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**WATERSHED WORK PLAN**  
**FOR**  
**WATERSHED PROTECTION, FLOOD PREVENTION AND WATER MANAGEMENT**  
**SILVER LAKE – LOCUST ISLAND WATERSHED**  
**Salem County**  
**New Jersey**

January 1957

**Date**

**USDA Soil Conservation**  
**1370 Hamilton St., P.O. 210**  
**Somerset, N.J, 08873**

Silver Lake-Locust Island Watershed, New Jersey

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Final Table 1

June, 1967

Second Supplemental Work Plan Agreement

May, 1977

Revised Final Table 1

UNITED STATES DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

APPLICATION FOR PLANNING ASSISTANCE  
under the  
WATERSHED PROTECTION AND FLOOD PREVENTION ACT

The local organizations signing this application requests the

DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT of the State of  
(State Agency designated by the Governor)

NEW JERSEY to join in asking the United States  
Department of Agriculture to provide assistance in developing a work plan for  
the SILVER LAKE and LOCUST ISLAND MEADOW watershed. The following  
(Name of watershed)

information is submitted in support of the application:

1. Size of watershed: 5750 acres

2. Location of watershed

a. State(s) NEW JERSEY

b. County(s) SALEM

c. Soil Conservation District(s) SALEM-CUMBERLAND (NJ-SCD-15)

d. Tributary of MAD HORSE CREEK and ALLOWAYS CREEK

3. Watershed Problems: The flood problem is one of tidal inundation caused by storms. The village of Hancock's Bridge is protected by the banks of the Thorofare and Locust Island Meadow Companies. When either or both of these banks are breached by storm tides the village is covered by water, wells polluted, property damaged; the meadows, some 2000 acres or 35% of the area, which are very valuable muskrat producing areas (and other wildlife of value as game) are severely damaged; and crops are lost on upwards of 600 acres. 3700 acres, or 65%, of the watersheds are below the ten-foot-above mean sea level line. Two farms in particular were flooded over 80% of their area. The most serious storm tides have occurred on August 22, 1933 when tides rose 3 feet 8 inches above normal high; again on Nov. 25, 1950 tides were 3 feet 6 inches above normal high; and again on August 14, 1955 tides rose to 3 feet 2 inches above normal high. Estimated damages in the three storms amount to some \$260,000, and muskrat harvest is nil following the storms. The average production has been 6 rats per acre over 27 years, with a high of 11 and a low of 280 for the 2000 acres. Two years ago, 20 acres of this meadow sold for \$150 per acre. The banks and meadows provide the drainage outlet for the wet lands of the watershed, which amounts to about 75% of the total area. The watershed comprises about 1/5 of the township of Lower Alloways Creek, and has a large proportion of the tax ratables. The public is becoming very much aware of the need for the protection afforded by these meadow banks. The meadow companies have reached the limit of their resources in keeping the banks in repair, and have found that they are no longer practical to maintain in the present location.

4. **Project Objectives:** To provide a means to prevent flood damage from high tides caused by storms to the lands of the meadow companies, the village of Hancock's Bridge, and the farm lands in the watershed below the 10 foot level, and to maintain the drainage outlet for the wet lands of the higher parts of the watershed; To maintain the high wildlife value of the protected meadow; and to promote proper land use within the watershed.

5. **Types of Watershed Treatment Measures believed to be needed:**

1. Construction of properly designed dikes or levees to protect the area from storm tide floods.
2. Re-establishment of water-control structures for optimum benefits to wildlife and muskrat production.
3. Provide means to continue use as drainage outlet for upland farms.
4. Treatment of the uplands in line with proper land use and conservation of the resources of soil, water, and wildlife.

6. **Types of Assistance, other than planning, believed to be needed in treating the watershed:**

1. Financial assistance in construction of dikes or levees and water-control structures.
2. Technical assistance in developing the wildlife production.
3. Use of ASC-ACP pooling agreement funds in developing the drainage work needed in land use adjustments.

7. **Interest of Local People:**

The voluntary response in assisting to save the banks following the last floods has been spectacular. The meadow companies are very much interested in their lands, and the farmers adjacent are aware of the need for the maintenance of the protection. The Township Committee are very much concerned, but are financially unable to shoulder the burden. There is very good leadership at work. There is interest in forming a Watershed Association.

8. **Local Participation:**

(Twp. governing body)

Local organizations cooperating with the sponsors have taxing powers, the meadow companies can assess on its members, and credit facilities are available for some of the costs. The Soil Conservation District and the meadow companies can let contracts, and easements can be obtained. Some manpower will be available to assist with investigations and planning work. Some of the costs of installation can be provided by the local interests, and operation and maintenance of the works of improvements will be done by the local interests.

9. **Estimated Time to Complete Projects:**

Planning time is estimated to be 6-8 months, Installation must be completed within the next two years, and land treatment measures installed within five years.

It is the belief of the undersigned local organizations that Federal assistance under the Watershed Protection and Flood Prevention Act is needed. We hereby apply for planning assistance to determine whether or not the project proposed is physically and economically sound.

