-7 of the Main Report indicates that the Delaware River Basin Commission has already assumed complete sponsorship for the project, including the water supply storage. Conditions under which that water supply should be used are not specified in the legislation authorizing the Walter Modification (P.L. 87-874) or in subsequent actions by the DRBC. To use the supply for flow augmentation to enhance fisheries is as reasonable as use for salinity control. There is no legal basis for the notion that salinity control is the only purpose or the principal purpose to be served by water supply stored at Walter Reservoir.
- 16 Although the Fish and Wildlife Service reviewed the draft EIS and their comments are incorporated in this letter, FWS review does not satisfy the requirements of the Fish and Wildlife Coordination Act, as claimed in the last paragraph on page EIS-4. Full compliance with that Act will require evaluation of the Corps' selected plan of development and preparation of a final FWCA report with whatever recommendations may be appropriate. A final FWCA report has yet to be scheduled.
- **17** With Pennsylvania Fish Commission concurrence, the Fish and Wildlife Service recommended 1400' NGVD as the upper limit of vegetation clearing in the areas to be inundated by the water supply pool, yet the second and sixth paragraphs on page EIS-29 indicate the upper limit will be 1410' NGVD. There has been no correspondence between FWS/PFC and the Corps, nor is there anything in the Main Report or draft EIS, to indicate why your agency seems to favor more extensive clearing than FWS/PFC recommended for fisheries habitat.

- 13. The suggested "alternative" operation scheme is 13 identical to the actual operation scheme proposed by the Corps. The statement referred to on page J-228 has been misinterpreted. The statement provides a technical description of the regulating criteria used in various modeling studies. The statement that "No releases are made when the reservoir is below bottom of water supply pool ... in this model" is apparently being interpreted as implying that all inflows following exhaustion of water supply storage would be used to restore the depleted storage. The actual operation proposed by the Corps (and also simulated with the models) is that even when the pool is below the bottom of the water supply pool the minimum releases would be made and the excess inflow would be used to restore the water-supply storage. Any water in the lake below the bottom of the water supply pool (i.e., below the top of the sediment reserve pool) would also be available for minimum releases if necessary.
- 14. The last sentence on page 47 of Appendix K-1 is in error and has been corrected to indicate that there will be no significant change in modified pool biological productivity.
- 15. Reference is made to responses to comments 10 and 11. The text has been corrected.
- 16. The text has been corrected. A final FWCA report is scheduled to be received prior to signing of the project record of decision.
- 17 17. Page EIS-29 has been corrected to indicate the upper limit of vegetation clearing as 1400-feet NGVD.

- 5 -

- 18 We are pleased that the interagency team's habitat evaluation report (PAM HEP) is included in Appendix E of the Main Report and that, according to the last paragraph on page EIS-31, the Corps of Engineers is resolved to fully implement the mitigation plan developed by the interagency team. The Corps' representatives on the team are to be commended for their understanding of and sensitivity for the environmental issues an interased by the team.
- The documents (page EIS-37; Appendix A, page A-67; Appendix F) cite cultural resources research conducted as part of the Walter project, and identify extensive archeological and historical resources located in the project area that could be adversely impacted. It is stated that none of the identified sites is currently listed on the National Register of Historic Places. To ensure compliance with all preservation legislation, coordination with the State Historic Preservation Officer (as planned far in the EIS and other dacuments) should be documented in the final report. Such documentation should include the SHPO's determination of the eligibility of the identified cultural resources for listing in the National Register.
- 20 Potential impacts to the local mineral resources and production facilities, if any, that would occur as a result of modifying the project should be included in Table 4 on page EIS-45. If no significant impacts are anticipated, a statement to that effect should be included.

Thank you for the opportunity to comment on this important proposal.

Sincerely,

10.00 Anita J. Miller **Regional Environmental Officer** 

- 18 18. No response required.
- 19 19. Final cultural resource investigations are subject to fiscal year funding limitations. The remaining work has been identified to be completed prior to pool inundation. Conduct of the work will be scheduled as funds are received. SHPO coordination is continuing and all applicable statutes will be addressed.
- 20 20. Table 4 on page EIS-45 has been revised to include mineral resource impacts.

U.S. Department of Housing and Urban Development Philadelphia Regional Office, Region III Liberty Square Building 105 South Seventh Street Philadelphia, Pennsylvania 19106-3392

2 1 MAY 1985

Mr. Nicholas J. Barbieri Chief Planning/Engineering Division Environmental Resource Branch Philadelphia District Corps of Engineers Custom House 2nd & Chestnut Streets Philadelphia, Pennsylvania 19106

#### Dear Mr. Barbieri:

In response to your letter of March 28, 1985, we have completed a review of the Draft Environmental Impact Statement for the Francis E. Walter Dam Modification. Generally speaking, this document is adequate and satisfactory with respect to our areas of interest. While we have no major concerns, however, we would like to submit the following comments and observations.

- The list of modification alternatives on p. ZIS-8 refers to <u>2. Other structural and non-structural measures</u>. It is noted, however, that the discussion on p. EIS-9 deals <u>only</u> with non-structural alternatives.
- The inclusion of Environmental Protection Alternatives in Section III - Alternatives seems inappropriate. The reason for this is that the alternatives discussed are not alternatives to the proposed action but are alternatives for mitigating environmental impacts of the proposed action.
- 3. The discussion of land use impacts on p. EIS-36 assumes that "enforcement of local master plans that dictate where and how growth should occur should serve to restrain undesirable changes in land use ..." This will be true, however, only if affected communities have, in fact, developed plans in response to the proposed dam modification and if they have developed the corollary land use regulations to implement the plans.

Thank you for the opportunity to comment. We look forward to receiving a copy of the Final Statement when it is completed.

Sincerely.

Lawrence Levine Regional Environmental Officer

- 1. DEIS Section I; Book 1, Main Report, Sections I and III; and Book 2, Appendix D, Sections I through IV detail the evolution of the Walter Dam Modification, specifically citing the DRBC "Level B Study" and "Good Faith Negotiations". The DEIS focuses on those referenced decisions to include structural components in the Comprehensive Basin Plan; one of which is the Modification of the Walter Dam. The non-structural discussion is included in the DEIS for completeness of discussion; to emphasize their dependence on the Modification; and to display their role and tenuous position in a long-term "total" solution for the future. (Reference is made to responses to comments from the Department of the Interior and the Pennsylvania Game Commission.)
- 2 2. Refer to above. The discussion of construction impacts and mitigation deliberately focuses on alternatives on "how to" modify Walter Dam. The determination that the Walter Dam is to be modified was established previously. Alternatives in designs and construction methods resulted from inter-agency coordination and significantly isolated critical attention to surface drainage, wetlands, wildlife and fishery and vegetative and scenic integrity. Those important considerations are addressed in the cumulative documentation and will be further defined in greater detail in the final construction plans.
- 3 3. This is a true statement. Local planning agencies have displayed the expertise to develop the plans and awareness of ordinances necessary to assure compliance. The timeframe for local implementation of the plans is dependent on their constituency and authorities. Their plans have and are considering the dam modification. The counties are currently requesting planning assistance from the Commonwealth of Pennsylvania which has made an offer to assist (up request) affected counties and their municipalities.

1

2

3



COMPONDERLTH OF PENNSYLVAN A Department of transportation Haprisburg pennsylvania (712)

OF TRANSPORTATION

May 24, 1985

1

Francis E. Walter Dam and Reservoir Modification Drart Environmental Impact Statement

Mr. Nicholas J. Barbieri, P.E., Chief Planning/Engineering Division Department of the Army Corps of Engineers, Philadelphia District Custom House - 2D Second and Chestnut Streets Philadelphia, Pennsylvania 19106

Dear Mr. Barbieri:

Thank you for the opportunity to review and comment on the Draft Environmental Impact Statement (D.E.I.S.) for the proposed modification to the Francis E. Walter Dam and Reservoir. The focus of our review was on the transportation aspects of the proposed project witr particular emphasis on the relocation of L.R. 40041. We offer the following general comments on the D.E.I.S.:

1. There are different lengths noted (2.5, 2.7, 3.0 and 3.6 miles) for the proposed relocation of L.R. 40041. The length of the relocation should be consistent throughout the document.

2. The D.E.I.S. does not provide sufficient detailed information regarding the five alternative alignments that were investigated for the relocation of L.R. 40041.

As a result, it is difficult for our Department to adequate'y assess the impacts associated with each alignment as well as the reasons for their dismissal or selection in order to insure compliance with the requirements of the National Environmental Policy Act of 1969 (N.E.P.A.) and Pennsylvania Act 120.

To enable our Department to thoroughly assess the impacts associated with the relocation of L.R. 40041, and insure compliance with N.E.P.A. and Act 120, the analysis of alternatives should be expanded to address all applicable environmental subject areas with the potential for being impacted by the various alignments. The environmental subject areas to be considered are outlined in Exhibit B of our Department's Circular Letter, Number C-2912 and Act 120. Copies of this information are attached for your use. A figure showing the location of all the alternatives studied should be added to supplement this discussion. In addition, consideration should be given to including a Summary Impact Matrix for the various alternatives in the document. 1. Errors have been corrected and apparent discrepancies have been clarified.

2 2. The discussion of the formulation and design of the road relocation was presented in Book 1, Main Report; Book 2, Appendix D; and Book 4, Appendix H. For one feature of the overall project, coverage was thought to have been adequate. However, as the result of a meeting with your staff, we have revised the report to include format and text changes to satisfy their requests. It is our understanding that this should result in your concurrence with the selection. Francis E. Walter Dam and Reservoir Modification Draft Environmental Impact Statement

Mr. Nicholas J. Barbieri, P.E.

May 24, 1985

3

3. On July 25, 1984 representatives from our Department, the Pa. Game Commission, the Fish and Wildlife Service and your agency conducted a field view of the project area. At that time, a concern was expressed about the relocation of L.R. 40041 bisecting two high quality wetland areas. In response to this concern, your agency agreed to study alternative alignments that would not bisect these areas.

-2-

Figure 1 on Page EIS-20 still shows the bisecting of these wetland areas by the relocated roadway. The D.E.I.S. provides little discussion of the impacts associated with this bisection as well as the mitigation measures being considered to minimize these impacts. In addition, as noted in comment #2, there is insufficient detail provided on the alternative in order to determine that there is no practicable alternative to the destruction or modification of wetlands as required by Executive Order 11990, Protection of Wetlands.

The D.E.I.S. must include additional information on wetlands impacts and mitigation in order to insure the proposed relocation is in compliance with E.O. 11990.

- 4. The D.E.I.S. should clarify whether or not the PAM HEP analysis has taken the wildlife impacts associated with the roadway relocation into consideration.
- 5. The document should also clarify what will happen to the right-of-way at such time as the existing roadway is abandoned. Will it come under Corps' ownership or revert to the original property owner?
- 6 6. A major portion of our highway improvement program is Federally-aided and we must follow the Federal Highway Administration's regulations for highway project development. One Federal law in particular, Section 4(f) of the Federal-Aid Highway Act of 1968, protects publicly owned land from a public park, recreation area or wildlife and waterfowl refuge. In complying with Section 4(f), we are required to prepare extensive justification and documentation for any highway improvement project involving these lands. It has been our experience since the adoption of this law that most of the involvements with these lands are minor in nature and result in little or no adverse impact on the property or its uses. In most cases, the official(s) having jurisdiction over the property agree(s) that the highway improvement enhances the property and its uses.
- 7 The proposed modification to the dam and reservoir is to include the development of recreation areas and facilities. Some of these facilities are proposed to be located adjacent to relocated

3. This comment seems to have been precipitated by confusion in Figure 1 of the EIS. The original "over-thehill" alignment (Alternative A) did bisect the wetlands. The selected alignment (Alternate C) avoids the wetlands. Figure 1 and the text have been revised to clarify this.

- 4. Wildlife impacts were considered by the PAMHEP team for all relocated road alternatives. This has been documented in a Planning Aid Report which has been added to Book 3, Appendix E. Clarification is also included in the FEIS.
- 5. When the present Bear Creek Road right-of-way is abandoned, it will become Federal property for park use. No recreational facilities will encroach on the relocated highway right-of-way, which will have a common boundary on the west side of the park.
- **6,7** 6,7. Compliance with the requested right-of-way for that portion of the new road within Federal lands appears to be a simple administrative procedure. However, this additional right-of-way for any portion of the new road outside these project lands may be considered an improvement or enhancement; thereby, requiring reimbursement to the Federal Government. This matter will be addressed during the final design process and the initiation of real estate arrangements.

Francis E. Walter Dam and Reservoir Modification Draft Environmental Impact Statement

Mr. Nicholas J. Barbieri, P.E. -3-

May 24, 1985

We welcome the opportunity to meet with you to discuss our comments. Please feel free to contact Mr. Fred Bowser, Director of our Bureau of Design at 717-787-3310 to arrange a meeting at your convenience.

Very truly yours,

Canid Colome

David C. Sims, P.E. Deputy Secretary for Highway Administration

Attachments



COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES P. O. Box 1467 Harrisburg, Pennsylvania 17120



RM-WR

1

F 40:6

Office of the Deputy Secretary Resources Management (717) 783-5338 May 28, 1985

Dr. John A. Burnes Chief, Planning Branch Department of the Army Philadelphia District - Corps of Engineers Custom House - 2nd & Chestnut Streets Philadelphia, PA 19106-2991

Dear Dr. Burnes:

The Department of Environmental Resources appreciates the opportunity to review the proposed Francis E. Walter Dam Modifications General Design Memorandum. On behalf of the Department, I am pleased to offer the following comments:

- Areas G and H, designated as borrow sites on page 4-11, Book 1 of 6, are within the Lehigh State Scenic River corridor. Because of their high visibility, these borrow areas are not compatible with the Scenic River designation or the aesthetics of the Lehigh Gorge State Park. It is recommended that these borrow areas be eliminated from consideration, as suggested in the report itself.
- 2 As previously indicated in a letter to Nicholas J. Barbieri, Corps of Engineers, on September 12, 1984, we believe that the continued success of white water boating on the local economy and enhanced public use of the Lehigh Gorge State Park necessitates that the modified Francis E. Walter Dam provide for releases more than on an "as available" basis. We recommend that operational flexibility be built into the project by coordinating releases with other projects (eg. Beltzville and Blue Marsh) to support increased white water boating on the Lehigh River. Additionally, we strongly feel that the Recreational Benefits Section on page 4-6 of Book 1 of 6 should address the economic benefits of white water boating which are directly related to the project.

1. Borrow sites G and H are in presently disturbed areas, previously used as borrow source, having sparse scrub-shrub vegetation. Dam expansion will further impact these sites which are on the existing Federal reservation. As stated in the report these sites will be difficult to restore; thereby, making them probably the least desirable. However, it would be premature to eliminate them at this time without a guarantee of sufficient material from the other sites. If the site were used, the site would be restored. Borrow site rehabilitation requirements would produce an improved vegetative transition than now exists from the natural forest to the dam face.

2 2. The investigations recognized the benefits to whitewater boating; however, they are considered to be of a "windfall" nature to whitewater boating. The project is not designed nor is there storage allocated for whitewater boating. Compared to the water supply and flood control storage benefits, whitewater benefit requirements are minor, even incidental. Releases from project storage will be delivered at the request of the Commonwealth of Pennsylvania through the Delaware River Basin Commission. With the Modification, whitewater boating will be enhanced by normal operations and specific requests for releases are expected to infrequently conflict with the projects authorized purposes. May 28, 1985

- 3 The single lane gravel recreation road between the lower parking lot below the dam and the Lehigh River, as shown on Plate 1-22, Book 1 of 6, should be downgraded to a foot trail. This will reduce the possibility of boaters utilizing the parking area and river access for launching boats. Boating between the Francis E. Walter Dam and the Borough of White Haven should be discouraged as this Department has previously agreed with local fishermen.
- 4 The  $Q_{7-10}$  flow which can be expected in the Lehigh River at the Bethlehem and Easton gauges as a result of the modified project should be included in the report. This information is important since any significant change over the present  $Q_{7-10}$  flow would have to be considered as part of the downstream water quality management program. An increase in the  $Q_{7-10}$  would tend to reduce point source treatment costs and could be accounted for as a net benefit.

**5** In addition to the above substantative comments, we also offer the following editorial corrections:

Book 1 of 6, page 4-22, para. 7 (General)

Change Plate 1-29 to 1-22 Change Plate 1-30 to 1-23

Book 1 of 6, page 5-9, para. 1, line 4

SRBC should be DRBC

Book 1 of 6, page E 15-5, Table 1

Wild and Scenic Rivers Act should not be listed as N/A, but should refer to Act No. 1982-71

Book 2 of 6, page D-32, last line -

Change the word "chance" to "change"

Finally, since the spring and fall whitewater boating season is dependent upon water releases from Francis E. Walter Lam, we look forward to maintaining very close coordination with the Corps of Engineering during the anticipated February 1988 through Spring 1991 construction period to resolve problems that could affect whitewater boating opportunities.