Signed: Barry M. Beal  
(Name)

Approval is recommended for this project for Federal assistance under the Watershed Protection and Flood Prevention Act

for Salem-Cumberland Soil Conservation District  
(Organization)

Date December 8, 1955

/s/ Alden T. Cottrell  
(Name)

Cliff Harris Balzer  
(Name)

for Dept. of Cons. & Ec. Devel.  
(Designated State Agency)

for Locust Island Meadow Co.  
(Organization)

Date December 9, 1955

Date 3/2/56

John M. Parcooster  
(Name)

for Shoreline Meadows Co.  
(Organization)

Date December 9, 1955

\_\_\_\_\_  
(Name)

for \_\_\_\_\_  
(Organization)

Date \*\*\* \_\_\_\_\_

\_\_\_\_\_

NAMES OF SIGNERS AND MAILING ADDRESSES

Town Bank Watershed

Harvey M. Beal, Supervisor  
Salem-Cumberland Soil Conservation District  
107 W. Broadway  
Salem, New Jersey

Mayor Thomas J. Grieves  
Salem  
New Jersey

Alden T. Cottrell  
State of New Jersey  
Department of Conservation and Economic  
Development  
State House Annex  
Trenton, New Jersey

Silver Lake-Locust Island Watershed

Harvey M. Beal, Chairman, Board of Supervisors  
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Alden T. Cottrell  
State of New Jersey  
Department of Conservation and Economic  
Development  
State House Annex  
Trenton, New Jersey

WATERSHED WORK PLAN

SILVER LAKE -- LOCUST ISLAND WATERSHED  
Salem County  
New Jersey

Prepared Under the Authority of the Watershed  
Protection and Flood Prevention Act. (Public  
Law 566, 83d Congress; 68 Stat. 666 as amend-  
ed by Public Law 1018, 84th Congress; 70 Stat.  
1088)

Prepared By: Salem-Cumberland Soil Conservation District  
Locust Island Meadow Company  
Thorofare Meadow Company

With assistance by:

~~United States~~ Department of Agriculture, Soil Conservation Service  
~~United States~~ Department of Agriculture, Forest Service

January 1957

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SECTION 1 - THE WATERSHED WORK PLAN  
SILBER LAKE - LOCUST ISLAND WATERSHED

Salem County, New Jersey

January 1957

SUMMARY OF PLAN

The purpose of this Plan is to state specifically the feasible measures needed and how they will be carried out to achieve the maximum practicable reduction in erosion, in flood water damage, and facilitate drainage. Application of this Plan will provide protection to and improvement of land and water resources. The development and execution of the Plan is based upon the cooperation of Salem-Cumberland Soil Conservation District, The Locust Island Meadow Company, The Thorofare Meadow Company, the Township Committee of Lower Alloways Creek Township, landowners, State and Federal agencies and a coordinated utilization of their facilities.

The major water problem is one of inundation occurring when destroyed or overtopped dikes permit flooding of a considerable portion of the watershed. The Locust Island Dike is overtopped or breached by flood waters from Alloways Creek with the resulting flooding of the Locust Island portion of the watershed. The Silver Lake Dike has been breached by tidal waters from outside the watershed 4 times in the last 24 years. The flooding of large areas of the watershed destroys crops such as corn, tomatoes, asparagus and hay and drives out the large number of muskrats which live in the marsh areas and are a valuable source of income to the local people. With the planned works of improvement installed and in full operation, the damage from flood waters will be eliminated and drainage will be improved.

The Salem-Cumberland Soil Conservation District provides through its Program and Plan of Operations for the application of a complete program of soil and water conservation and improved plant management within this watershed. The objectives are to use each acre of agricultural land in accordance with its capabilities for sustained agricultural production and to treat each acre in accordance with its needs for protection and improvement. The land treatment measures planned to control the minor erosion that exists in the watershed are contour farming, cover cropping, field diversions, pasture planting, conservation crop rotation, waterway development, wildlife borders, crop residue management, and wildlife area improvement. No benefits to floodwater damages were claimed for land treatment measures.

The structural measures will consist of dike construction or rehabilitation with the necessary sluiceways to provide for the disposal of surface water from the watershed.

The Plan provides for the installation of the structural measures during fiscal year 1958 and the installation of the land treatment measures in 5 years.

The total estimated installation cost is \$197,877 of which \$16,185 is for land treatment, and \$181,692 is for structural measures. The Federal government will pay \$148,917 and the non-Federal participants will pay \$48,960 of the total cost. The Locust Island Meadow Company, the Thorofare Meadow Company and the Township Committee of Lower Alloways Creek Township will provide the necessary funds for operation and maintenance which is estimated to cost \$2,247 annually. The average annual benefits of \$10,463 compared to the average annual cost, including operation and maintenance, of \$8,653 give a benefit cost ratio of 1.21 to 1.

## DESCRIPTION OF THE WATERSHED

### Physical Data

#### General

The Silver Lake - Locust Island Watershed lies in the southern tip of Salem County, surrounds the village of Hancock's Bridge and comprises approximately one-fifth of the Township of Lower Alloways Creek. It covers approximately 5,590 acres, including about 50 percent of the arable portion of the Township. Approximately 2,100 acres of tidal marshland were diked and protected from flooding about 150 years ago. When first diked it was cropped and produced very high yields and was easier to prepare for tillage than the upland which had to be cleared of trees and stumps. As the land subsided and the water table approached the surface land use was changed from crops to hay. The lower portion of the marsh land was converted to muskrat and wild duck habitat with the higher land used for crop production. Since the dike break of January 1955 this entire area has been a lake.

Silver Lake Meadow has no main stream; the surrounding lands drain directly into it down gentle slopes. Locust Island Meadow has one major branch, draining about 2 square miles.

#### Topographic Features

The topography is flat to very gently rolling, with a maximum elevation in the eastern part of 32 feet. The bulk of the upland lies between mean sea level and 15 foot elevation. Normal tides range nearly 6 feet between low and high. Ground water levels are high, leaving little available storage in the soil. The dikes created a large outlet basin to hold the surface drainage of the watershed and prevented frequent flooding by storm tides which have reached a record level of over 9 feet above normal low tide twice in the past 5 years. Tides of 7 to 8 feet occur annually.

The slopes are very gentle with about 99 percent falling in the 0-5% classes.

	<u>Slope Class</u>	<u>Acres</u>	<u>Percent Total</u>
A -	0 - 2%	4,360	78
B -	2 - 5%	1,174	21
C -	5 - 10%	56	1

### Geology

The underlying geologic formation of the Silver Lake Watershed is the Kirkwood laminated marine clay with fine sand of Tertiary age. It is seldom exposed at the surface. This clay is nearly everywhere mantled by variable thicknesses of Cape May slightly clayey or silty gravels, (Pleistocene), ranging from 5 to 20 feet. This in turn is capped in many places by up to 4 feet of silt, also Pleistocene.

The variation in depth to clay is accentuated by deep cutting up of the clay beds by geologic erosion previous to the mantling process. It is believed that the frequent closed depressions result at least partly from differential settling over the buried topography.

Some of the deep erosion channels in the old topography have been filled, first with well-washed coarse sand and gravel, then with up to 20 feet of silty alluvium. This is now found in the marshy areas. To a much lesser extent the same process has affected nearly every depression.

### Physiography

This watershed is within the Coastal Plain physiographic province. It is part of the "Inner" Coastal Plain though not far from the edge of the "Outer". This gently sloping to flat topography with a rather poorly developed drainage pattern and many closed depressions is typical of the buried clay country south from New Brunswick. About two-fifths of the watershed is now marshland. Less than one-quarter of the watershed is above 10 feet mean sea level and well drained. The remainder is less than 5 feet above sea level.

### Soils

Other than the mucky alluvium of the tidal marsh, the soils belong to the Sassafras catena. As a rule they are silty loams, deep, distinctly horizonated, and with a moderate moisture capacity and an open permeable substratum. On the low flat knolls the silt cap in places attains sufficient thickness to be classed with the Matapeake soils. In the somewhat poorly to poorly drained depressions, Keyport and Elkton are most frequently mapped, with Woodstown and Fallsington in lesser amounts. It is believed that most of these low areas are closely related, differing mainly in the thickness of the silt or silty clay loam deposit on top of the gravels.

## Land Use

Based on the Conservation Survey, approximately 38 percent is marshland used for muskrat trapping and ducks, 6 percent is in woodland, 2 percent idle and urban or farmsteads, 48 percent in cropland and 6 percent in pasture.

The marsh area is used for muskrat production, for duck shooting and fishing. Black ducks have utilized the marshes as a brood rearing area and considerable numbers have been raised. The fall flooding for muskrat trapping contributes an excellent resting and feeding area for migrating ducks and geese. Under tidal conditions the types of vegetation are not as productive of food and cover as with fresh water. Also, they are more productive when controlled flooding is practiced. Fall flooding is controlled by flash boards installed in the existing sluices and it is expected that the Meadow Companies will install such controls after the construction on the project is completed.

## Cover Conditions

Row crops (including corn, soybeans, tomatoes, asparagus, peppers) occupy the bulk of the cropland, usually followed by small grain winter covercrops. Some small grains, wheat or barley, are left to mature. Perhaps 60 percent - 70 percent is in row crops annually. Erosion is a minor problem, while drainage and water control are major problems. Woodland, the smallest area of cover, is located mostly on the poorest drainage. Since the flooding problem is primarily one from outside the watershed, cover conditions play no part in flood control.

## Climate

The climate of the area is relatively mild. Extremes of temperature are considerably less than areas farther inland from the Delaware Bay area. The average annual temperature is 53.4 degrees, with the monthly average ranging from 50.9 degrees for February to 75.2 degrees for July.

Average annual precipitation is about 44 inches with the greatest amounts occurring during July and August. During the remainder of the year the monthly distribution of precipitation is fairly uniform.

The most significant and pertinent factor is the location of the project on tide-water, subject to storm tides. The frequency of hurricane tides is apparently increasing, and the sweep of wind over miles of open water builds up a tremendous height of tide. The Delaware Bay estuary is funnel shaped, and constricts the flow, raising the heights of tide some 2 feet over the Atlantic Ocean tides under normal conditions. This effect is even greater under storm conditions. Winds of 30 - 50 mph are not uncommon, and reach 60 - 75 mph at times.

## Principal Water Uses and Sources

Within the watershed, shallow wells produce the bulk of the domestic water, and storms have frequently caused saltwater pollution of these wells. Very little irrigation has been installed due to existing normal water levels fairly close to the surface supplying the needs of the types of crops now raised.

When protected with dikes, the marsh area provides storage for internal runoff from heavy rains. When the dikes are breached the tidal waters flow into the watershed filling the marsh area and eliminating the storage area for internal runoff.

No municipal water supply system is located within the watershed.

## Economic Data

The principal types of crops produced within the watershed are truck and corn. At present there are 37 active farms in the watershed of which 80 percent are owner operated.

Crops consist of corn, tomatoes, asparagus, soy beans, peppers, hay and pasture. There are only five dairy farms in the watershed which accounts for the small amount of pasture. The hay acreage is divided between clover and alfalfa.

Hancock's Bridge is the only community within the watershed and has a population of about 250.

About 6 percent of the area is in woodland with very little timber suitable for sale in the near future. The stands are composed mainly of oak and gum. The principal value of the woodland is for wildlife habitat. The killing out of trees along the edges of the flooded areas was noticed in September 1956.

The wildlife resources are very important. The marsh lands provide excellent habitat for muskrats. The Silver Lake marsh is considered the best muskrat area in the State. Black ducks have utilized the marshes as a brood rearing area for many years. The landowners realize considerable income from duck hunting rentals, since the fall flooding for trapping provides an excellent resting and feeding place for migrant ducks and geese.