Although we have indicated the aforementioned recreational and water quality concerns, we believe that the Corps of Engineers can properly address these concerns and thus we continue to support the proposed Francis E. Walter Modification which is vital in providing water supply storage and drought management protection in the Delaware River Basin. 3 3. As shown on the plate, a barricade will be placed at the lower end of the parking area. Public access will be controlled at this point. A single lane gravel road is required for maintenance, operations and security.

4. The Q<sub>7</sub>-10 flow in the Lehigh River at Bethlehem and Easton as a result of the modified F.E. Walter Project is not readily available. However, comparisons of computer simulations that include the Delaware River basin-wide regulation effects of Cannonsville modified, Merrill Creek, Prompton modified, Nockamixon and Hackettstown in addition to F.E. Walter modified are available. These simulations show that the combined effect of these projects is an ultimate increase in the Q<sub>7</sub>-10 flow of 25 cfs, an increase of only about 6% over the 433 cfs without these projects. The effect of F.E. Walter modified would be only a portion of this ultimate increase.

It should be recognized that until the Prompton modified, Cannonsville modified, Hackettstown and Merrill Creek projects come on line, the effect of F.E. Walter modified alone would temporarily be greater than its ultimate effect in combination with the above projects. However, any claim of benefits due to F.E. Walter as modified should not ignore the anticipated ultimate impact of the other projects.

Given the relatively small increase in the  $Q_{7}$ -10 value, it was not considered practical to evaluate increased benefits.

5. The editorial corrections have been made.

6. The Corps will continue its coordination with whitewater interests through the Pennsylvania Department of Environmental Resources. Our goal is to minimize adverse impacts of the project including those associated with construction. Dr. John A. Burnes

May 28, 1985

If you have any questions regarding our concerns, please contact Mr. John E. McSparran at (717) 787-6750 or myself at (717) 783-5338.

Sincerely,

- 3 -

\* Theothy Ulan

R. Timothy Veston Associate Deputy Secretary for Resources Management

# UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION III 841 Chestnut Building

Philadelphia, Pennsylvania 19107

# NAY 28 '85

element Colonel Ralph V. Locurcio District Engineer Department of the Army Corps of Engineers -Philadelphia District Custom House, 2nd & Chestnut Streets Philadelphia, Pennsylvania 19106

Re: COMMENTS - Modification of the F. E. Walter Dam and Reservoir lehigh River Basin; Luzerne County, Fennsylvania. Draft Main Report and Environmental Impact Statement (EIS) with Appendices (A-COE-D3b101-PA)

Dear Lt. Colonel Locurico:

Pursuant to the responsibilities granted to the USEPA within Section 309 of the Clean Air Act (P.L. 91-604), this Regional office has completed its review of the draft environmental impact statement (DEIS) of the referenced project. We have initially rated this project as EC-2 in the USEPA reference category. This rating indicates that the review identified a number of environmental concerns, and there is insufficient isformation in the DEIS to respond to them. Our detailed comments regarding this project have been appended for your consideration and response. I would also recommend a post-DEIS scoping meeting and/or an on-site visitation to the site to clarify a number of the anticipated concerns from the project.

Further information and correspondence regarding this DEIS should be directed to Robert C. Runowski (215/597-6289) of my staff at your earliest convience.

Sincerely Richard V. Pepino, Chief

NEPA Compliance Section

cc: USFWS - Kulp PaDER - DeBenedictis PaFC - Miller PaGC - Duncan COMMENTS

#### F.E. Walter Dam and Reservoir Modification

This Regional office completed its review of the draft environmental impact statement (DEIS) and the Main Report for the implementation of the proposed project activities. The rationale, and affirmation, of the modification has been well documented and presented by the sponsoring agency. The addition of the increased depth and storage capacity for public water supply and recreation to the existing flood control project has been carefully evaluated. We have concluded that the increased scope of project activities should not significantly, or adversely, impact the aquatic and terrestrial habitat, or the water quality, of the target area. However, we have identified a number of issues which will require additional explanation or study. These are noted hereafter.

(1) Alternatives (p. EIS-8 to EIS-15; DEIS): The procedures for the selection of the optimal alternative left a series of unresolved issues. The direct presentation of the selected plan, without adequate supportive information for any of the other alternatives, made it difficult to determine if any of these other alternatives, or some combination of them, would achieve the same overall objectives while further minimizing the environmental impacts.

There is a similar situation regarding the projected economics of this selected plan compared with the other alternatives. As a reviewing agency, we have only been provided with benefit cost ratio (BCR) for the selected project alternatives (1.4 to 1.0). A formal presentation of the BCR for the other activities, especially the non-structural activities involving ground water development and conservation, should have been incorporated within the scope of the justification for the selected project.

Consequently, we recommend providing additional technical and economic information, and, explaining in detail the process by which the particular project activity was selected.

2 (2) Minimum Release (p. EIS-2; op. cit.): The proposed increase of the minimum release from 50 to 63 cfs is intended "....to comply with Commonwealth of Pennsylvania regulations. This will protect downstream water quality and aquatic habitat during low-flow periods." (p. EIS-2; op. cit.). However, neither the Pennsylvania Fish Commission nor the USFWS agree to this level, and both have proposed higher flows.

1. Reference is made to the response to comments 13-16 from 1 the Pennsylvania Game Commission.

2 2a. Reference is made to the response to Comment 11 from the Pennsylvania Game Commission.

Reference is made to responses to the U.S. Department of the Interior for discussion concerning minimum flows, mitigation versus enhancement, sponsorship of fisheries enhancement, filling and operation of the reservoir, and related subjects. It appears that there is a misunderstanding of the impact of the proposed project on downstream conditions. The 63 cfs criteria would be applied only during stressed conditions. Further coordination of specific-detailed-technical items may be appropriate prior to finalizing the Water Control Manual.

The EIS has been revised to reference the derivation of the minimum flow releases. The complete derivation is presented in Book 5, Appendix J, Hydrology and Hydraulics, page J-218, paragraph 14.03b. MINIMUM RELEASE CRITERIA.

The 63 cfs is minimum flow criteria for the receiving stream which is the Lehigh River. Point Pleasant is extraneous to the subject 63 cfs. The Point Pleasant withdrawal and associated minimum flows in the Delaware River should be addressed by that project and may have to be discussed in the context of the entire Delaware River Basin Systems. Neither is a purpose of this investigation nor this report.

The PFC and the USFWS provided a range of flows. Specific data for the Lehigh River below the dam site such as a definition of adverse impacts or the quantification of such impacts were not provided. Regardless, the Corps conducted a field simulation for the purpose of measuring and recording hydraulic data at three locations downstream of the dam. This was done for flows beween 63 cfs to 186 cfs. The factors of incremental depth, wetted perimeter. velocity and channel bottom were not significantly changed over the range of flows tested (i.e., released from the existing project). The only noticeable visual difference, that of the amount of exposure of rock outcrops, should have little bearing on the quality of aquatic life. With these findings, the Corps proceeded with the 63 cfs. This issue was considered one of many which was followed up as part of the study. Once it was determined that there was no adverse  $\sim$  S records for Water Year 1983 (WY83) indicate that 63 cfs is equalled or exceeded approximately 97% of the year, and, that the average annual discharge is approximately 613 cfs. Consequently, we are concerned that

(a) 63 cfs is, in fact, adequate to support the extant fishery in the Lehigh River downstream of the dam;

(b) no explanation has been presented in the DEIS for the Corps' derivation of 63 cfs as an acceptable minimum release,

(c) the DEIS has provided no information regarding either the PaPC or the USFWS determination of an acceptable minimum release and their projections regarding the adverse impacts to the downstream areas.

(d) the DEIS has not addressed the long term impacts of the adequacy of a release of 63 cfs in relation to the proposed increased withdrawal at Point Pleasant, PA of 95 MGD from the Delaware River.

3 (3) Water Quality: The increased storage capacity of the Walter dam will extend the average detention time for water from 1.7 to 59.7 days. The increased retention time will also obviously increase nutrient loadings, present greater eutrophication problems, and, through stratification, probably develop anoxic conditions at lower levels. The proposed multi-level withdrawal should adequately address the water quality concerns for dissolved oxygen and temperature. Both of these parameters are crucial in maintaining the designation of the Lehigh River as a "High Quality-Cold Water Fishery" (p. EIS-18; op.cit.). We also recommend a regular monitoring program after implementation of the proposed modification to ensure the maintenance of dissolved oxygen and temperatures. We contend that neither parameter should vary significantly from the current acceptable values, and, should not violate the current PaDER criteria. While reaeration of the discharge is to be expected at some distance below the dam, we are also concerned that the river and aquatic habitat of the reach immediately below the dam is also protected.

4 (4) Terrestrial Habitat: We have considered both the habitat evaluation (May 1984) and the discussion of mitigation activities. We concur with the USFWS recommendations (p. 19; Planning Aid Report, May 1984) and strongly recommend the adoption of mitigative proposals (p. 17-18; op. cit.) and the selection of implementation sites prior to the actual indication of construction.

impact the issue was considered addressed and no further concern or effort warranted. Along with other issues, the issue is raised and addressed in Book 1, Main Report, Supplement b, page b-5.

3 3. For discussions on nutrients, stratification and anoxic conditions, reference is made to Book 6, Appendix K, pages K-2 and K-3.

A program for monitoring temperature and dissolved oxygen has been considered as a matter of standard procedure at our reservoirs. This will be addressed in detail in the Feature Design Memorandum for Instrumentation and Inspection which is developed during the final design of the project.

Refer to paragraph 2.03a for a discussion concerning reaeration. Only minor dissolved oxygen depressions will occur.

4. Recommended mitigative proposals resulting from the PAMHEP teamwork have been accepted as noted in the DEIS. The timing for site selection will be appropriately fitted into the schedule. Locations and implementation are dependent on firm real estate acquisition boundaries not yet established. The PAMHEP team will be consulted as appropriate.

ရာ 1 ЗС

**5** (5) <u>Relocation of L.R. 40041</u>: We considered the explanation (p. 3-15 to 3-16; op. cit.) regarding the realignment of Bear Creek Road (LR 40041) and the further discussion of the probable environmental impacts (p. EIS-14 to EIS-15; op. cit). The identification of the selected alternative was done in a summary fashion without explanation of the other options or a graphic depiction of alignment, habitat impacted, topography, or cost. The Penn DOT designated the road as a "major collector" (1982) with the indication of its importance in providing access to the area. In addition, the proposed relocation of LR 40041 could adversely impact a wetland area, neither the size or location of which we have been apprised. Consequently, we strongly recommend additional information regarding the rationale for the selected realignment and supportive data regarding habitat/wetlands impacts.

3

**6** (6) <u>Wetlands</u>: In all of the discussions regarding the modification of the F.E. Walter's dam and reservoir, there has been no precise identification either of the location or of the size of the wetlands in the target area. In the proposed relocation of LR 40041 (p. EIS-15; op.cit.), only the avoidance of the black spruce wetlands was noted, without more specific detail. The PAM-HEP did indicate that "the wetlands are expected to be impacted by the project" (p. 9, op. cit.) without further explanation. We believe that to comply fully with requirements of Section 404 (b)(1) and Executive Order 11990 (Protection of Wetlands), a more detailed explanation is needed to locate the wetlands and the their impacts from the project.

In summary, this Regional office will not object to the further development and implementation of the proposed project. However, we contend that it is important to develop this project with minimal adverse environmental impacts. Since there are areas of environmental concerns and incomplete information, we believe that it is the responsibility of the applicant to consider and to address these concerns in the most judicious manner. The resources of the NEPA Compliance Section are offered in any way to facilitate the expeditious resolution of those points of concerns. 5. The Main Report and FEIS revisions provide additional data and a map (FEIS Figure 1) regarding road relocation alternatives. Work by the PAMHEP team did consider alternatives which avoided the wetlands. Subsequent design refinement furthered that avoidance and considered other peripheral wildlife impacts. There are no wetland impacts on the selected alignment. Refer to FEIS Figure 1, Section IIIc and Section 5; and Book 3, Appendix E. (Refer also to responses to subject comments from the Pennsylvania Game Commission and the Pennsylvania Department of Transportation.

6. The FEIS revised data clarifies the locations of major project wetlands, three of which are on the west side of the reservoir and one on the east side. On the west side, the selected alignment for the Bear Creek Road relocation avoids both the high hill wetlands and those in the vicinity of the access road dike. A pond is partially impacted and mitigation is applied. On the east side, the Cider Run wetland area is not impacted. Refer to FEIS Figure 1, and Section IIIc. The PAMHEP team mitigation suggestions include all the wetland areas and are expected to be accomplished. 1640

#### SUMMARY OF RATING DEFINITIONS AND FOLLOW-UP ACTION

### stal Impact of the Action

#### ab Lack 2. Objections

SPA has no objections to the proposed action as described in the draft impact statement or suggests only minor changes in the proposed action.

#### EC-Environmental Concerns

EPA has identified environmental impacts associated with the proposed action that should be corrected in order to fully protect the environment.

## EO-Environmental Objections

EPA has identified significant environmental impacts associated with the proposed action that should be avoided in order to adequately protect the environment. EPA intends to work with the proposing agency to reduce these impacts.

#### EU-Environmentally Unsatisfactory

EPA believes that the proposed action is environmentally unsatisfactory because of its potentially harmful effect on the environment. If the potential for unsatisfactory impacts is not corrected at the final EIS stage, the project will be recommended for referral to the CEQ. EPA intends to work with the proposing agency to reduce these impacts.

#### Adequacy of the Impact Statement

#### Category 1-Adequate

The draft impact statement adequately sets forth the environmental impact of the preferred alternative or action and adequately sets forth alternatives that are reasonably available to the project or action.

#### Category 2-Insufficient Information

The draft EIS does not contain sufficient information to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS which could reduce such environmental impacts of the action. The inadequate information, data, analyses, or discussion should be included in the final EIS.

#### Category 3--- Inadequate

The draft EIS does not adequately assess the potentially significant environmental impacts of the action, or the reviewer has identified new, reasonably available, alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS which should be analyzed in order to reduce the potentially significant environmental impacts. The inadequate information,

Figure 4-1

POLICY AND PROCEDURES

•

1640

data, analyses, or discussions are of such a magnitude that they require full public review at a draft stage. This rating constitutes a finding that the draft EIS does not meet the purposes of NEPA and/or the Section 309 review, and thus must be formally revised and made available for public comment in a supplemental or revised draft EIS.

## Figure 4-1 (continued)

**a-**33

COMMONWEALTH OF PENNSYLVANIA ADMINISTRATIVE DIVISIONS. Pennsylvania Game Commission ADMINISTRATION 787-5670 P.O. BOX 1567 HARRISBURG, PA. 17120 LICENSE SECTION 787-2084 PERSONNEL GAME MANAGEMENT 787-5529 INFORMATION & EDUCATION 787-6286 May 28, 1985 LAW ENFORCEMENT 787-5740 LAND MANAGEMENT REAL ESTATE 787-6818 LTC Ralph V. Locurcio District Engineer Department of the Army Philadelphia District Corps of Engineers Custom House 2nd and Chestnut Sts. Philadelphia, PA 19106 In re: Main Report, Draft EIS and Appendices for Francis E. Walter Dam and Reservoir Modifications Dear Colonel Locurcio: The Pennsylvania Game Commission has reviewed the above-referenced environmental documents and prepared the attached review report. The PAM-HEP assessment of the proposed plan of action is a comprehensive assessment of wildlife values and impacts and mitigation needs. The Philadelphia District is to be commended for employing and participating in this study. Unfortunately, we have noted some significant problems in providing similar comparative data for all the other listed project alternatives. We are including specific recommendations for correcting these deficiencies and for insuring proper implementation of required mitigation programs. We trust you will respond to these in a positive manner. If you have any questions or comments, kindly address them to Gregory J. Grabowicz, Chief, Environmental Impact Assessment and Minerals Division at (717) 783-8743 or J. Hugh Palmer, Game Biologist at (717) 458-6320. Thank you. ruly mours, er S. Duncan Executive Director

Encl.

a-34

 

 PENNSYLVANIA GAME COMMISSION ENVIRONMENTAL IMPACT REVIEW REPORT

 Prepared by:
 J. Hugh Palmer, Game Biologist Environmental Impact Assessment and Minerals Div. Bureau of Land Management Pennsylvania Game Commission, May 10, 1985

 Project:
 Francis E. Walter Dam and Reservoir Modification Carbon and Luzerne Counties, U.S. Army Corps of Engineers

Scope: Review of Main Report, Draft Environmental Impact Statement and Appendices

Investigator: J. Hugh Palmer, Game Biologist Bureau of Land Management

#### Introduction:

Under the provisions of Section 2(a) of the Fish and Wildlife Coordination Act, the Pennsylvania Game Commission has served as a review agency for the development of the Francis E. Walter Dam and Reservoir modifications. We have attended various FWCA informational and coordination meetings, participated as a member of the terrestrial impact assessment team as part of the Pennsylvania Modified 1980 Habitat Evaluation Procedure (PAM HEP) and coordinated with the Corps of Engineers in efforts to resolve the problems associated with the relocation of L.R. 40041.