## WATERSHED PROBLEMS

### Floodwater Damage

The primary floodwater problem is one of inundation caused by floodwater runoff from outside the watershed overtopping or high tides breaching and overtopping the dikes which protect the land. The breached

dikes cause the entire flood plain to become a tidal salt water lake. The croplands and muskrat marsh areas are damaged with resulting financial losses to the landowners.

The Silver Lake dike has been breached in recent years as follows:

August 22, 1933, 3 breaches of approximately 60', repair cost, \$1256.00  
November 25, 1950, 810' of dike washed out, repair cost \$12,157.16  
August 14, 1955, 90' breach, repair cost \$16,221.30  
January 11, 1956, 50' breach, no repairs to date. This was part of the work repaired after the August 14, 1955 storm.

The Locust Island dike has had minor breaches or slight overtopping every year according to the records of the Locust Island Meadow Company.

The Locust Island dike was overtopped in September 1940 by excessive runoff in the Lower Alloways Creek. This runoff was caused by a severe tropical storm which started on September 1, 1940, with over ten inches of rainfall in twelve hours. The water flooded the entire Silver Lake - Locust Island area. The annual repair costs run between \$300 and \$500 and are in addition to the annual maintenance costs.

The November 25, 1950 flood covered 508 acres of cropland and 1,200 acres of muskrat marsh. The August 14, 1955, September 1, 1940 and the August 22, 1933 floods covered 336 acres of cropland and 1,200 acres of marsh. Because of the delay in repairing the dike after the January 11, 1956 breach, the returns from the cropland and marshland are lost for at least a two-year period.

#### Erosion Damage

Because of the flat slopes erosion damage is not a serious problem, although some gullying and sheet erosion occur on the lighter soils.

Erosion of the uplands and silting of bottomlands is not a problem over most of the area since the slopes are short and gentle as a rule.

#### Wildlife

The flooded marsh lands no longer provide a breeding place for muskrats and no crop of rats can be expected for at least a year after the dike is restored. The cover which provided food and breeding ground for ducks is destroyed by the flood waters.

#### Forest Land Situation

Approximately six percent of the watershed is in forest cover typical of the New Jersey marsh land areas. Small areas of pine and oak grow on the higher ground, while swamp maple, gum, and other swamp hardwoods occupy the lower swampy areas. A few good stands of timber are found on high ground surrounded by swamps which cannot be crossed with equipment except on very rare occasions. The forest within and adjacent to the flooded area is being killed by the water.

There are no indications that any conversions in land use from agriculture to forest are needed.

The watershed is in an area where technical assistance in managing forest land is provided to all landowners under the Cooperative Forest Management program sponsored by the New Jersey Department of Conservation and Economic Development and the United States Forest Service.

Because of the small amount of forest, its location on low, flat terrain, and the lack of indication that substantial watershed protection benefit will accrue from improvement in forest hydrologic condition, it appears logical to carry out any needed forest land treatment measures under the above program rather than under the provisions of Public Law 566.

#### OTHER WORKS OF IMPROVEMENT

There are no currently proposed works of improvement which will affect or be affected by the structure included in this plan.

#### WORKS OF IMPROVEMENT TO BE INSTALLED

##### Land Treatment Measures for Watershed Protection

The land treatment measures are based upon the use of each acre of land within its capabilities and treatment in accordance with its needs as is now being carried out by the Salem-Cumberland Soil Conservation District. This objective can be obtained by the establishment and maintenance of all applicable soil, water and plant management practices essential to proper land use. These measures produce benefits primarily to the land on which installed. No benefits to floodwater damages were claimed for land treatment measures. Individual landowners and operators normally can and will install most of these measures with expectation of favorable financial returns, if given adequate technical assistance. However, in order to encourage early adoption of the needed practices, cost-sharing is offered through the Agricultural Conservation Program.

The quantity of these measures to be installed is based on the needs as revealed by the land capability survey and on a realistic estimate of the amount that can be accomplished in the five-year period. The Farmer-District Conservation Plan developed by the farmer with the help of the Soil Conservation Service will set forth the practices needed on his unit. The major types of measures to be established are discussed below:

Contour Farming: Contour farming to conserve moisture and reduce runoff and erosion will be applied on fifty acres.

Cover Cropping: Cover cropping to prevent erosion, runoff and soil deterioration over the winter should be used successively on the cultivated land and will be applied on 200 acres.

Field Diversions: Field diversions control water flow to prevent erosion, reduce headward development of gullies by diverting water to stable channels and protect cultivated areas below the diversions. One mile of field diversions will be installed under this plan.

Pasture Planting: Planting of cropland retired to pasture and seeding of some existing pastures to more productive grasses and legumes will be carried out on 100 acres of land. The effect of this practice, under good management, will be to improve the grazing capacity and to reduce erosion and runoff.

Conservation Crop Rotations: Conservation crop rotations consist of growing different crops in a rotation where the soil-improving crops at least offset the soil-depleting crops in their effect on the soil. Emphasis is given to the type of crops that provide maximum protection during seasons of the year when the erosion hazards are greatest. A total of 200 acres of conservation crop rotations will be established under this plan.

Waterway Development: Five acres of waterway development to reduce erosion are to be installed.

Wildlife Borders: Wildlife borders are strips of herbaceous plants and woody shrubs along borders of fields or woodlands to conserve soil and provide food and cover for wildlife. A total of five acres will be established under this plan.

Crop Residue Management: Crop residue management consists of using plant residues left in the field, such as stubble, in a manner to reduce wind and water erosion, to conserve moisture, and to improve the soil, as contrasted with burning or removal of such material. This practice will be applied on 400 acres.

Wildlife Area Improvement: Wildlife area improvement covers treating the land devoted to wildlife production by planting, ditching, control of grazing and fire or other means. A total of 400 acres of wildlife area will be improved under this plan.

Other Measures: Other land treatment measures that are less directly important in reducing erosion and conserving moisture will round out the needed land treatment program. These measures include fertilization irrigation, rotation grazing, deferred grazing, pasture improvement, open and closed drains, pond construction, channel improvement and land clearing. The installation of these measures will provide a balanced, complete conservation program on the watershed.

#### Structural Measures for Flood Prevention

The damages to the Locust Island area occur when runoff from Alloways Creek, which is outside the watershed, overtops the dike and inundates the cropland and marsh area. This plan provides for repairing and re-construction of 7,300 feet of dike, sufficient in size and height to prevent overtopping and washouts. The dike will be at least three feet above recorded high water with a twelve-foot top width,  $2\frac{1}{2}$  to 1 side slopes on the water side and  $1\text{-}3/4$  to 1 side slopes on the land side

To provide for the flow of water from the watershed, pipe sluiceways with tide gates will be constructed. To facilitate construction of sluiceways to provide a stable foundation, and to provide for easy access, it is planned to construct the sluiceways on the end or ends of the dike where possible. This will require the construction of some inflow and outflow channel. Each sluiceway will be protected by a headwall with wingwalls and apron. The dike will be seeded or planted and maintained with suitable vegetative cover.

The estimated cost of this dike and sluiceways is \$101,590 of which \$99,590 is Federal and \$2,000 is non-Federal. The Federal cost is divided \$74,640 for the dike and \$24,950 for the sluiceways. The non-Federal cost is for easements, rights-of-way, and contracting services. The estimated annual cost including installation and operation and maintenance is \$4,706. Location of dike is shown on Figure 1.

#### Structural Measures, Multiple Purpose

The Silver Lake dike is for the purpose of protecting the watershed from tidal inundation. Sluices and tide gates are necessary to dispose of floodwater originating within the watershed. This dike is overtopped or breached by high tides which accompany severe storms of the hurricane type and the salt water inundates cropland, pasture and marsh causing much damage. In order to prevent such damage this plan provides for repairing and reconstruction of 5,100 feet of dike sufficient in size and height to prevent overtopping and breaching. The dike will be at least three feet above recorded high tide with a twelve-foot top width, 2-1/2 to 1 side slopes on the water side and 1-3/4 to 1 side slopes on the land side. To allow for the flow of the water from the watershed, pipe sluiceways with tide gates will be constructed. To facilitate construction to provide a stable foundation and to provide for easy access, it is planned to construct the sluiceways on the end or ends of the dike, where possible. This will require the construction of some inflow and outflow channels. Each sluiceway will be protected by a headwall with wing-walls and apron. The area at the breach in the dike will be filled with material from borrow pits since the material adjacent to this area was washed away. The dike will be seeded or planted and maintained with suitable vegetative cover.

The estimated cost of this dike is \$80,102, of which \$49,327 is Federal and \$30,775 is non-Federal. This cost is divided with \$24,950 for flood prevention and \$55,152 for drainage. The Federal cost is divided \$24,377 for its share of the dike and \$24,950 for the sluiceways. The non-Federal cost is divided \$28,775 for their share of the dike and \$2,000 for easements, rights-of-way, and contracting services. The estimated annual cost including installation, operation and maintenance is \$3,947. Location of dike is shown on Figure 1.

TABLE 1 - ESTIMATED PROJECT INSTALLATION COSTS

Silver Lake - Locust Island Watershed - New Jersey

Price Basis 1955

Items	Unit	No. to be applied		Estimated Cost	
		Total	Federal	Federal	Total
<u>LAND TREATMENT PRIMARILY FOR</u>					
1. Watershed Protection					
Soil Conservation Service					
Contour Farming	acre	50		125	125
Cover Cropping	acre	200		400	400
Field Diversion	mile	1		200	200
Pasture Planting	acre	100-		1,750	1,750
Conservation Crop Rotation	acre	200		3,000	3,000
Waterway Development	acre	5		500	500
Wildlife Borders	acre	5		210	210
Crop Residue Management	acre	400		2,000	2,000
Wildlife Area Improvement	acre	400		8,000	8,000
SCS Subtotal				16,185	16,185
<b>TOTAL LAND TREATMENT</b>				<b>16,185</b>	<b>16,185</b>
<u>STRUCTURAL MEASURES</u>					
Soil Conservation Service					
Dikes	each	2		107,705	28,775
<b>TOTAL CONSTRUCTION COSTS</b>				<b>107,705</b>	<b>28,775</b>
<u>INSTALLATION SERVICES</u>					
Soil Conservation Service					
Engineering Services				27,296	0
Other				13,916	
SCS Total				41,212	
<b>TOTAL INSTALLATION SERVICES</b>				<b>41,212</b>	<b>41,212</b>
<u>OTHER COSTS</u>					
Land, Easements and Rights-of-way				2,000	
Administration of Contracts				2,000	
<b>TOTAL OTHER COSTS</b>				<b>4,000</b>	<b>4,000</b>
<b>TOTAL INSTALLATION - STRUCTURES</b>				<b>148,917</b>	<b>32,775</b>
<b>GRAND TOTAL</b>				<b>148,917</b>	<b>48,960</b>
<u>SUMMARY</u>					
Total SCS				148,917	48,960
<b>TOTAL</b>				<b>148,917</b>	<b>48,960</b>