## Species Affected

2 The wildlife species list for the project area was developed from the Pennsylvania Game Commission's Fish and Wildlife Data Base supplemented by data collected on site. This listing is contained in Tables A-13-A-14, A-15, and A-16 (pages A-53-A-60) of Supplement E-1. This list was used to develop the evaluation species candidate list and to confirm the presence of federal or state-listed species of special concern. These latter listings are contained in PAM HEP form 3 (pages A54-A56, Supplement E-2) and PAM HEP forms 4a and 4b (pages A57-A60 of same supplement). No federally listed endangered species will be directly impacted by the selected plan. There will be no significant impacts to any state-listed species if the recommended mitigation plan is properly implemented.

#### Interference with Commission Lands

**3** The project limits of the selected plan will not directly impact any lands owned or leased by the Game Commission.

1-3. No response required.

-2-

## Reduction in Wildlife Habitat

A cover map of the project site was prepared by the U.S. Fish and Wildlife Service using the Anderson and Cowardin systems. The map was submitted in the planning and observed to January, 1982. This report is included in the DEIS as Supplement E-3, as to the d and the prepare the Land Use Cover Map included as Figure 2 of the PAM HEP to the d Report of May 1984. This latter report is included as Supplement E-2, the discout map is not included. This mapping accurately portrays the existing vibility habits of the project site. Baseline acreage data are presented on PAM HEP Form 2 (pages A43-A53, Supplement E-2).

**5** Acreage changes resulting from project implementation were measured on Figure 2 and reported on FAM HEP Form 7 (pages Al07-Al09, Supplement E-2). These data present a highly accurate and comprehensive compilation of wildlife habitat losses.

## Reduction in Wildlife Populations

6 As the PAM HEP methodology was used for this study, wildlife losses are expressed in terms of habitat unit (HU) reductions rather than population losses. Habitat unit reductions for terrestrial evaluation species are detailed on PAM HEP Forms 7, 8, and 9 (pages Al07-Al14, Supplement E-2) and are summarized on page 11 of the same supplemment and page EIS-33 of the DEIS. Due to the guilding process, these data provide an accurate assessment of the reduction in habitat quality and quantity, which serves as a relative indicator of population losses.

The issue of impacts to turkey vulture nest sites was not resolved by the PAM HEP team. However, an investigation by John S. Coleman of the Pennsylvania Vulture Project indicated these would not be significant.

## Reduction in Wildlife-Related Pecreation

Hunting is identified as a major recreational activity at Walter Dam in both the Main Report (pages 1-27, 2-9, 2-12) and the DEIS (page EIS-23). In addition, the area is also utilized for a variety of non-consumptive, wildlife-related activities such as bird-watching, wildlife photography, and nature study. No data are contained in these or any of the supplemental reports to indicate the current levels of these activities and how they would be affected by project implementation.

## Development of Wildlife Mitigation Programs

A comprehensive wildlife mitigation program to replace terrestrial habitat unit losses is detailed in Supplement E-2 (pages 15-19 and Al15-Al31) and is summarized (pages EIS-32 - EIS-35). As indicated in the analysis of the PAM HEP data, this plan will provide 1981 habitat units of mitigation for the 1924 HU's lost through project implementation (Table 3, page EIS-33, DEIS). Mitigation site selection will be coordinated with the PAM HEP team. Final selection will be made in accordance with the criteria established in Supplement E-2. A commitment by COE to fully implement this mitigation plan is contained on page EIS-31.

**10** A plan for mitigative restoration of disturbed areas is outlined on pages EIS-29 - EIS-31 of the DEIS. Basic features include the storing and reapplication of topsoil and revegetation with native plant species.

4. The fold-out map is not reproducible. It can be found in the PAMHEP report.

5-7 5-7. No response required.

8. Recreational statistics for the present visitation usage do not detail those activities which are generally passive in nature. Since the character of the modified project will remain unchanged and more emphasis is directed toward those passive activities, it is reasonably assumed that the improved facilities will both accommodate and attract a larger proportional visitation rate in that usage category. Non-consumptive, wildlife-related recreational uses are inherent in the broader activity mix of hiking, nature education and horseback riding.

9.10 9,10. No response required.

## Development of Wildlife Enhancement Programs

**11** The PAM HEP team made recommendations for enhancing wildlife values of the project area (page 19, Supplement E-2). No additional information regarding this enhancement was found in the DEIS or the supplemental reports.

-3-

## Relocation of L.R. 40041

92 1 12 Impacts associated with this relocation were evaluated in the PAM HEP analysis on the basis they would be restricted to deciduous forest areas. Subsequent alignment modification to the basic "over-the-hill" design added the potential for increased wetlands impacts. The recommended alignment detailed in the EIS will require 40-foot cuts and fills and will be inclose proximity to a wetlands area (page 4-3, Main Report, and Appendix H). The use of the railroad grade alignment is rejected due to weathered rock and the need to meet PennDOT design criteria (page 3-16, Main Report) and because it would require massive cuts and fills (page EIS-14-15, DEIS).

#### Comments, Conclusions, and Recommendations

13 The requirements for a Draft Environmental Impact Statement are contained in Part 1502 of the November 29, 1978 Council on Environmental Quality Regulations for implementing the provisions of the National Environmental Policy Act (NEPA). Section 1502.1 provides that the EIS should contain relevant material to plan actions and make decisions. Section 1502.14 provides for the presentation of the environmental impacts of the proposed action and alternatives in comparative form to clearly define the issues and provide the basis for making an alternative selection. This shall include a rigorous exploration and objective evaluation of all reasonable alternatives.

14 The DEIS for the Walter Dam and Reservoir modifications details the proposed action, but provides only cursory data on possible alternatives (pages EIS-8 - EIS-13, DEIS).

**15** While the evaluation of wildlife impacts for the proposed action is comprehensive, accurate and acceptable, no such comparable data are provided for any of the alternatives. Therefore, the Game Commission cannot make any decision as to the relative acceptability of any alternative.

**16** Unless there is a statutory or regulatory basis for this DEIS to be exempt from these provisions of the CEQ/NEPA Regulations, it is incomplete and unacceptable in terms of addressing project alternatives.

**17** The PAM HEP assessment of the wildlife impacts for the proposed action provides a highly detailed and comprehensive analysis of existing conditions, the impacts to them that would result from project implementation, and the mitigation requirement and plan. Implementation of the proposed mitigation will adequately and properly mitigate for all direct wildlife impacts. The Commission commends COE for its utilization of and participation in the PAM HEP study.

**18** Final selection of the mitigation sites remains to be made. This selection should be made prior to the initiation of project construction (scheduled for 1986) and coordinated to avoid conflicts with utility relocations and recreational facility sitings. Location of these latter two features should be coordinated with the PAM HEP team to avoid impacting wetlands and other critical and unique habitat features and mitigation sites.

**11** 11. Federal regulations require cost sharing, or reimbursement, with a non-Federal participant for enhancement purposes. A non-Federal sponsor was never identified. Enhancements often occur through coordination efforts with State and volunteer agencies after the project becomes operational.

12 12. No response required.

13-16 The Environmental Impact Statement (EIS) which is being reviewed as part of the General Design Memorandum (GDM) is for the Advanced Engineering and Design for the proposed project. It refers to the development of the detailed concept and preliminary design for the Walter Dam site only. The EIS for the selection of the Walter Site and its basic concept of raising the existing dam for water supply and associated recreation was already approved for the Level B Study and its associated EIS. The range of alternatives were presented at that time. This was adequately discussed in Book 1 (Main Report), Book 2 (Appendix D) and Sections I, II, and III of the Draft EIS for this current study.

As explained in the main report and in greater detail in Appendix D, the initial selection of the Walter Site in House Document 522 was as a component in a regional plan. The planning and development of such a regional plan has been a dynamic process with its last major efforts in "Level B" and the Good Faith Negotiations. It is a process involving all political, resource, business and public interests in the region requiring massive resources and many years for reaching major points of decision. The current investigation of the Walter Modification never intended (never deemed it necessary), nor was it appropriate for it to revisit the comprehensive process for the decision of its selection for its development and implementation at this time. The intent was to confirm that the project was still needed and environmentally justified and to finalize the concept prior to continuation with its design and construction.

-3-

## Development of Wildlife Enhancement Programs

**11** The PAK HEP team made recommendations for enhancing wildlife values of the project area (page 19, Supplement E-2). No additional information regarding this enhancement was found in the DEIS or the supplemental reports.

## Pai on of L.R. 40041

Expacts associated with this relocation were evaluated in the PAM HEP analysis the theat they would be restricted to deciduous forest areas. Subsequent alignment modification do the basic "over-the-hill" design added the potential for increased wetlands impacts. The recommended alignment detailed in the EIS will require 40-foot cuts and fills and will be inclose proximity to a wetlands area (page 4-3, Main Report, and Appendix H). The use of the railroad grade alignment is rejected due to weathered rock and the need to meet PennDOT design criteria (page 3-16, Main Report) and because it would require massive cuts and fills (page EIS-14-15, DEIS).

## Comments, Conclusions, and Recommendations

13 The requirements for a Draft Environmental Impact Statement are contained in Part 1502 of the November 29, 1978 Council on Environmental Quality Regulations for implementing the provisions of the National Environmental Policy Act (NEPA). Section 1502.1 provides that the EIS should contain relevant material to plan actions and make decisions. Section 1502.14 provides for the presentation of the environmental impacts of the proposed action and alternatives in comparative form to clearly define the issues and provide the basis for making an alternative selection. This shall include a rigorous exploration and objective evaluation of all reasonable alternatives.

**T4** The DEIS for the Walter Dam and Reservoir modifications details the proposed action, but provides only cursory data on possible alternatives (pages EIS-8 - EIS-13, DEIS).

While the evaluation of wildlife impacts for the proposed action is comprehensive, accurate and acceptable, no such comparable data are provided for any of the alternatives. Therefore, the Game Commission cannot make any decision as to the relative acceptability of any alternative.

**16** Unless there is a statutory or regulatory basis for this DEIS to be exempt from these provisions of the CEQ/NEPA Regulations, it is incomplete and unacceptable in terms of addressing project alternatives.

**17** The PAM HEP assessment of the wildlife impacts for the proposed action provides a highly detailed and comprehensive analysis of existing conditions, the impacts to them that would result from project implementation, and the mitigation requirement and plan. Implementation of the proposed mitigation will adequately and properly mitigate for all direct wildlife impacts. The Commission commends COE for its utilization of and participation in the PAM HEP study.

**18** Final selection of the mitigation sites remains to be made. This selection should be made prior to the initiation of project construction (scheduled for 1986) and coordinated to avoid conflicts with utility relocations and recreational facility sitings. Location of these latter two features should be coordinated with the PAM HEP team to avoid impacting wetlands and other critical and unique habitat features and mitigation sites.

As indicated in the Main Report and Appendix D, the selection of the basic project has met CEQ/NEPA Regulations, review and approval. Your agency was requested to review the scheme which was selected for development. The only alternatives which are being presented for review are those for the various components or features such as recreation features, realignment of Bear Creek Road, dam raising schemes and tower selections. This method of analysis is in accordance with the concept of tiering as described in part 1508.28 of the CEQ Guidelines implementing NEPA.

17 17. No response required.

18. Mitigation site selection cannot be made until project boundaries are firmly established. A time for that selection will be inserted in the construction schedule. The PAMHEP team will be consulted as appropriate. **19** Mitigation plan implementation is not included in the schedule for design and construction described in the Main Report (pages 4-13 - 4-34). To provide the maximum mitigative effect, the plan should be implemented prior to the start of general construction. Provisions for plan implementation should be included in the construction schedule. Delaying mitigation implementation until the end of project construction is not acceptable.

-4-

20 The PAM HEP team has recommended that wildlife enhancement be accomplished on the project area by constructing additional clearings within the forested areas over and above the number needed to mitigate the losses resulting from project construction. Additional enhancement could be achieved by providing shoreline wetlands developments. This development would benefit such wildlife species as Canada geese, wood ducks, American coot, kingfisher, and raccoon, as well as various fish species and could be implemented through appropriate borrow site selection.

21 Proposed borrow sites are identified and discussed in the Main Report (pages 4-10 - 4-11 and plate 1-18). The recommendation is made that sites should be located below permanent pool elevation to reduce the need for site restoration. Location of borrow sites at the permanent pool elevation would provide areas for emergent and scrub-shrub wetlands development, given a relatively stable pool level. Borrow site selection will be made at some future time and should be coordinated with the PAM HEP team. Such shoreline wetlands development would help eliminate the problem of increased shoreline erosion that would result from raising the pool level (page EIS-27, DEIS).

22 Recommendations have been made to revegetate the spillway and other construction sites with native shrub and herbaceous species. The utilization of these species is biologically desirable, but their application in revegetation may not be viable. Revegetation plan development should employ the Soil Conservation Service Plant Adaptation Data System in order to insure maximum success and effectiveness.

23 Regarding the relocation of L.R. 40041, the Game Commission has previously voiced concerns about wetlands impacts, construction in previously undisturbed areas, and secondary impacts arising from increased access and resulting development. For these reasons, the Commission has favored the railroad grade alignment. The COE has countered that this alignment does not meet PennDOT design criteria, has problems associated with weathered rock, would require massive cuts and fills, and would cost more than the over-the-hill alignment.

24 Even with the COE proposed alignment avoiding direct wetland impacts, the Commission is of the opinion that the railroad grade alignment is biologically preferable. A preliminary review of these alignments by a Commission engineer failed to confirm the geological and design problems listed by COE or the conclusion that the over-the-hill would be less costly. Initial PennDOT assessments tend to support the Commission position.

**25** The material contained in Appendix H deals only with the engineering and design aspects of the COE recommended over-the-hill alignment. No biological data are provided in any of the environmental documents to allow a comparison of the wildlife impacts of the various alignments. Pending the provision of such data and the completion of a detailed engineering analysis by PennDOT, the Game Commission strongly recommends the use of the railroad grade alignment.

19 19. Reference is made to the response for comment 18.

. C. Marsher Carpenne

高度建筑学校 化化学学 化化学学 化化学学 化化学学 化化学学 化化学学

- 20 20. Reference is made to the response for Comment 11.
- 21 21. Borrow sites are selected according to geologic capability for providing needed construction materials. The need to use them is dependent on the volume of material available from a given site. That can only be determined as sites are used. The final surface grade of underwater sites is a construction detail which may prove worthy of consideration for wetlands development if the edge nears permenant pool elevation. The PAMHEP team will continue to be utilized when appropriate for this and other purposes.
- 22 22. The Soil Conservation Service Plant Adaptation Data System (PADS) will be utilized as a necessary planning tool when detailed planting plans are developed.
- 23 23. The alternative which utilizes the abandoned railroad alignment does meet Penn DOT criteria. However, in doing so, large cuts and fills are required. This results in the most expensive alternative. Stabilizing the cuts or slopes in the weathered rock which exists may cause problems not only during construction but also in maintaining the road throughout its entire life. Such roads founded in cuts usually result in greater maintenance and pose safety problems especially during winter conditions. In addition, this alternative results in the greatest scars, has the greatest aesthetic impacts and will eliminate a major recreation feature, the largest and most scenic trail to be used for equestrian, hiking and cross country activities in this area. This subject was recently discussed with Penn DOT. Penn DOT was satisfied with the conduct of the Corps technical analysis and conclusions.

-4-

**19** Mitigation plan implementation is not included in the schedule for design and construction described in the Main Report (pages 4-13 - 4-34). To provide the maximum mitigative effect, the plan should be implemented prior to the start of general construction. Provisions for plan implementation should be included in the entruction schedule. Delaying mitigation implementation until the end of

Ine 2AA HEP team has recommended that wildlife enhancement be accomplished on the project area by constructing additional clearings within the forested areas over and above the number needed to mitigate the losses resulting from project construction. Additional enhancement could be achieved by providing shoreline wetlands developments. This development would benefit such wildlife species as Canada geese, wood ducks, American coot, kingfisher, and raccoon, as well as various fish species and could be implemented through appropriate borrow site selection.

21 Proposed borrow sites are identified and discussed in the Main Report (pages 4-10 - 4-11 and plate 1-18). The recommendation is made that sites should be located below permanent pool elevation to reduce the need for site restoration. Location of borrow sites at the permanent pool elevation would provide areas for emergent and scrub-shrub wetlands development, given a relatively stable pool level. Borrow site selection will be made at some future time and should be coordinated with the PAM HEP team. Such shoreline wetlands development would help eliminate the problem of increased shoreline erosion that would result from raising the pool level (page EIS-27, DEIS).

22 Recommendations have been made to revegetate the spillway and other construction sites with native shrub and herbaceous species. The utilization of these species is biologically desirable, but their application in revegetation may not be viable. Revegetation plan development should employ the Soil Conservation Service Plant Adaptation Data System in order to insure maximum success and effectiveness.

23 Regarding the relocation of L.R. 40041, the Game Commission has previously voiced concerns about wetlands impacts, construction in previously undisturbed areas, and secondary impacts arising from increased access and resulting development. For these reasons, the Commission has favored the railroad grade alignment. The COE has countered that this alignment does not meet PennDOT design criteria, has problems associated with weathered rock, would require massive cuts and fills, and would cost more than the over-the-hill slignment.

**24** Even with the COE proposed alignment avoiding direct wetland impacts, the Commission is of the opinion that the railroad grade alignment is biologically preferable. A preliminary review of these alignments by a Commission engineer failed to confirm the geological and design problems listed by COE or the conclusion that the over-the-hill would be fess costly. Initial PennDOT assessments tend to support the Commission position.

25 The material contained in Appendix H deals only with the engineering and design aspects of the COE recommended over-the-hill alignment. No biological data are provided in any of the environmental documents to allow a comparison of the wildlife impacts of the various alignments. Pending the provision of such data and the completion of a detailed engineering analysis by PennDOT, the Game Commission strongly recommends the use of the railroad grade alignment.

- 24 24. Coordination with Penn DOT does not indicate support as interpreted by the PGC. Penn DOT has requested display of additional technical data in order to satisfy their needs for concurrence with the formulation and alternative selection process. Refer also to responses to comments 23 and 25.
- 25 25. The alternative for road relocation using the abandoned railroad right-of-way is more costly than all other alternatives; it requires more fill material, disturbs more surface area, and is a longer road to maintain. It is less aesthetically desirable as the cuts and fills would be obvious from the park, and detract from the forest continuity. It would eliminate a major recreational feature and would require considerable maintenance to stabilize falling rock and erodable fills. Refer to revisions in Book 1 and Book 4 (Appendices G & N).

Except for the wetlands, over-the-hill alternatives essentially are equal in their impacts to wildlife habitat. This was established in the PAMHEP analysis. Additional biological data were provided in the FWS Planning Aid Report which has been added to Book 3, Appendix E. This information has also been incorporated into Section IV of the EIS.

The final design of the selected alignment accommodates the specialized needs of wildlife passage and surface water system continuity. (Refer to responses to Penn DOT.)

a-40

Based on the review of the Main Report, DEIS, and attached appendices, the Pennsylvania Game Commaission makes the following recommendations:

-5-

**26** 1. The COE prepare and circulate a supplemental DEIS that provides detailed biological data on the wildlife impacts of all project alternatives identified in the current EIS. The Commission stands ready to assist in the development of such data as it did in the PAM HEP study for the proposed action.

**27** 2. Mitigation site selection be coordinated with the PAM HEP team to provide site selection prior to the onset of project construction. Enhancement sites should be selected during this process.

**28** 3. The schedule of design and construction be modified to provide for the development of the recommended mitigation sites prior to the onset of general project construction.

**29** 4. Selection of utility relocation and recreational facility sites are coordinated with the PAM HEP team to avoid impacts to wetlands, other critical and unique habitat, and mitigation sites.

ß

÷

**30** 5. Borrow site selection should be coordinated with the PAM HEP team in order to avoid impacts to wetlands, other critical and unique habitat, and mitigation sites, and to promote to the maximum degree feasible, vegetated wetland development along the shore of the permanent pool.

**31** 6. Revegetation plans for the spillway and other construction areas be developed in coordination with the PAM HEP team and the Soil Conservation Service.

**32** 7. The supplemental DEIS contain the necessary biological and engineering data in order to properly evaluate all the proposed alignments for the relocation of L.R. 40041.

- 26 26. Expanded data is provided in the FEIS and in the various comment responses herein. No supplementary DEIS is anticipated.
- 27-28 27-28. Site selection will be appropriately scheduled to occur prior to construction when real estate boundaries are determined. The PAMHEP team will continue to be utilized. Enhancement sites would be considered only if a cost-sharing participant is identified.
  - **29** 29. Utility relocation and recreational facility siting will be accomplished by COE Staff with consultation with the PAMHEP team as necessary.
  - **30** 30. Borrow sites have been selected on the basis of materials available. Sites proposed in wetlands areas have been eliminated. Habitat losses were considered in the PAMHEP analysis. Sites have been ranked for use to further eliminate sensitive areas. Rehabilitation requirements for sites used will benefit the mitigation plan. The PAMHEP team will continue to be consulted as necessary.
  - 31 31. The PAMHEP team and SCS will be utilized as necessary.
  - **32** 32. The revisions included in the Main Report and FEIS provide the required data. A supplemental document is not required.

# FEDERAL ENERGY REGULATORY COMMISSION

WASHINGTON, D.C. 20426

JUN 1 0 1985

Federal Project Review General Design Memorandum Modification of the Francis E. Walter Dam & Reservoir Lehigh River Basin, Pa.

Mr. Nicholas J. Barbieri Chief, Planning/Engineering Division Philadelphia District, Corps of Engineers Custom House - 2D & Chestnut Streets Philadelphia, PA 19106

Reference: Environmental Resources Branch

Dear Mr. Barbieri:

This is in response to your letter of March 28, 1985, requesting comments on the Draft General Design Memorandum and the Environmental Impact Statement for the modification of Francis E. Walter Dam to provide additional storage for water supply and recreation.

The study evaluated the engineering, economic, and environmental feasibility of providing additional storage to meet regional water supply needs in the Delaware River basin. The selected plan consists of raising the dam 30 feet to provide approximately 70,000 acre-feet of additional storage for water supply to the existing 108,000 acre-

The Commission has previously given consideration to the development of power at Francis E. Walter Dam and Reservoir (formerly Bear Creek Reservoir). In a January 25, 1946, letter to the Chief of Engineers, the Commission concluded that power development at Bear Creek Reservoir was not economically feasible and that provisions

As a part of the current review, we evaluated the feasibility of adding hydropower generating facilities at the Francis E. Walter Dam. This analysis was based on run-of-river type operation; however, potential also exists for providing storage and thereby facilitating a peaking plant. Our cursory analysis indicated that a hydropower plant with an installed capacity of about 10 to 12 megawatts would provide maximum net annual benefits. Power benefits were based on the marginal costs of capacity and energy from a Mr. Nicholas J. Barbieri

1

2

a-43

federally financed coal-fired powerplant. Marginal capacity and energy values at October 1984 price levels and 8-3/8 percent Federal financing are estimated to be \$254 per kilowatt-year and 25 mills per kilowatt-hour, respectively. These values include real fuel cost escalation projections made by the Energy Information Administration in 1983. Annual cost estimates were based on a 50-year project-life.

-2-

As part of the Corps of Engineers' Lehigh River Basin Study currently underway, we recommend that consideration be given to providing storage for power purposes by reallocating some of the flood control storage to power either on a permanent or seasonal basis. Such a reallocation would not result necessarily in the loss of flood control benefits because of additional discharge capability provided by the power turbines. A computerized model of Francis E. Walter Dam and reservoir simulating the historical operations would facilitate the determination of the amount of storage that can be allocated to power purposes with appropriate consideration for the primary purpose of flood control.

As shown in your report, Weatherly Borough applied for a license on February 28, 1983, to construct a hydroelectric plant at the Francis E. Walter Dam (FERC Project No. 2969). The application for the license was denied by the Commission on March 21, 1985, because the proposed development was not compatible with modifications of the project which were under consideration by the Corps. The actual issuance of a license to any party would be carefully considered in relation to any plans of the Corps of Engineers and the FERC/Corps Memorandum of Understanding and would be coordinated with all entities involved.

Based on the consideration of your report and our study, we conclude that hydropower development is economically feasible and that later, more detailed studies based on conceptual design, current costs and benefits, and other site-specific information would determine the optimum capacity. If power is included as an initial purpose, consideration should be given to include provisions to accommodate future development of power at Walter E. Francis Dam. Obviously, the optimum level of power development by non-Federal interests may differ because of differences in evaluation criteria.

Sincerely,

Quentin A. Edson Director, Office of Hydropower Licensing

- 1. As part of the Corps Lehigh Hydropower Study, the Philadelphia District is undertaking the analyses being suggested. The (HEC-5) Simulation of Flood Control and Conservation Systems computer program and Daily Flow Models are being used to optimize the storage allocation between flood control and hydropower. Storage reallocations with no measurable reduction in flood control protection are being considered.
- 2 2. As stated, an objective of the proposed modification is not to preclude future development of hydropower. Advanced development of minimum integral features such as penstocks will be considered. However, inclusion of such features now as opposed to after completion of the proposed modification must be justified on the basis of economic or practical efficiency.

CARBON COUNTY PLANNING COMMISSION

> P. O. Box 210 Courthouse Annex Jim Thorpe, Pa. 18229

## POSITION PAPER OF

## THE CARBON COUNTY PLANNING COMMISSION

**1** The County of Carbon wishes, first of all, to express its displeasure that a Public Hearing on a major water supply project for the Delaware River Basin must be held in the Susquehanna River Basin. There are dozens of facilities large enough that are close to the Walter Dam in both Luzerne and Carbon Counties where this Hearing could have been held.

The Carbon County Planning Commission has repeatedly, in the past, endorsed the proposed Walter Dam enlargement, but with certain conditions.

**2** We need to know that the water resources available from the enlarged Francis E. Walter Dam can be available to the communities of our County, as well as other downstream users. We need to know that the recreational facilities to be developed at Walter will be an appropriate addition to the burgeoning recreational industry in Kidder and Penn Forest Townships.

In particular, we want to work with the PA DER, the DRBC, and the U.S. Army Corps of Engineers to develop the recreational facilities along the Carbon County side of F.E. Walter. We wish to correct the statement in the Environmental Impact Statement that local residents do not desire recreational development at F. E. Walter. We do on the Carbon County side.

We wish to also start to work with the PA DER to develop a total Watershed **4** Management Plan with growth strategies, natural resources strategies, and 1. As was stated at the public meeting on July 13,1985, the location was selected with much forethought and coordination. The facilities which were available closest to the to the Walter Dam Site were used for the previous general workshop and public meeting. Both the workshop facilities and the public meeting facilities were inadequate in accomodating the number of participants. More were expected for this meeting. No other larger public or commercial facilities were available near the dam site. We coordinated with Bear Creek and Kidder Townships in selecting Wilkes Barre. This was the best choice for their citizens to commute. These are the townships which would be most impacted by the proposed project.

2

2. As was stated by a representative of the DRBC at the public meeting, a "pool" concept exists for the entire Delaware River Basin. If a community in Carbon County applies for a new water source, the application is processed and includes a public hearing. If the application does not interfere with other uses the request is granted.

The recreation plans have been formulated in a cyclic process. Concepts were developed, coordinated and revised. In each cycle the plans were defined in increasing detail and reflected changes and compromises made as a result of the previous cycle. This is detailed in the report. Emphasis was placed on Bear Creek and Kidder Townships concerns and desires. Within topographic constraints and environmental sensitivity of the area, the plan should reflect their concerns and desires. Further development of the plans will continue to incorporate this procedure.

# CARBON COUNTY PLANNING COMMISSION

P. O. Box 210 Courthouse Annex Jim Thorpe, Pa. 18229

# POSITION PAPER OF

## THE CARBON COUNTY PLANNING COMMISSION

The County of Carbon wishes, first of all, to express its displeasure that a Public Hearing on a major water supply project for the Delaware River Basin must be held in the Susquehanna River Basin. There are dozens of facilities large enough that are close to the Walter Dam in both Luzerne and Carbon Counties where this Hearing could have been held.

The Carbon County Planning Commission has repeatedly, in the past, endorsed the proposed Walter Dam enlargement, but with certain conditions.

2 We need to know that the water resources available from the enlarged Francis E. Walter Dam can be available to the communities of our County, as well as other downstream users. We need to know that the recreational facilities to be developed at Walter will be an appropriate addition to the burgeoning recreational industry in Kidder and Penn Forest Townships.

3 In particular, we want to work with the PA DER, the DRBC, and the U.S. Army Corps of Engineers to develop the recreational facilities along the Carbon County side of F.E. Walter. We wish to correct the statement in the Environmental Impact Statement that local residents do not desire recreational development at F. E. Walter. We do on the Carbon County side.

4 We wish to also start to work with the PA OER to develop a total Watershed Management Plan with growth strategies, natural resources strategies, and 3

3. Your previous input has been fully considered and within constraints stated in Response 2 the plan should reflect this. This process with your agency will continue. The report and EIS has been revised to better reflect Carbon County's position on recreation which was incorporated by the Corps in its planning process. In the near future, recreational Master Plan and operational management plan documents will be prepared. The documents will show the level of initial development and an array of facility options, and methods to acquire them, for future development as needs arise.

4 4. This will be passed on to PADER.

-2-

Sonal resources all considered for their post enlargement effect on our the hope that the residents of Bear Creek will join us in that effort.
It is important to all of us that we continue to address our water supply needs. While we seem to be the ones who are always stuck with the dams, we recognize that you can't store fresh water in the ocean. In Carbon County we are determined to make sure that the enlarged facilities at F.E. Walter are a positive addition to our County. We will also determine to make sure that we have access to the full range of recreational facilities that can be developed on the Carbon County side.

5

5. Your statement expresses basic planning philosophies on this type of project. The goal is to develop a project which meets the regions needs for which it was intended. The plan should also minimize adverse impacts on the communities in which it is located and, in turn, maximize benefits which it can offer local communities by its existence. Karess & Reich

LAW OFFICES

MARTIN J. KARESS JAMES L. REICH JUDITH A. DEXTER

215 N. NINTH STREET Allentown, Pennsylvania 18102

May 28, 1985

U.S. Army Corps of Engineers Baltimore District P.O. Box 1715 Baltimore, Maryland 21203

Attn: Harry Debes, Project Manager

#### Re: Proposed modification of Francis E. Walter Dam and Reservoir as outlined in EIS draft, February 1985/Dream Mile Club

#### Gentlemen:

Please be advised that I represent and serve on the board of directors for the Dream Mile Club Inc. in Blakeslee, Pa., an interested party in the proposed modification. Basically, the Club owns approximately 800 acres of forest with improvements and 3.2 miles of the Tobyhanna stream on both sides, with title to the creek bed situated north of 940 and immediately east of route 115, bounded on the west by Blue Ridge Real Estate Company holdings.

Our Club is extremely alarmed after reviewing the report recently issued by your office, by reason of certain proposals which we find unnecessary and unduly harsh as the same apply to our Club. The areas of concern are the following:

a. Our only means of traversing the river by automobile is over a concrete causeway which is scheduled to be removed while being impervious to flooding and water conditions of the extremest nature foreseeable. The structure should pose no legitimate danger or threat to your proposed expansion, as it has not, over the many years that it has existed, including Hurricane Agnes, which occurred in the mid-fifties. Recent studies by the Club have indicated that without the aforesaid causeway, we or a condennor will be required to spend hundreds of thousands of dollars to establish alternate road systems to restore or replace as the case may be, the causeway and, in that case, in a manner not nearly comparable to the method of traversing our property presently enjoyed and utilized on a daily basis.

1-5 1-5. A Corps of Engineers regulation requires that we design the land acquisition line to assure that major hazards to life or unusually severe property damage would not result from utilization of the full flood control pool. The criteria for the F.E. Walter Modification Project is based upon the top of the flood control pool or spillway crest (elevation 1482.0) plus sufficient freeboard (5 feet) to provide for adverse effects of saturation, wave action and bank erosion. The consideration to acquire a dwelling stems not only from the location of the dwelling but also the location of its well and septic systems which may become contaminated and its access which may be inundated as a result of high water.

May 28, 1985

limited and will certainly affect each member's enjoyment and ownership rights. In all reality, in the event a 100-year flood should occur, the threat by these structures would be far overshadowed by the deluge of will, debris and broken-up structures, etc. from upstream and the

-7-

" woodland abutting the areas affected. Certainly, some thorough association should be given before rendering this edict upon our letts and membership.