1/Exclusive of any reimbursement from ACP or other Federal funds

January 1957

TABLE 1 - ESTIMATED PROJECT INSTALLATION COSTS

Silver Lake - Locust Island Watershed - New Jersey

Installation Cost Item	:No. to be Applied:		Estimated Cost (Dollars) <sup>1/</sup>		
	:Unit:	:Non-Federal	:PL 566 Funds	:Other	: Total
	: : Land	: Non-Fed. Land	: Non-Fed. Land	: Non-Fed. Land	: Total
	: : Land	: Non-Fed. Land	: Non-Fed. Land	: Non-Fed. Land	: Total
<u>2/</u>					
<u>LAND TREATMENT FOR</u>					
1. Watershed Protection					
Soil Conservation Service					
Contour Farming	acre	50		125	125
Cover Cropping	acre	200		400	400
Field Diversion	mile	1		200	200
Pasture Planting	acre	100		1,750	1,750
Conservation Crop Rotation	acre	200		3,000	3,000
Waterway Development	acre	5		500	500
Wildlife Borders	acre	5		210	210
Crop Residue Management	acre	400		2,000	2,000
Wildlife Area Improvement	acre	400		8,000	8,000
SCS Sub-total				16,185	16,185
<b>TOTAL LAND TREATMENT</b>				<b>16,185</b>	<b>16,185</b>
<u>STRUCTURAL MEASURES</u>					
Soil Conservation Service					
Dikes	each	2	141,796	37,874	179,670
Sub-total Construction			141,796	37,874	179,670
<u>INSTALLATION SERVICES</u>					
Soil Conservation Service					
Engineering Services			41,207		41,207
Other			13,735		13,735
Sub-total Installation Services			54,942		54,942
<u>OTHER COSTS</u>					
Land, Easements & Rights-of-way				2,000	2,000
Administration of Contracts				2,000	2,000
Sub-total Other				4,000	4,000
<b>TOTAL STRUCTURAL MEASURES</b>			<b>196,738</b>	<b>41,874</b>	<b>238,612</b>
<b>TOTAL PROJECT</b>			<b>196,738</b>	<b>58,059</b>	<b>254,797</b>
<b>SUB-TOTAL SCS</b>			<b>196,738</b>	<b>58,059</b>	<b>254,797</b>

1/ Price Base 1955

2/ Exclusive of any reimbursement from ACP or other Federal funds.

February 26, 1960

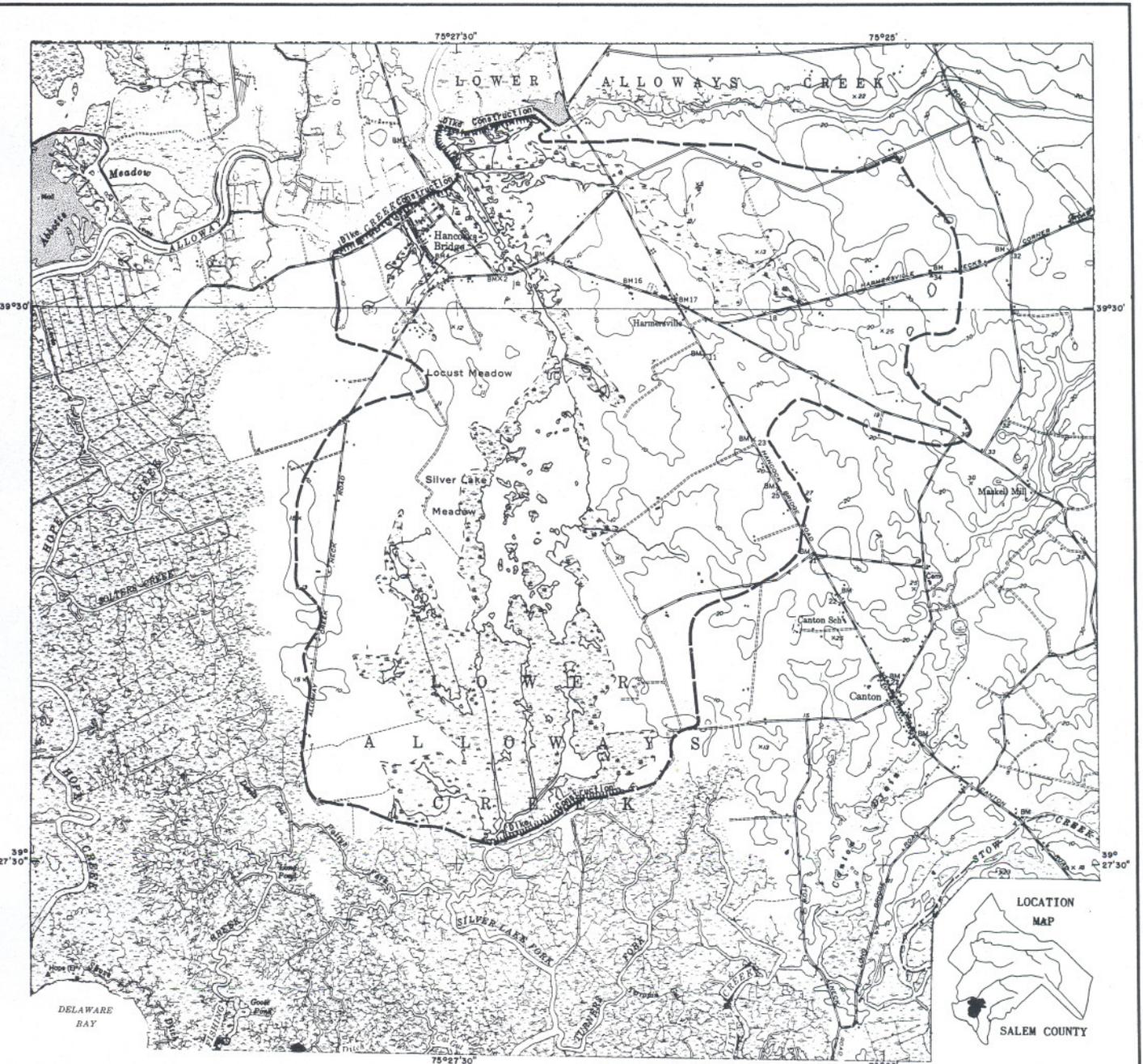
# SILVER LAKE - LOCUST ISLAND WATERSHED

U. S. DEPARTMENT OF AGRICULTURE

SALEM CO., N. J.