In surmary, it must be stressed that our Club, above all, is aware of the staggering burden of furnishing the needs of water and safety from flooding to the using public of the Delaware River Basin Commission. However, it is suggested that artful consideration in appropriately addressing the already beseiged difficulties encountered through deficit spending and budgeting should not be overlooked, as well as the practical effects of carrying to fruition these proposed plans as outlined above. Certainly, potential harm and immediate impact upon our Club must be considered, as well as the cost mentioned above and the lack of available funds for such type expenditures. I strongly suggest that preserving the status quo and minimizing the disruption of your proposed endeavors is of paramount importance, for the potential harm does not justify sacking our beautiful refuge and incurring the astronomical cost which would not fulfill any realistic need, nor produce a comparable scheme for getting about or utilizing our property.

**5** We respectfully request that we receive consideration in formulating final plans on these particular points and request that you contact me at your earliest convenience so that we may make a field inspection of the area and, further, implement our observations and concerns.

I look forward to your comments and subsequent consideration of these sincere observations as noted above. Should you have any questions, call me at your earliest convenience.

Kameco

MJK/ml

cc: Dr. William F. Weir Dream Mile Club board of directors Mr. A. Duarte George Kanuck, Esquire, member of DRBC In light of the above, we are currently considering the effects of allowing the non-habitable structures, namely the concrete causeway, the cable suspension bridge and the picnic shelters to remain within the project area. Please note, however, that the final acquisition lines must be approved by higher command authority prior to the start of land acquisition and, therefore, any recommendations made are subject to revision. U.S. Army Corps of Engineers

May 28, 1985

Certainly, anyone can readily appreciate that this structure poses no potential risk to the dam development, which is borne out through history through the aforesaid flood in the fifties, while on the other hand, will have a devastating effect upon the utilization of our Club grounds, making many areas inaccessible, except with huge expenditures which fall short of the desired result. In effect, this taking will destroy in many aspects the value of our property and fishing club, while serving an unjustified condition precedent to the modification.

-2-

2 b. The present cable suspension bridge almost  $\frac{1}{2}$  mile south of the causeway is also scheduled for removal and is critical to our enjoyment of the property, particularly to the many members of our Club who are in their retirement years and limited in physical activity, who will, obviously, without the crossing, have their enjoyment of our facility rendered a stunning blow, having their investment in the Club basically cease in many aspects, without a suitable replacement of this suspension bridge. Recent studies have indicated that any attempt to replace such a structure further upstream, as we considered, would cost in excess of \$35,000. The present cable suspension bridge should pose no real threat to the modification of the dam even in the event the 100-year flood is experienced. Here again, I feel the precautions that have been dictated by your honorable agency are unnecessary to protect expansion to the dam and the public for whom we are concerned. I must stress that balancing the equities is particularly important where such little threat is encountered, and on the other hand, such harm is bestowed upon the condemnee. Certainly, while the government may classify their taking as an easement, in all respects these removals will constitute, in fact and law, a permanent taking and substantial deprivation of one's use of this vast acreage which we have attempted to preserve and enjoy, rendering severe practical and economic impact upon our Club.

**3** c. In your proposal, at least two (2) substantially improved picnic shelters and at least four (4) recently renovated cabins and five (5) or more outhouses are also scheduled to be removed to counter a potential hazard from a potential 100-year flood. While the proposed easements to be procured are considered to be of a temporary type nature, the resulting damage to our Club is substantial and costly, as stated above. Without our lodging facilities, our enjoyment of this preserve will be severely

E & C ASSOCIATES NEW ADDRESS 825 EAST GITY LINE AVENUE BALA GYNWYU, PA. 19004 215-668-9242 **和日**二年に成熟的日本に成了 Hidge & Austice Cliffs 2.0.000 245-625-0631 May 21, 1985 Mr. Nicholas J. Barbieri, PE Chief, Planning/Engineering Division Department of the Army Custom House - 2nd & Chestnut Streets Philadelphia, Pa. 19106 Re: Environmental Resources Branch Dear Mr. Barbieri: I have read with interest the draft of the main report of the environmental impact statement relative to the Francis E. Walter Dam, Lehigh River, Pennsylvania. It certainly appears to me that the study has gone into great depth and I fully approve. My comments would be that I would like to see you start the construction activity as soon as possible. Yours very traly VDC/bf Vernon D. Cox, Jr.

No response required.

#### 3 1 7

a~50
GFWC-Women's Service Club of Bear Creek Area Mrs. Serah Koury

Wilkes-Barre, PA

U. S. Army Corps of Engineers Philadelphia District Custom House, 2nd & Chestnut Sts. Philadelphia, PA 19106

### Gentlemen:

On behalf of the GFWC-Women's Service Club of Bear Creek Area I am writing you in regard to the "proposed" expansion of the Francis E. Walter Dam. We have a committee which has been closely following the progression of said project for the past two years.

Since all of the meetings held in this area showed an overwhelming opposition to the expansion as proposed, it was with great disappointment that the EIS shows no alternative construction methods at P. E. Walter. The notice for hearings on the funding for this project by the D.F.B.C. was also disappointing, in that no hearing is to be held within close proximaty of the area involved.

Although we have briefly looked at the EIS, there is no wey we can do this report justice with a reply that is expected by May 15th. We are hopeful that the D.T.B.C. will request the Army Corps of Engineers to grant an extension of that date. I feel it is important to point out that our club rep-

3 resents a cross-section of the Bear Creek/Buck Township Area. We have fifty members from these townships, and we are urging the D.F.B.C. and The army Corps of Engineers to be bold enough to break from the plan developed in the 1960's. Modern technology opens many avenues not available in the past. We are challenging you to show a creative new approach

to the problems that are facing the Deleware River Basin System.

Sincerely,

While an the start

Mrs. Sarah Koury, President CPWC-Women's Service Club of Bear Creek Area 1. As described in detail in Book 2, Appendix D, the decision to raise the Walter Dam was the result of a continuous regional planning process. The decision was the result of multiple and extensive investigations. All potential alternatives to reservoirs have been considered and, where appropriate, are being implemented or placed in the Comprehensive Basin Plan for future implementation. As far as reservoirs, more than 250 sites have been investigated. Many have been studied more than three times since 1962. The Walter site has repeatedly surfaced as one of the best alternatives to meet regional water needs. The last two efforts, the "Level B Study" and the "Good Faith Negotiations" designated the project as the first or highest priority.

The proposed modification is a regional project. It has received various degrees of support and opposition throughout the Delaware River Basin. At our last public meeting, the project received both support and opposition from people in the area surrounding the site.

During both the "Level B Study" and the "Good Faith Negotiations", the DRBC held meetings throughout the Delaware River Basin. They strategically held meetings near the proposed reservoir sites which they were recommending for construction prior to the year 2000. The meetings near the Walter Dam site were held in Wilkes Barre. GFWC-Women's Service Club of Bear Creek Area Mrs. Sarah Koury

Wilkes-Barre, r.

S. Army Corps of Engineers
Solution House, 2nd & Chestnut Sts.
Philedalphia, PA 19106

Gentlemen,

1

2

On behalf of the GFWC-Women's Service Club of Bear Creek Area I am writing you in regard to the "proposed" expansion of the Francis E. Walter Dam. We have a committee which has been closely following the progression of said project for the past two years.

Since all of the meetings held in this area showed an overwhelming opposition to the expansion as proposed, it was with great disappointment that the EIS shows no alternative construction methods at P. E. Walter. The notice for hearings on the funding for this project by the D.P.B.C. was also disappointing, in that no hearing is to be held within close proximaty of the area involved.

Although we have briefly looked at the EIS, there is no way we can do this report justice with a reply that is expected by May 15th. We are hopeful that the D.5.B.C. will request the Army Corps of Engineers to grant an extension of that dete. I feel it is important to point out that our club represents a cross-section of the Bear Creek/Buck Township Area.

resents a cross-section of the Bear Greek/Buck Township Area. We have fifty members from these townships, and we are urging the D.F.B.C. and The Army Corps of Engineers to be bold enough to break from the plan developed in the 1960's. Modern technology opens many avenues not available in the past. We are challenging you to show a creative new approach to the problems that are facing the Deleware River Basin System.

#### Sincerely.

Mrs. Sarah Koury, President CFWC-Women's Service Club of Bear Creek Area 2. As was announced through later public meeting information, this deadline was later extended to June 24th. This, therefore, extended the normal 45 day comment period to 85 days.

3

3. As indicated in the response to Comment 1, the Comprehensive Plan, which was adopted in 1962, is a dynamic plan. It is constantly being reviewed and updated. Since 1962, the entire plan has been re-studied and revised, the latest efforts being the "Level B Study" and the "Good Faith Negotiations".

a-52

## LEHIGH RIVER OUTFITTERS ASSN. Tel: 717/325-8378

P.O. Box 44, Jim Thorpe, Pa. 18229

My name is Douglas Fogal, from Pocono Whitewater Rafting, and representing the Lehigh River Outfitters Association.

Since the Walter Dam was originally authorized for flood control. one dramatic change has been the phenomenal growth of downstream boating. That includes canoeing, kayaking, and principally, whitewater rafting. One tourist authority has termed rafting a new industry in Carbon and adjacent counties.

Our organization would like to go on record as 100 percent in favor of the enlargement modification because of the potential for additional recreational usage. At the same time, we must oppose certain flow diversions that could seriously curtail the present seven days a week downstream recreational pattern-principally particular types of hydropower projects such as peaking. We have no trouble with "run of river" hydro.

What could be at stake here from an economic impact position \$9,000,000 could range from to \$27,000,000 actual cash brought into the area.

Studies for the Department of Environmental Resources have set the safe carrying capacity of the Lehigh at 4000 people per day. With the cost of the raft trip added to expenditures for gasoline, food, souvenirs, and other attractions, this totals \$300,000 a day spent by rafters in Carbon and adjacent counties. With no other whitewater river within a day's ride, this means a potential economic bonanza for local communities and for one of the highest unemployment areas in the state.

We are close now to 30 days a year usage, converting to \$9,000,000 annually. Summer weekend augmented flows could bring

The investigations recognized the benefits to whitewater boating. However, the project is neither designed nor is there storage allocated for that purpose. Nonetheless, under normal operations with the Modification, boating opportunities could increase. Requests for specific releases should be directed to the Pennsylvania Department of Environmental Resources (PADER). The Corps will continue its coordination with whitewater interests through PADER.

the industry into the 60 day \$18,000,000 level. Full dam gration with regular schedules would make possible a marketing that could bring these figures to 90 days and \$27,000,000 spent in the area. With current weekday business virtually untouched at only 15 % of total these figures are realistically attainable.

We feel downstream recreation offers a valid second reason for the modification program and we ask that rafting be kept in the forefront of planning.

Page 1 of 2

# THE PENJERDEL COUNCIL



PUBLIC STATISMENT OF ROBERT C. WONDERLING MANAGER, THE PENJERDEL COUNCIL

GIVEN BEFORE

U.S. ARMY CORPS OF ENGINEERS PUBLIC MEETING CONCERNING STUDIES FOR THE MODIFICATION OF THE FRANCIS E. WALTER DAN

WILKERS BARRE, PENNSYLVANIA JUWE 13, 1985 Good Evening, My name is Robert C. Wonderling, Manager for the PENJERDEL Council. The PENJERDEL Council is a tri-state association of business, industry , and the professions with significant employment in Southeastern Pennsylvania, Southern New Jersey, and Delaware. The Council was created to address and help solve major regional problems. Our main concerns are those that deal with regional transportation, ports, the environment, defense related issues, and water quality and supply.

The goal of the Council is to improve the economy and the overall quality of life for the Delaware Valley. The Council also advocates proper use and management of the Delaware River and its tributaries so as to ensure our future water needs. In this regard, the quality and long term availabity of this region's water supply is of outmost importance to the PENJERDEL Council.

In 1983 the PENJERDEL Council supported the "Good Faith" agreement with the understanding that the proposed water supply and flood control projects would be built. The "Good Faith" agreement provides, for alternatives to the Tocks Island project. The modification of the Francis E. Walter Dam is one of the alternatives to Tocks and is fully endorsed by the PENJERDEL Council. It is the position of the Council that proposed modifications of the F.E. Walter Dam should move forward as scheduled.

#### Page 2 of 2

s is review of the General Design Memorandum/Environmental Impact bracement for the Francis E. Walter Project indicates that the U.S. Army Corps of Engineers have shown creativity in the development of a project which will not only address the water supply problem and aid the region's economy, but will enhance an existing recreational and environmental facility.

The PENJERDEL Council recognizes that current policy by the federal government insists that the cost of the modification of the project be shared by the intended users. The Council is in agreement with this position. Kowever, we do not support any policy designed to recover the initial cost of construction for F. E. Walter Dam or any other existing project in the Basin.

In light of the curent water supply crisis we must act now and move forward with the F.E.Walter Dam Project. The vitality of the region is directly linked to the quantitiy and quality of our water resources. The proper management and enhancement of these resources is not only important now, but also is paramount as we approach the next century.

On behalf of the PENJERDEL Council, I appreciate the opportunity to be heard at this time, thank you.

No response required.

May 17, 1985 Hesley James nazareth, Ras M. S. armoy Corps of Engineers Custom House Second and Chestnut Streets Philadelphia, Pa. 19106 Lin In regards to Expansion Plans for Francis & Walter Dem: I wish to enter this letter as a comment on the Draft Report. Why can a few people (as compared to the general public) in Bear Township ruise you to elimote a comping area, when this is a public project for everyone ? 9 am a camper and would love to comp at the reservoir area. Sincerely Neelly James.

May 17, 1985 Wesley James

Nazareth, PA, 18064

U.S. Army Corps of Engineers Custom House Second and Chestnut Streets Philadelphia, Pa 19106

Sir,

1

In regards to Expansion Plans for Francis E. Walter Dam:

I wish to enter this letter as a comment on the Draft Report.

Why can a few people (as compared to the general public) in Bear Township cause you to eliminate a camping area, when this is a public project for everyone? I am a camper and would love to camp at the reservoir area.

Sincerely,

Wesley James

1 The camping has not been eliminated but deferred for future development. At this time, according to the Pennsylvania Department of Environmental Resources, adequate camping capacity is being provided in this area by the Hickory Run State Park. Camping would be developed in the future to meet future needs. This concept and phasing was planned in coordination with the Pennsylvania Department of Natural Resources which includes the Bureau of State Parks.

÷. i. I am hoping you will be able to proceed with the modification project with all due speed. If everything goes according to schedule, when will the project be completed? Peter Forte Jim Thorpe, PA I will not be able to attend the meeting woul my comment June 13 m Thorpo recor Tama in + was thing survey of Ima PAN project many people to upor Commercia. the prime Peter 2 I will not be able to attend the meeting on June 13, but I would like my comments included in the record. I am a resident of Jim Thorpe and a private boater. I would like to see whitewater recreation become part of the purpose of the modification project. Many people are upset with the lack of coordination with water releases and the boating public; both commercial and private. No one can dispute that flood control must be the primary purpose, but storage could be held briefly and then released to coincide for

Peter S. Forte Jim Thorpe, PA

optimum boating.

1 With a scheduled initial construction start date of December 1986, the project will be operationally complete for both Water Supply and Recreation by September 1992.

2

The investigations recognize the benefits to whitewater rafting however, they are considered to be a "windfall" to whitewater boating. The project is not designed nor is there storage allocated for whitewater boating. Compared to the water supply and flood control storage purposes, whitewater requirements are minor, even incidental. Releases will be delivered at the request of Pennsylvania through the Delaware River Basin Commission. With the modification, whitewater boating will be enhanced by normal operations and specific requests for releases are expected to infrequently conflict with the project's authorized purposes.

a-5 õ 3RD JUNE 1985

# PETER FORTE

JIM THORPE, PA.

U.S. ARMY CORPS "OF ENGINEERS PHILADELPHIA DISTRICT ATTENTION: NAPEN-P. (WALTER MOD.)

DEAR SIR:

8

ú

I WILL NOT BE ABLE TO ATTEND YOUR PUBLIC MEETING ON JUNE 13. 3 MY FRIENDS AND I HAVE CONCERNS RELATED TO THE F.W. MODIFICATION PRO-JECT THAT WE WOULD LIKE TO SEE INCLUDED AS PART OF THE PUBLIC RECORD. WE ARE GREATLY CONCERNED AND DISTRESSED THAT WHITEWATER RECREA-TION IS NOT PART OF THE STATED PURPOSE OF THE MODIFICATION PROJECT. WE REQUEST THAT IT BE MADE PART OF YOUR FINAL PROPOSAL. NO ONE CAN DENY THAT FLOOD CONTROL MUST TAKE PRECEDENCE OVER OTHER ACTIVITIES, BUT IN A PROJECT THE SIZE OF THIS, WE HOPE YOU WILL INCLUDE WHITE-WATER RECREATION AS PART OF THE FINAL PROPOSAL. WE ARE ALSO CONCERNED ABOUT THE WAY WATER STORED AND RELEASED. MANY TIMES WATER IS RELEASED FOLLOWING A STORM ASAP, WHEREAS IF IT WAS STORED FOR A FEW DAYS, IT COULD BE RELEASED WHEN IT COULD BE UTILIZED FOR WW BOATING BY THE MAJORITY OF THE BOATING COMMUNITY. RELEASING WATER ASAP MAKES SENSE WHEN MORE RAIN IS ON THE WAY, BUT WE ARE HOPING SOME PROVISION CAN BE MADE TO HOLD RAINFALL FOR WEEK-END USE WHEN POSSIBLE. WE KNOW FISHERMEN ARE UPSET ABOUT WW FLOWS ON LEHIGH RIVER, HOWEVER, THERE ARE THOUSANDS OF PLACES FOR THESE SPORTSMEN TO PURSUE THEIR SPORT IN PENNSYLVANIA. OUR ONLY OTHER SOURCE OF RELIABLE WW BOATING IS 300 MILES AWAY ON THE YOUGHIOGHENY. IN SUMMARY, OUR CONCERNS ARE TWO-FOLD. WE WOULD LIKE TO SEE WHITEWATER RECREATION BECOME PART OF THE PURPOSE OF YOUR F.W. MODIFICATION PROJECT, AND WE LIKE TO SEE SHORT-TERM WATER STORAGE FOR WEEKEND USE WHEN PRACTICAL.

THANK YOU FOR YOUR CONSIDERATION. WE APPRECIATE THE OPPORTUNITY TO PROVIDE INPUT INTO THE PLAN. WE HOPE OUR CONCERNS WILL BE INCORPORATED IN YOUR FINAL PROPOSAL.

SINCERELY, Poter 5 Forte

I HAVE ENCLOSED A LIST OF CONCERNED CITIZENS WHOSE VIEWS REFLECT THE COMMENTS LISTED ABOVE.

1. Peter S. Forte Fim Thorpe, HA 2. gre Peulle

Summet Hell, Pa.

3. John Bachert Lehighton, A.

The following people have given permission to use their names in support of the statements in my letter. John T. Adams

Jim Thorpe, PA.

Robert Ashmore

Walnutport, PA.

Hilda Cook

Pottsville PA.

James Sherry McAdoo, PA

John Sakusky Jr.

Tamagua, PA. James Todd Zimardu

Tamaqua, PA

Robert Mohrbach Jr Tainaqu'a, PA

3 Reference is made to Comment 2.



**1** Reference is made to Peter Forte, Comment 2.

# Return Receipt Requested

Weatherly, Pa. 18255 June 5, 1985

U. S. Army <u>C</u>orps of Engineers Custom House, Second and Ch@stnut Sts., Philadelphia, Pa. 19106

RE: NAPEN-P (Francis E. Walter Dam Mod.)

Dear Sirs:

In reference to the article in the Lehighton Times News, June 4, 1985, titled Francis E. Walter Dam discussions set for June 13th.

**1** Why a public hearing in Wilkes-Barre, Pa., they are not affected by the future Dam modification? Common sense would have told you to have it in White Haven, Jim Thorpe or Lehightoh, or didn't you want it possible for people from those areas to attend the meeting? For people who are affected that was a slap-in-theface, wouldn't you think so if you were one of them?

2 I would love to attend the meeting and state my opinion, since it is so far and I am not in the best of health, I have no alternative except to put it in writing.

3 I attended sessions on the "Lehigh River Gorge Park" which I wanted the Lehigh River considered a "WILDERNESS" River. At that/time some people were more concerned about not having enough water "let" for them to enjoy rafting. To which I replied, he and I might need that same water for our drink, should it become a matter of fife or death. It was fresh water and should be preserved for the future, not wasting it for rafting. And, don't ever allow motor boats on it. None at all.' And, forget the hydroelectric power plants. Nothing should in any alter Walter Dam, nor should every Tom, Dick and Harry tell us what they want to do with this fresh body of water.

4 As for the water supplies in the Philadelphia areas, there are thousands of acres on which they can build dams closer to

1. We expected greater public participation than at the last general workshop and public meeting. Those facilities were too small for the number of people which attended last time. We were unable to reserve larger facilities near the Dam Site. In consultation with Bear Creek Township and Kidder Township officials, Wilkes-Barre was selected as the next convenient/closest location.

2. As in the past, we continue to seek everyone's input both verbal and written. Comments can be sent or called into us.

3 3. The conservation, planning, and development of water resources is concerned with all our needs. When water is plentiful its proper management should satisfy all needs. When it is in short supply, its proper management should strive to conserve and to prioritize its use. Philadelphian As for water restrictions, New York City wastes (from my observation); as for them and the Delaware River Commission, they weren't the only ones who had restrictions. They could care less about us. First they want to send their garbage and trash, their radiation waste and tell us what we should do with the water in our area. We don't live in Russia, yet. This is still America, isn't it? Who dictates to whom? Or does political pressure have the say, in spite of everything? Fhiladelphia has a lot of votes for those running for offices, in Harrisburg and Washington, D. C..

Why enlarge Aquashicola Creek or Trexler Dam? Build dams near Philadelphia and New Jemsey, nearby? Delaware should build their own dams for their needs. As for New York City, the state of New York covers a great area, let them build their own dams if they need more water.

I remember two or three years ago, the local towns, boroughs or whatever, were ready to reach into Walter Dam for much needed water to live, the drought right here in our counties was bad; we must preserve the water, for Pennsylvania.

7 When my well dried out, no one from Philadelphia, New York or Delaware knew or cared if I died of thirst, or had the money to have another well dug. Another well had to be dug in the middle of winter and there was no heat in the house for days.

8 L/suppose you won't even bother reading this letter or present it to the people attending. However, I know someone who plans to attend, he will tell me.

Incidently, how come you didnot state in the article just what an enlargement would involve, in land-taking etc., so the public who couldn't attend would have an idea what it was all about?

Afstiga

4-8

4-8. The surface and groundwaters of a Region such as the Delaware River Basin are a complex and interdependent system. The proposed modification of Walter Dam is for the benefit of this region. Its selection is the indirect and direct result of multiple investigations over the years. Different alternatives for solving the region's water problems were considered. Hundreds of reservoir sites were investigated.

9. Everyone on our mailing list has received notices, newsletters, and brochures concerning the progress and findings of the study. In addition, the draft report and Environmental Impact Statement were made available upon request and the entire study (six volumes) were placed at repositories for public use. You are being automatically added to the mailing list. Stoddartsville Blakeslee F.O., Pa.

June 13, 1985

Yr. Faul Gaudini Project Manager U. S. Army Corps of Engineers Custom House, 2nd & Chestnut Streets Fhiladelphia, Pa. 19106

> <u>Attn: NAPEN-P (Walter Mod.)</u> Sub: Objections to Segments of F. E. Walter Mod. Plan

Dear Paul:

**1** Those of us who have attended meetings conducted by DRBC and the Army Corps of Engineers over the past few years are accustomed to negative response to almost all comments and suggestions concerning the Francis Walter Daw Project. At this point most of us realize that "come hell or high water", this project will go forward.

**2** I wish to discuss the "high water part". Stoddartsville is at the distal point of maximum flood level, which would occur only if the Lehigh Valley were subjected to torrential rain--the "one-in-a-100-year-storm".

**3** The houses on the Luzerne County side of the Lehigh River being considered for removal are vacation homes--not primary housing and in any case would not be completely inundated and therefore not irreparably damaged by high water.

Cne of the projected services for the impounded area is public recreation---at government expense. These houses are owned by tax-paying people not tax-absorbing. Thus they provide recreation at no expense except to the owner.

In the beginning we were given to understand that the primary reasons for enlarging the dam were flood control and flow control in the Delaware watershed. Now it seems that recreation is being emphasized as a primary reason for expansion. Considering the abuse of the existing Mational Farks, it seems inadvisable to create yet another area to be descrated by litterbugs who seem to consider public areas and facilities their own special dumping grounds.

**5** Another part of the plan includes the relocation of a dirt road, Township Route 553 in Tobyhana Twp. This road would be under water only briefly in maximum flood. Three homes on this road are well above flood level and only one is occupied full-time. Access to them can be achieved from the other end of the road in question. Therefore the cost of relocation seems to be unjustified. Granted the cost allowance is only slightly under \$200,000--and when thinking in millions, it seems to be of little consequence.

**6** I am resigned to the Dam expansion if and when it is funded. However, I believe it behooves the DRBC and the Engineers to accomplish this work with a minimum of destruction to existing facilities. 1-3 1-3. A Corps of Engineers regulation requires that we design the land acquisition line to assure that major hazards to life or unusually severe property damages would not result from flooding. This criteria for the F.E. Walter Dam Modification Project is based upon the top of the flood control pool or spillway crest (elevation 1482.0) plus sufficient freeboard (5 feet) to provide for adverse effects of saturation, wave action and bank erosion. The consideration to acquire a dwelling stems not only from the location of the dwelling but also the location of its well and septic system which may become contaminated and the dwelling access which may be inundated as a result of high water.

Since several homes in Stoddartsville are located in the project area described above, we are proposing to perform a topographic survey to establish the elevations around the affected properties to determine and to minimize the extent of any proposed land acquisition. It should be noted that any recommendations to acquire lands for the proposed project still must be approved and therefore are subject to revision.

4 4. The request and subsequent initiation of the modification resulted from critical water supply needs. Recreation is included to take advantage of the "multipurpose" concept and its economics of scale to satisfy recreation needs. Water supply is the priority of the sponsor and recreation is secondary. We have stated this since the beginning of this study.

We have been successful at providing first class, wellmaintained and clean facilities at our two other recreation sites, Beltzville and Blue Marsh Lakes. The intent is to similarly develop and maintain a recreation area at the Walter Dam Site.

- 5. The raising of TR 553 is the least costly means of assuring access when the flood control pool is fully utilized. This access is not solely for the existing homes but for the landowners who rely on the road for access to their properties for which they plan development in the future.
- 6. Throughout our work, we have emphasized minimizing adverse impacts, especially any individuals which would be relocated. Every effort will be made to minimize any impact or inconvenience which acquisition may place on the affected landowners.

### -- 2 ---

I have observed rebuilding of homes and businesses on the Susquehanna flood plain, protected only by dikes which we know from olders experience are not infallable. Therefore I wonder why it is necessary to destroy properties which are at minimum risk of flooding.

Serious consideration to the above will be appreciated.

Very truly yours, Mary 5. Eyre 7 7. In the case of projects such as floodwalls and levees, the Corps provides protection where no or inadequate protection exists. The Corps formulates the protection works according to established procedures and criteria. The limits of such works are evaluated and the level of protection (which is usually not absolute) is predicted. Those affected are provided a better condition (less risk) than would exist without the floodwalls and levees.

In the case of structures located in a future flood control project such as in the case of the homes in Stoddartsville, the situation is partially or completely opposite. As a result of the operation of a project their risk is introduced or increased. The project either introduces the risk of flooding where one never existed or induces a higher risk if the structure is located in a natural floodplain. The Corps project, in this case, does not better the individual's situation. The project is responsible for creating this risk. The risk must be eliminated and the parties involved compensated for their losses and inconveniences. These costs are accountable and included in the total economics (cost) of the project.

1. Desire "General Design Memorandum" Book 1 of 6 sent a.s.a.p.

I do not understand why cottages (ours, "the Lodge") in Stoddartsville will be raised in an easement area where in other areas it is not required. Why can't we assume the risk (1 in 100 years?) and have flood insurance if needed.

Mrs. Pierce B. Day Pittsford, NY A Corps of Engineers regulation requires that we design the land acquisition line to assure that major hazards to life or unusually severe property damages would not result from floods up to the magnitude of the standard project flood (SPF). The SPF at the F.E. Walter Dam Modification Project is based upon the top of spillway crest (elevation 1482.0) plus sufficient freeboard (5 feet) to provide for adverse effects of saturation, wave action and bank erosion. The consideration to aquire a dwelling stems not only from the location of the dwelling but also the location of its well and septic system which may become contaminated and its access which may be inundated as a result of high water.

1

Since your home in Stoddartsville is located in the project area described above, we are proposing to perform a topographic survey to establish the elevations at and around your property to determine the extent of any proposed land acquisition. Please note, however, that the acquisition lines must be approved by higher command authority prior to the start of land acquisition and therefore, any lines submitted are subject to revision.

Permanen. Address:

rittsford. New York

1

Coltage Address:

Blakeslee, Fa.

Lewschweit of the Army rhits displice District, Corps of Engineers Custom House-2 D & Chestnut Streets Philadelphia, Pa.

June 20, 1985

Subject: Modification of Francis E. Walter Dam in Luzerne, Lackawanna, Monioe and Carcon Counties, Fennsylvania. Specifically: Stoddartsville.

Dear Mr. Locurcio,

Wy name is Pierce Day. I'm an engineer with Essimen Kocak Company end have the singular misfortune of owning a cottage in Stondartsville which falls within the flood easement area of the proposed Francis K. Walter dam modification. I have fillowed the development of the plan with keen interest and after reading book 1 of the main Report and Environmental impect Statement feel reasonably convinced that there exists a long term need for additional water supply and flow augmentation. Further, I'm favorably impressed by the number of studies, the comprehensive planning and the efforts to inform the public. Public meetings that workshops clearly afforded the opportunity for public comment. However, I feel there has been limited response to suggested alternatives that conflict in any way with the original plan.

2 I would like to address specifically the impact of the modification on Stoddartsville since the only reference to the area in the Environmental Impact Statement is and I quote "There are also rapids on the Lehigh River at Stoddartsville". The next paragraph states that "The sesthetic of the project is the inclusion of the viewer --- ". Clearly the author was not that viewer or he would have recognized the over 20 foot drop of the Stoddartsville Falls together with the ruins of the old Mill as one of the most scenic, picturesque sites in the Poconos. The proposed modification would destroy this historic, scenic area for all time not to mention Stoddartsville itself. The four cottages in the easement area have been an integral part of this summer resort for over 60 years and generations of summer residents have enjoyed the almost idyllic atmosphere of this place with its swimming, unparalleled fishing and many beautiful walking trails. I invite you to walk along the river below the caoin or through the forest of stately pines on the other side. I think you would agree this section of the Leghish would elso qualify as a "scenic" river under the Pennsylvania Wild and Scenic Rivers program.

1. The decision to modify the Walter Dam for needed water supply and recreation was the result of a continuous regional planning process. The decision is the result of multiple and extensive investigations. Once the validity of this decision was confirmed, the Corps' task was to develop the best plan for modifying the existing project to meet its stated purposes. All suggestions, comments and concerns within the context of this have been and are still being considered fully and when appropriate and possible, changes and adjustments have already been and will continue to be made up to its final design. Our public information and draft report have documented this.

2. It is unfortunate that the text infers what was not intended. The Stoddartsville area (including the falls) as well as other areas along the Lehigh River and its tributaries are beautiful as you describe. The proposed development of the project attempts to minimize adverse impacts on the area. In all our concepts, including the recreation plans, the road realignments, the flood control pool area, and the permanent lake, we remained sensitive to this natural beauty and when possible avoided or reduced its disturbance. We feel that for this type of project, we have been successful in minimizing adverse impacts.

a-66

.

Page 2 My concern therefore is for the preservation of this historic recreation 3 area which I understand is affected only in the event of the so called "Standard Project Flood." What is the basis for this allowence for flood waters which far exceed any reasonable projection of flood condition? Surely the 1955 flood could be considered or representing the 100 year flood condition. That flood was the result of two major burricene level storms passing over the region in short succession. 4 my suggestion which I believe is consistent with all objectives of the dam modification is to reduce the allocation for flood waters thereby lowering the proposed flood control pool spillway crest elevation of 1482 feet by about 10 feet or whatever is consistant with the above suggested reduction in flood waters allocation.

Sincerely,

a-67

Pierce B. Day

3. The elevation of the spillway plus five feet for wave runup determines the flood control pool requirements. This is required for proper design. In the case of the Stoddartsville historic recreation area, much of this is already in natural flood plains and, therefore, periodically subject to flooding. The proposed project would utilize this area and beyond for temporary storage or ponding of storm runoff during events. This ponding induces a slower velocity than flood flows which have historically engulfed these flood plains. This proposed project would in actuality have a net effect of reducing the erosive and destructive forces of some of these flood flows.