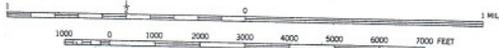
SOIL CONSERVATION SERVICE

ASSISTING SALEM - CUMBERLAND SOIL CONSERVATION DISTRICT



L-1424

SCALE



REPRODUCED BELLEVILLE, MO. 1984

PLANNED STRUCTURAL MEASURES MAP

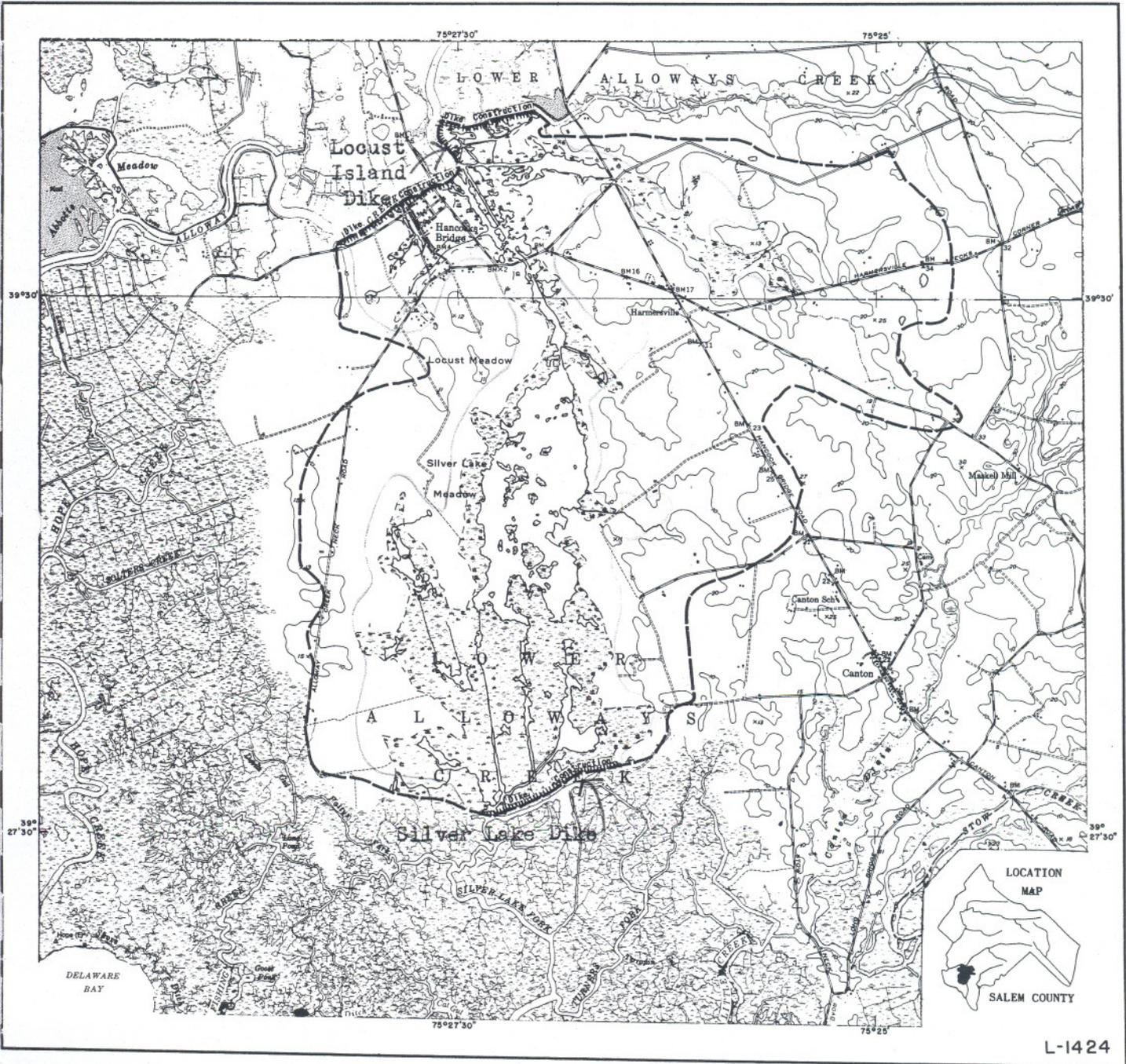
SILVER LAKE - LOCUST ISLAND  
WATERSHED

U. S. DEPARTMENT OF AGRICULTURE

SALEM CO., N. J.

SOIL CONSERVATION SERVICE

ASSISTING SALEM-CUMBERLAND SOIL CONSERVATION DISTRICT



L-1424

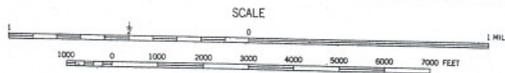


Figure No. 1

## BENEFITS FROM WORKS OF IMPROVEMENT

The installation of the structural works of improvement will result in primary average annual monetary benefits of \$10,463. The dikes will function as interdependent measures to provide floodwater reduction benefits and drainage benefits. The dikes are interdependent because the floodwaters and tidal waters could flow from one area to the other were both dikes not there. The total benefits from increased muskrat production are estimated to be \$1843 annually. See Table 7.