3

4. This proposal was considered but because of the steepness of the topography, 10 feet represents approximately 26,000 acre-feet of storage. This is a 37 percent reduction in the 70,000 acre-feet of storage to be developed for water supply. Because of the economics in scale of these type projects, this, in turn, represents an even greater impact on the economics of the cost of the water supply being developed.

1.00 Elizabeth J. Davis Berkeder Pa

1. Why when W-B Area has built in the floor area again, can't we stay with summer cottage The Lodge in Stoddartsville, PA in the flood easement area? Can we sign a waver to allow us to stay?

2 2. What will happen to my Cemetery at Stoddartsville with mother, father, sister and 2 nieces?

Elizabeth S. Davis Blakeslee, PA

- A Corps of Engineers regulation requires that we design the land acquisition line to assure that major hazards to life or unusually severe poperty damages would not result from floods up to the magnitude of the standard project flood (SPF). The SPF at the F.E. Walter Dam Modification Project is based upon the top of spillway crest (elevation 1482.0) plus sufficient freeboard (5 feet) to provide for adverse effects of saturation, wave action and bank erosion. The consideration to acquire a dwelling stems not only from the location of the dwelling, but also the location of its well and septic system which may become contaminated and the dwelling's access which may be inundated as a result of high water.
- 2 Since The Lodge is located in the project area described above, we are proposing to perform a topographic survey to establish the elevation at and around the property to determine the extent of any proposed land acquisition. Please note, however, that the acquisition lines must be approved by higher command authority prior to the start of land acquisition and therefore, any lines submitted are subject to revision. With respect to the Stoddartsville Cemetery, our preliminary review of the topography indicates that the Cemetery is located above the 1487' elevation described above and should not be affected by the Modification Project.

1. I, having an interest in property on Lewis Drive, Bear Creek Village would like to know what effect there will be on the land/home situation along White Haven Road and Bear Creek Village. What homes will be condemned for the Walter Dam expansion by the Corps and what value will be placed on them. Land transfer activity has been great in that area, and it is assumed that the dam impact is high.

Mrs. Grayson G. Tabler Chevy Chase, MD Although the preparation of the Real Estate Design Memorandum (REDM) is still incomplete, preliminary indications are that the proposed acquisition of a flowage easement along Bear Creek may extend up to a point approximately 4800 feet downstream from the Route 115 bridge. Additionally, it appears that no homes will be affected by the proposed Government acquisition along Bear Creek. Please note, however, that the final acquisition line must be approved by higher command authority prior to the start of acquisition and therefore, the tentative plans described above are subject to revision.

1

The value of any property proposed to be acquired cannot be determined at this time. When acquisition authorization is received, each property is appraised by a qualified appraiser. The estimate of value in each appraisal will be based upon sales of comparable properties in the area.

19th June 1985

From: Cdr. John L. Butler

Blakeslee, Pa.

To: The District Engineer Corps of Engineers 2nd and Chestnut Streets Philadelphia, Pa. 19106

Subject: Public Meeting, 13 June 1985 Wilkes-Barre, Pa.

 I found the meeting and the work shop on the 13th very informative and your representatives most helpful in their explanations.

> 2. The Inn (historic hotel) at Stoddartsville is my most immediate concern. I believe it will be in the maximum flood control pool and could be inundated up to the porch level. My thought is, considering its historic status, that it could possibly be left where it is and the owner waive any possible claims for damage against the Government. It has been flooded before during the 1955 flood, and Agnes and survived with minimal damage to the basement and first floor.

Paul Gaudini has been most helpful in explaining the Government's position. I submit my suggestion for your consideration. If it is not feasible, I understand the ususal policy is for the Government to purchase the property at a fair market value and then to re-sell it back to the owner at a Salvage price and then he may move it if feasible.

Cdr. USN Retired

A Corps of Engineers regulation requires that we design the land acquisition line to assure that major hazards to life or unusually severe property damages would not result from floodings. The criteria for the F.E. Walter Dam Modification Project is based upon the top of the flood control pool or spillway crest (elevation 1482.0) plus sufficient freeboard (5 feet) to provide for adverse effects of saturation, wave action and bank erosion. The consideration to acquire a dwelling stems not only from the location of the dwelling but also the location of its well and septic system which may become contaminated and the dwellings access which may be inundated as a result of high water.

1

2 In the past, the Corps has allowed landowners to repurchase their respective homes to physically relocate the structure. The decision to allow salvage is based upon a request submitted by the landowner at the time of acquisition. The Corps then evaluates the request with respect to project criteria, construction contract schedules, etc., and if acceptable, may allow the landowner to retain salvage rights to the property.

a-70

1

SIR

SOMETIME ALO MRS MARGRET BECKERMAN WAS CONTACTED BY A LADY FROM THE CORP OF ENGINEERS OFFICE ABOUT HAVING A MEETING WITH THE RESIDENTS OF PENN MAKE BOROUGH. WE WERE NEVER CONTACTED AGAIN. You Dio HAVE MEETING'S WITH THE PROPLE FROM BEAN CREEK, AND WITH THE PEOFUE FROM WHITE HAVEN, BUT THE PEOPLE FROM THE NERPEST MUNICAPILITY WERELEFT OUT WE ALSO HAVE QUESTIONS + CONCIERNS THAT NEED TO BE ANSWERED. WE WOULD LIKE TO HAVE A MEETING JUST FOR THE RESIDENTS OF PENN LAKE. AS HALF OF THE RESIDENTS ARE SUMMER PEOPLE NOVIO IT BE POSSIBLE TO SCHEOULE A MEETING DEFONE HADON 2 DAY? AS FOR THE PETITION THERE ARE A LOT OF CONCERNED PEOPLE. HopiNG TO HEAR FROM You Sound. MAS BECKERMAN, S William J. Jeffers ACTING FRESIGENT WHITE HAVEN PA. OF BORGUNH COUNCIL "

7-17-85

Sir:

1

2

7-17-85

Sometime ago Mrs. Margret Beckerman was contacted by a lady from the Corps of Engineers office about having a meeting with the residents of Penn Lake Borough. We were never contacted again. You did have meetings with the people from Bear Creek, also with the people from White Haven, but the people from the nearest municipality were left out. We also have questions and concerns that need to be answered. We would like to have a meeting just for the residents of Penn Lake. As half of the residents are summer people, would it be possible to schedule a meeting before Labor Day? As for the petition there are a lot of concerned people. Hoping to hear from you soon.

"Mrs. Beckerman is Acting President of Borough Council"

William J. Jeffers White Haven, PA 18661

As far as our records show we have satisfied all requests for meetings. We regret if there has been a mix-up in your case. You will be contacted to make arrangements.

2 The current concept is for a maintenance road for only official vehicles and public access for equestrian and pedestrian activities. Because of your group's concern, as well as many others, this will be reconsidered. However, this can not be resolved without further design detail. Upgrading the road to provide vehicular access from the East and West Bank recreation area will depend on the final requirements for the dam embankment, spillway and dike.

a-71

U.S. Army Corps of Engineers flagmond &. Netto Pena take. Custom House, 2nd & Chestnut Sts. Attn: WAPEN-P (Basin Section) PETITION to: Philacelphia, Pennsylvania, 19165 Perm Lake Perme dake OCAMAN WE, the UNDERSIGNED, are local property owners and taxpayers in the ish of PENN LAKE PARK, Luzerne County. Our community is the CLOSEST to the Jessele Bartley E. Waiter Dam and will clearly be most effected by any major modificaich as the proposed expansion. While many of us are in general agree-PEnn Lake the stated DOWNSTREAN benifits of the expanded project for flood control Jucan yestrumoras ale reservate considerations - WE ARE VERY MUCH AGAINST loosing vehicular access . From Jaken accross the Sam area as proposed for the general public and local residents. Pera Lake It is INCONCEIVABLE that the corps would care for DOWNSTREAM needs WITHOUT REGARD for local residents and recreational visitors who have used the road THROUGH the dam'for years - unless the water level was temporarily up. Penn Jaka We suggest a SIMPLE COMPROMISE! If you want local cooperation - SHOW SOME CONSIDERATION to the local residents. Take care of the DOWNSTREAM requirements with your expansion if you MUST - but provide LOCAL ACCESS through Pem La ohnow the dam for us LOCALS. We deserve FULL VEHICULAR access to the promised recreational amentities WITHOUT driving an extra "20 to 30 MILES" to use them! W.A. William Seffers magie marter PENN HAE 0 Roma Loke torothy Babot Rom dake Penn Cale Ann Lake Polule Multim udid, a Curcio allicia Thacom While the for Rob / Penne Lake Mildred Carter Penny Labe White Haven the , Joan Jolie White Hoven A. . 12 limphe whe Haven Penn Lake Pen lake Withow Joren Krautheim enn dake fue George Jon Lake Whit Havai Rom Julee marin dichler margo Berdenan - Y.P. Boro Council -Ann Sake to PeniLake -Pent Lake A Donald C Beckerman Rem Laka Ih S Monts. illy Harris -PEUNUAKE PA Penny Lake susan Johnson -Jeanne Titmaurice for shake Penn hake, Pa. Debra frexler -Penni Lake Perr Jake, Pa. Kin mac Millian Kawlinski Penn Lake In fermitice Ca. n in Su via Olanundii nra Canta Acke Fingella Runlakl

Pan Jake Cambada la Condada la Producta Pan Jake, M. Pan Jake, M. Ferni Lete PA our court hill Rundle M. in Sals, w' K, 1/4 SENN LAKE - 1 Rene Char My Daw and a ver ditan Vielian C ETH H Will-0P attler Ţ Shelle Bunne 10 Cm P.F. r. Ben hole. Penhole P. . Benv sere. Can take lenn take hus ble, A . Ann sold, fe. Prun Jak, fe. Bun Shu, a. In the Law Lak. Bucket h. Run Kele, P. Dani Lele, Danz PENN LARE P the D. Lawsis rue In Rem Lk Willi umbhearing wattern ₩. A B inn Dan in the second se ŝ 4 22 24

a<del>-</del>73



a-74

There no 100 motor s 4. The 4 Kannat non COMMETICA 1150

- 1. There should be areas on the lake where motor boats are prohibited. These areas should be restricted for the use of non power boats or boats with only electric motors. These areas should be located at the upstream reaches of the lake. these areas should have their own simple access locations.
- 2 2. The boat launches at the West Bank and Kannar's Bridge should be developed.
- 3 3. A boat launch should be installed just below the dam. This launch shall be restricted for only non commercial use.

Glenn Babel Drums, PA 1. Boating will be limited to 10 horsepower for the entire lake.

- 2. Decisions for the deferment of the West Bank boat launch and the elimination of the car-top launch at Kannar's Bridge evolved as described in the report. Development of these facilities would probably depend on changes in future circumstances and in local attitudes.
- 3 3. The proposed Lehigh Gorge State Park is located downstream of the Walter Dam Site. The development of recreation concepts below the dam are being coordinated with the Pennsylvania Department of Environmental Resources for compatibility with the proposed State Park.

2 ane inn mus 11 Inde The it. I would she and a cash ma ENert Elurke

Later Harmony Pa

- The Francis Walter Dam is not a new dam. It is constructed of earth and rock with some concrete work. The dam is exposed to the elements naturally however, the earth and rock can erode over the years. For more than very brief periods this dam has never been full or nearly so. It therefore has never had to endure the pressure of the impounded water at its full capacity for any real length of time to test its ability to withstand continued pressure.
- 2 Since this is not a new dam and erosion must have taken place you can not be sure of its strength. Now you plan to increase the height of the old and weakened dam. You plan to increase the width of the dam a well as the thickness of the dam you are increasing, the area of dammed water many times. This will exert a force many times the previous tested force the old dam could stand. I question the ability of the old dam along with the enlargements raised height and some increased thickness to hold back the impound waters when this dam is full. I would like to be advised who made the independent computations of the dam's strength if such a test was made and if it was not made why hasn't such a test been made. The Corps of Engineers have made errors in the past and it could be that this could be another error. I hope not as the Lehigh River Gorge would keep the broken dam waters concentrated instead of allowing these flood waters to spread. The towns such as White Haven and others down the river would be wiped out.

I would like to have a copy of the draft of the Main Report.

E. Kent Clark Lake Harmony, PA

- F.E. Walter Dam is a relatively young dam (25 years of age) which has experienced no significant erosion since its construction. The existing dam was designed in accordance with Corps design criteria which has always been conservative. Extensive subsurface explorations and materials testing for instrumentation installation and for the current design have verified the dam's present condition, which is good. The instrumentation installed at the dam is monitored frequently and regularly and has proven the dam to be operating in accordance with or better than those assumptions made for its design.
- 2 The dam modification design is currently in progress and it will be done in accordance with current Corps criteria which has become even more stringent since the time of the design of the existing structure. As mentioned before, extensive exploration and testing is being done for this design and has and will include sampling and testing of materials in the existing dam. The plan for the modification calls for the disassembly and construction of the top and a portion of the downstream side of the dam. If, in the very unlikely case, any serious defects due to erosion such as mentioned in your letter were present, they would certainly be revealed during this construction and corrected. We also call to your attention the fact that a completely new spillway and intake tower is to be built which will substantially extend the life of those structures.

a-7

This space is provided for your comments or suggestions or other persons to be added to the mailing list

Gentle-en:
I am neither for nor against the expansion of the Malter Dam.
I want the fact noted that there is a building boom going
on in the Poconos, Much of this is attributed to the hopes
of legalized gambling.
Many of the developments do not have approved sewage treatment
plan ts. The few that have treatment plantsare not large enough
to accept the increased flow of all the new building. The
proposed casino in the Lake Harmony area and the influx of
Day Time patrons alone yould be more than a treatment plant
can accept.
The Delaware and Lebish Rivers would in time become Contaminated
perhaps not immediately h ut it would come. This is happening
in many of the Lakes in "ortheastern Pennsylvania already.
Enclosed are clippings from a local paper that will give you
an idea of some of the building plans in the Lehish Water
Shed. Since 30% of the use of the water is for drinking this
problem should be given a long hard look.
Please consider this as constructive ideas and in no way criticism.
I attended the hearings at Wilkes-Barre Vo-Tech and many of the
reople testifying are gut for personal gain. The one vocal group
in the right side of the ball rear were from the Union with the
hores of a lot of work.
I have lived in the Lehizh River Watershed for 70 years.
I would like to see it stay clean and healthy, all the towns
along the river have put in treatment plants, some of them already
need updating and most of the mines are out of existance so lets
keep the river clean and not slide block to what it had been.
Thanks for your time and do the best Job Possible.

Hayden Crilley

5

We are in full agreement with your desires in maintaining clean and healthy environment of the region. The proposed project is being formulated and designed with this in mind. With respect to water quality, we predict no adverse impacts and can even improve downstream conditions.

InA SPPI 422 MA Recreational BALL + CARE OF The rest. will take 11 field eonlo

1 1. If possible make a ball field on the grass area by the current spill way. If not, make room for one at the new spillway. Ball games seem to be popular at picnic areas. All one really has to do is put up a sign that states "Recreational Ball Field" People will take care of the rest.

T.G. Gayeski Bear Creek Twp, Wilkes-Barre, PA There will be no formal playgrounds but fields will be available for visitor use next to the picnic areas.

cinter

1. I am requesting a copy of the Draft Report since they are much too long to be reviewed at the gas station in Bear Creek, where they are being kept.

I feel it is imperative that the May 15th date deadline for public comment be extended. This report certainly was not compiled in a month's time; and to expect response in such a short period of time is unfair, in my opinion.

Your consideration of this extension is appreciated.

Mrs. V. Mislivets Bear Creek, PA As was announced through later public meeting information, this deadline was later extended to June 24th. This, therefore, extended the normal 45 day comment period to 85 days.

Dear Ans:

1-2 1. Exactly one year ago I brought a letter to Army Corps, Lehigh River Basin Committee concerning the Extension of the study of the Lehigh River Basin to include Mountain Meadow Run lakes on Meadow Run Creek located approximately 2000 feet above Sea Level on the top of the mountain which is the starting point of the water for Bear Creek which is the beginning of Francis Walter Dam.

> Both dams at M and MR Lake have been condemned by the DER. MR Lake spillway is ok but the M.L. spillway is in need of repairs.

3 Of all the news I have been hearing about the drought and water shortage of water in both New Jersey and Pennsylvania, I think there should be someone along the Lehigh or Delaware Rivers to make our repairs of the M.L. spillway. It would to good clean drinking water for the future.

Joseph L. Stone Wilkes-Barre, PA

- 1-2 1.-2. Previous responses have stated that the Corps is only authorized and is being funded for advanced studies of the proposed Modification of the Walter Dam. The dams to which you refer are a local matter and, as you infer, their safety is under the jurisdiction of the Commonwealth of Pennsylvania.
- 3 3. It appears that your proposals may be valid. They could be brought to the attention of local officials or even local water purveyors. It may be a very efficient concept for providing local water supplies.

â ġ

ninter well atter Treiting

1. I live at Meadow Run - Mt. Lake which is the starting point that empties into Bear Creek and F. Walter Dam. One of our Lakes has a spillway that needs repairs and DER has said they will break the dam if we do not repair it. We do not have a great deal of money and I would like to know if it can be included on the F. Walter dam project c/o Lehigh River Basin Commission. I will attend the Thursday afternoon June 13 meeting.

Joseph L. Stone Sr. Wilkes-Barre, PA Reference is made to Comments 1-3 on the previous page.

l wor albrightsn nu ummel ne inc Kilder. aite i c ir. 1.N

Keep up the good work - my summer home is in Albrightsville, Kidder Township.

Mayor Wm W. Yost Tamaqua, PA William D. Haas Bear Creek, PA

June 19, 1985

Ralph V. Locurcio Lieutenant Colonel, Corps of Engineers District Engineer Philadelphia, PA 19106

Dear Lieutenant Colonel Locurcio;

I attented the June 13 afternoon workshop at the Wilkes-Barre Ares Vocational-Technical School for the purpose of discussing the raising of the F.E.Walter Dam.

As chief Trustee of the Pocono Trust, I was advised by several Corps personel to make a stated request on behalf of the Trust. That request is as follows and is in two parts:

- 1. At the point on White Haven Road (L.R.40041) where the Bear Creek crosses underneath, the Trust has three controlled accesses to its' property. The Trust would like to have the Corps, or whoever is ultimately responsible, provide us with three equally suitable access roads to the Trusts' property, with equally suitable gates and locks, to replace those that will subsquently be flooded. See numbers 1, 2, and 3 on the enclosed map.
- 2. Furthermore, it was explained to me the Corps' plans to use not only the actual land needed by the new White Haven Road, but all the Trusts' land inbetween the New Road and the Bear Creek. See Note "A" on map. The Trust strongly desires to keep ownership of this section of land. Our intentions would be to keep that tract undeveloped as it is now.

I appreciate this opportunity to share with you the concerns of the Pocono Trust. Please know you may contact me concerning the interests of the Trust. My telephone numbers are:

Thank you very much.

Sincerely Yours.

William D. Haas, Chief Trustee

Enclosure not included

1

a-83

- 1. As discussed at the June 13, 1985 public workshop, the land located between the proposed alignment of relocated White Haven Road (L.R. 40041) and the F. E. Walter reservoir is under consideration for acquisition. The area would be used for recreational development. In the event that development is deemed plausible the area will be recommended for acquisition. However, acquisition of the area must be approved by higher command authority and therefore, any recommendation made is subject to revision.
- 2 2. With respect to access onto the remaining portion of the Trust's property from relocated White Haven Road (L.R. 40041) the Corps of Engineers will provide adequate access to the property adjacent to the relocated roadway. In the past the Corps has always attempted to accommodate landowners by providing similiar access to that acquired, and this would be done in consideration of design and safety criteria as prescribed by PennDOT.



# List of Appendices and Their Contents

# Supplement b


#### INTRODUCTION

Since only the Main Report with Environmental Impact Statement and not the voluminous Appendices are available to the General public upon request, a compilation of the contents of the Appendices to the Main Report is enclosed in this supplement. In this way, readers can review the list of the content of the Appendices, determine if there is anything of interest to them, and visit a study repository.

Study repositories house the complete report, including the appendices, for the purpose of public reference. The study repositories are listed below.

Krumsky BP Gas Station 3000 Bear Creek Boulevard, RT 115 (off Exit 36, PA Turnpike) Bear Creek Township Wilkes-Barre, PA

Tobyhanna Township Government Center Building State Avenue Pocono Pines, PA

Wilkes College Library Franklin & South Streets Wilkes-Barre, PA

Economic Development Council of Northeastern Pennsylvania 1151 Oak Street Pittston, PA

Delaware River Basin Commission 25 State Police Drive West Trenton, NJ

U. S. Army Corps of Engineers Custom House, 2nd & Chestnut Streets Philadelplhia, PA Kidder Township Municipal Building L. R. 13039 Lake Harmony, PA

Buck Township Municipal Building Star Route 115 White Haven, PA (Please call 717/#72-3344 if you wish to visit this location)

White Haven Borough Building 312 Main Street White Haven, PA

Bimmick Memorial Library 54 Broadway Jim Thorpe, PA

Pennsylvania Department of Environmental Resources Harrisburg, PA

Allentown Library 1210 Hamilton St. Allentown, PA . •

# APPENDIX A - STUDY AREA

# CONTENTS

## OVERVIEW AND DELINEATION

Delaware River Basin Lehigh River Existing Project Site Definition of the Study Area According to Project Purpose

## HISTORY OF WATER RESOURCES DEVELOPMENT

Supreme Court Decrees Comprehensive Planning Institution of Water Resources

PEOPLE AND HISTORY

Lehigh River Basin Walter Site-Area History and Archeology

DEVELOPMENT AND ECONOMIC BASE AND TRENDS

Population Per Capita Income Labor Force and Employment Housing Recreation Industry Second Home Industry Transportation Land Use

## APPENDIX B - NATURAL RESOURCES

# CONTENTS

# PHYSIOGRAPHY

Delaware River Basin Lehigh River Basin Project Site and Drainage Area

#### SOILS

Delaware River Basin Lehigh River Basin Project Site

GEOLOGY AND MINERALS Delaware River Basin Lehigh River Basin Project Site

### CLIMATE

Temperature Rainfall Snowfall Storms Droughts

GROUNDWATER

Delaware River Basin Lehigh River Basin Site and Drainage Area

SURFACE WATER

Waters Draining into Walter Site Lehigh River Delaware River Delaware Estuary

FLOODPLAINS

Extent of Floodplains Floodplain Land Use Communities Along the River

# <u>APPENDIX B</u> - (continued)

# PROJECT SITE ENVIRONMENT

Flora Fauna Air Quality Aesthetics

## APPENDIX C - PROBLEM IDENTIFICATION

#### CONTENTS

#### WATER RESOURCES MANAGEMENT

House Document 522 Comprehensive Plan Madigan-Praeger Level B Study Good Faith Negotiations State Water Plans

# WATER SUPPLY

PA Sub-basin 2 PA Sub-basin 3 NJ Region 5 DE New Castle County

## GROUNDWATER

Groundwater	Supply
Groundwater	Quality
Groundwater	Management

# WATER QUALITY

General Water Quality Needs Change in Policy and Definition Acid Mine Drainage and Sedimentation Salinity

# FLOW MAINTENANCE

Depletive Use Salinity Intrusion Flow Objectives

# CONSERVATION

Conservation Measures Being Implemented Conservation - The Cornerstone

#### RECREATION

Market Area Other Market Area Resources Recreation at the Walter Site White Water Recreation Market Area Needs

# APPENDIX C - (Continued)

# FLOODWATER AND FLOODPLAIN MANAGEMENT

Major Damage Centers Flood Prone Units Potential Flood Damages Average Annual Damages

# ENERGY

Energy Resources and Needs National Energy Independence

# PROJECT OBJECTIVES

Water Supply Groundwater Water Quality Flow Maintenance Recreation Flood Control Hydropower

## APPENDIX D - FORMULATION

#### CONTENTS

#### EVOLUTION OF A PROJECT

General Methodology Study Goals Planning Objectives Planning Criteria

## COMPREHENSIVE PLANNING

House Document 522 DRBC Comprehensive Plan Tams Studies Further DRBC Studies Madigan-Praeger Report DRBC Comprehensive Plan-Prior Level B Level B Good Faith Negotiations

# AFFIRMATION OF THE MODIFICATION OF WALTER

EIS Coordination Water Resources Council Approval Status of Walter Modification DRBC Approval

AFFIRMATION OF THE AUTHORIZED PLAN

Storage Allocation Recreational Development

## HYDROPOWER CONSIDERATIONS

Run of River Conventional Peaking Modified Conventional Peaking Pumped Storage Power Marketing Conclusion

## ALTERNATIVE COMPONENTS CONSIDERED

Spillway and Dam Modifications Tower Modification Selection of the Best Scheme

## APPENDIX E - ENVIRONMENTAL

## CONTENTS

The purpose of this Appendix is to present the supplemental environmental investigations which were conducted as part of the preliminary assessment, project formulation and impact evaluation processes of the Advanced Engineering and Design (AE&D) for the Modificatin of Walter Dam; and to provide supporting information to the assessments and decisions discussed in the Main Report and Environmental Impact Statement. The following supplements are included in the Appendix:

## Supplement

#### Subject

E-1 Significant Delaware River Basin and Project Area Resources

E-2 PAMHEP Evaluation

U. S. Fish & Wildlife Service Habitat Mapping

E-4

E-3

PAMHEP Supplemental Evaluation of Alternatives for Relocating Bear Creek Road

# <u>APPENDIX F</u> - CULTURAL CONTENTS

The purpose of this Appendix is to present the supplemental cultural investigations which were conducted as part of the preliminary assessment, project formulation and impact evaluation processes of the Advanced Engineering and Design (AE&D) for the Modification of Walter Dam; and to provide supporting information to the assessments and decisions discussed in the Main Report and Environmental Impact Statement. The following supplements are included in the Appendix:

## Supplement

#### Subject

F-1

Preliminary Historical and Archaeological Assessment, Heite, 1981

F-2

Cultural Resources Report on Selected Areas, Rasson/Siegel, 1983

**F-3** 

Archaeological Assessment, Heite, 1984

## APPENDIX G - ECONOMICS

#### CONTENTS

WATER SUPPLY

Municipal and Industrial Water Supply Water Use Nature of Water Supply Benefits Alternative Water Supply Development

# RECREATION

Market Area Alternative Levels of Recreational Development Recreation Scheme Selection Similar Project Method Recreation Benefits Summary of Incremental Average Annual Recreational Benefits

## FLOOD CONTROL

Types of Flood Damages Types of Benefits Evaluated Data Collection System Methodology for the Analyses Inundation Damage - Benefit Models Potential Flood Damages Systems Analysis of Performance

## COST ALLOCATION

Authorization Allocation AE&D Initiation Allocation Prescribed Allocation and Cost Apportionment Apportionment of Operation and Maintenance Costs Authorized Interest Rate "Grandfathered" Interest Rate Prescribed Interest Rate

# SUPPLEMENT G-1

Description of Separable Cost-Remaining Benefits Method for Allocating Costs

## APPENDIX H - RELOCATION OF LR40041

#### CONTENTS

#### INTRODUCTION

Scope Pertinent Data Attorneys Reports Views of Owner Proposed Relocatin Contract Environmental Impact

EXISTING FACILITIES AND NECESSITY FOR RELOCATION

Description of Existing Facilities Necessity for Relocation

BASIC DESIGN CRITERIA, DATA, AND STUDIES

General Roadway Design Structural Design Hydrology and Hydraulic Analysis

GEOLOGY AND SOILS

Regional Geology Geology of the Reservoir Geology of the Highway Relocation Seismicity Subsurface Exploration Laboratory Testing Foundation Conditions Design Considerations Sources of Construction Materials Construction Sequence

PROPOSED HIGHWAY RELOCATION

Requirements Description Maintenance of Traffic Proposed Structures APPENDIX H - (Continued)

COST ESTIMATE

Cost Index Cost Estimate Comparison of Costs with Latest PB-3 Estimate

CONSTRUCTION SCHEDULE AND FUNDING REQUIREMENTS

Design and Construction Schedule Construction Funding

CONCLUSIONS AND RECOMMENDATIONS

Conclusions Recommendations

ATTORNEYS REPORTS

STRUCTURAL DESIGN

GEOLOGY AND SOILS DATA

PAVEMENT DESIGN

Supplement H-1 - Bear Creek Bridge Design Analysis

# APPENDIX I - OPERATION AND MAINTENANCE BUILDING

# CONTENTS

INTRODUCTION

Purpose Scope Pertinent Data Site Analysis Access

PLAN OF DEVELOPMENT

Operation and Maintenance Building Operation and Maintenance Facility Site Landscape Treatment Utilities

COST ESTIMATE

Cost Index Cost Estimate Comparison of Costs with Latest PB-3 Estimate

STRUCTURAL CALCULATIONS

#### APPENDIX J - HYDROLOGY AND HYDRAULICS

#### CONTENTS

BASIN DESCRIPTION

```
General
Physiography
Drainage Areas
Scope of Mapping and Elevation Datum
Existing Dams and Lakes Above Walter Dam
Existing Lehigh River Basin Tributary non-Flood
Control Reservoir Projects
Existing Lehigh River Basin Flood Control Projects
Proposed or Authorized Flood Control Projects
```

CLIMATOLOGY

General Temperature Precipitation Snowfall Storm Types Lehigh River Basin Annual Water Balance Evaporation

RUNOFF

Discharge Records Flood History Daily Damsite Flow

LEHIGH RIVER DISCHARGE-FREQUENCY ANALYSIS

Unregulated Flows Regulated Flows

HYDROLOGIC BASIN MODEL DEVELOPMENT

General Unit Hydrograph Analysis Model Calibration and Verification Uniform Storm

STANDARD PROJECT FLOOD

PROBABLE MAXIMUM FLOOD

SPILLWAY DESIGN FLOOD

### APPENDIX J - (Continued)

#### RESERVOIR CAPACITY

General Area and Capacity Allocation of Storage Sediment Storage Water Supply Storage Flood Control Storage

#### SPILLWAY DESIGN

Alternative Schemes Preliminary Spillway Design and Rating Final Spillway Design for Selected Scheme

## FINAL OUTLET WORKS DESIGN

General Original Outlet Works Design Requirements New Outlet Works Design Requirements Summary of New Outlet Works Features Outlet Works Design Energy Dissipation of Exit Discharges Discharge Rating Reservoir Drawdown Vortex Formation Slug Flow Cavitation Open Channel Discharge Final Selective Withdrawal System Design

FLOOD ROUTINGS FOR SELECTED SCHEME

General Standard Project Flood Routings Reservoir Design Flood Spillway Design Flood Routing

ELEVATION OF TOP OF DAM

General Freeboard Calculation Wind Setup Adopted Top of Dam Elevation

PLAN OF RESERVOIR REGULATION

General Flood Control Water Quality Control Water Supply Regulation Lehigh Rives Time of Travel Study

## APPENDIX J - (Continued)

## EFFECTS OF RESERVOIR REGULATION

General Flow Simulation Models Water Supply Water Quality Flood Control Effects on Downstream Damage Centers

#### EFFECTS ON UPSTREAM GROUNDWATER

General

HYDRAULIC MODEL

Downstream of F. E. Walter Dam Upstream of F. E. Walter Dam

UPSTREAM PROTECTION AND RELOCATION

General Bridge Relocation Analysis Extent of Upstream Flooding Upstream Stage-Frequency Analysis

CARE AND DIVERSION OF WATER DURING CONSTRUCTION OF SELECTED SCHEME

#### INSTRUMENTATION FOR SELECTED SCHEME

General Downstream of Project Upstream of Project Water Quality

ANALYSIS FOR REAL ESTATE ACQUISITION UPSTREAM OF SPILLWAY

General Acquisition Guidelines

SURPLUS FLOOD CONTROL STORAGE

General

#### MINIMUM PROVISIONS FOR HYDROPOWER

General

APPENDIX J - (Continued

# YIELD DEPENDABILITY ANALYSIS

General

ANALYSIS FOR ACQUISITION OF LANDS DOWNSTREAM OF SPILLWAY

General F. E. Walter Dam Regulation Analysis Conclusions and Recommendations

# APPENDIX K - WATER QUALITY OF THE RESERVOIR

CONTENTS /

INTRODUCTION

General

WATER QUALITY EVALUATIONS

The Existing 1300 Pool Special Drought Emergency Pool of 1981 Expected Water Quality Conditions of the Modified Project

SELECTIVE WITHDRAWAL SYSTEM DESIGN

Purpose Design Criteria Mathematical Models Sizing of the Selective Withdrawal System Flexibility of Design

# APPENDIX L - GEOLOGY AND SOILS

# CONTENTS

## GENERAL GEOLOGY AND SOILS

Regional Geology Geology of the Reservoir Geology of the Modification Sites Seismicity Subsurface Exploration Laboratory Testing <u>\_\_\_\_\_\_\_</u>\_\_\_\_

# FOUNDATION CONDITIONS

Damsite Spillway Outlet Works Dike

## GROUNDWATER AND SEEPAGE CONDITIONS

Damsite Spillway Dike

## DESIGN CONSIDERATIONS

Embankment Raising Economic Geology