Average annual floodwater reduction benefits are estimated to be \$7,293. They include \$5,023 crop and pasture, \$1,241 other agricultural and \$300 non-agricultural (property) and \$729 indirect benefits.

Primary average annual drainage benefits are estimated to be \$3,170. Of this amount \$317 indirect benefits will accrue to farm laborers and fur processors. Secondary benefits of \$1,433 from drainage were estimated to accrue annually. Secondary benefits were not used for project justification. Secondary benefits are those stemming from increased processing and marketing of crops and increased farm production expenses due to drainage measures. See Table 9-B.

Additional benefits not measurable in monetary values will result from project installation. These benefits include such things as the safety of travel on the roads within the flood plain and the protection to life and home within the village of Hancock's Bridge which lies directly back of the Locust Island dike. Some benefits, which have not been evaluated monetarily, will accrue to forest land.

## COMPARISON OF BENEFITS AND COSTS

With the structural measures installed and operating at full effectiveness, the ratio of average annual benefits, \$10,463 to average annual costs, \$8,653 will be 1.21 to 1 based on long-term projected prices for benefits and operation and maintenance, and 1955 prices for construction costs. See Table 8.

## ACCOMPLISHING THE PLAN

The education and information program will be aimed at helping to achieve an understanding and appreciation of the plan and participation in the program by the landowners and operators in the watershed and other interested people and groups in order to facilitate the full accomplishment of the program. The Extension Service will provide leadership in carrying out the educational program through meetings, press releases, and other forms of disseminating information. The Soil Conservation Service will assist by providing accurate information concerning soil and water conservation, the effectiveness of the various measures, and its watershed program.

Land treatment measures shown in Table 1 will be established on the land by the farm owners and operators in cooperation with the Salem-Cumberland Soil Conservation District. The cost of applying these measures will be borne by the landowners and operators. It is expected that they will be reimbursed for a portion of this cost through the Agricultural Conservation Program of the Agricultural Stabilization and Conservation Service. The amount of any reimbursement is not included in the estimated non-Federal cost for land treatment as listed in Table 1. The Soil Conservation District is now giving assistance in the planning and application of these measures under its going program. This assistance will be accelerated so as to assure planning and application of the planned measures within the installation period of the project.

The Soil Conservation Service will furnish needed additional technical assistance to aid cooperating landowners and operators in accelerating the preparation and application of soil and water conservation plans under the going Public 46 program.

The Farmers Home Administration soil and water conservation loan program is available to all eligible farmers in the watershed.

The Salem County Agricultural Stabilization and Conservation Committee will cooperate with the Soil Conservation District governing body by providing financial assistance for those practices which will help accomplish the conservation objectives as desired by the landowners.

The State Soil Conservation Committee will assist in the accomplishment of the plan through the performance of their duties as provided for in the Soil Conservation Act, State of New Jersey.

Forestry Cooperation Section of the New Jersey Department of Conservation and Economic Development, in cooperation with the United States Forest Service, will provide the technical assistance needed to assist landowners with their forest problem through its going program within the state.

The Division of Fish and Game will cooperate by supplying technical assistance in application of the biological phases of the plan.

The State Geologist will make available technical services and advise in accomplishing the plan.

The Salem-Cumberland Soil Conservation District has been ruled by the New Jersey State Attorney General as legally authorized to sponsor watershed projects under Public Law 566. The District will contract for works of improvement.

The Locust Island Meadow Company and the Thorofare Meadow Company will assess their members for funds for operation and maintenance.

The Township of Lower Alloways Creek will assist in providing funds for the operation and maintenance of the structural measures.

Technical specialists will be provided by the Soil Conservation Service to assist in planning, design, preparation of specifications, supervision of construction, preparation of contract payment estimates, making final inspection, execution of certificates of completion and to perform related duties for the establishment of the planned structural measures.

The Soil Conservation Service will provide funds for all construction related to flood control and will share in the cost of the agricultural water management as shown on Table 1. Federal assistance for carrying out the works of improvement on non-Federal land and the Federal funds for installing the works of improvement on Federal land, as described in this work plan, will be provided under the Authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83d Congress; 68 Sta. 666, as amended by Public Law 1018, 84th Congress; 70 Stat., 1088).

Since the project will be treated as a single construction unit, all land, easements, and rights-of-way for the entire project, will be secured by the Meadow Companies and the Township of Lower Alloways Creek before any Federal assistance is provided.

Funds for the share of the construction cost to be paid by the local organization will be obtained by the Meadow Companies through assessment of their members and through borrowing under the provision of the Act as amended. Preliminary discussions toward this end have been held with the local Farmers Home Administration representative.

The New Jersey Division of Water Policy and Supply will provide review and approval of designs and plans and issue permits for construction as required by state law.

#### PROVISIONS FOR OPERATION AND MAINTENANCE

##### Land Treatment Measures

Land treatment measures will be operated and maintained by the landowners or operators under cooperative agreements with the Salem-Cumberland Soil Conservation District. The Soil Conservation District will encourage the farmers to maintain the measures and to keep them in good operation.

##### Structural Measures for Flood Prevention and Agricultural Water Management

The Salem-Cumberland Soil Conservation District will be responsible for the operation and maintenance of the structural measures and will arrange with the co-sponsors to perform the works as follows: The Locust Island Dike will be operated and maintained by the Locust Island Meadow Company and the Township of Lower Alloways Creek. The Silver Lake Dike will be operated and maintained by the Thorofare Meadow Company.

Inspections will be made during or immediately after each period of high water and in the event of no high water at frequent intervals. The entire dike and appurtenant sluices will be inspected.

The estimated annual operation and maintenance cost based on long term prices is \$2,247.

The operation and maintenance will be accomplished by equipment rental contracts and force account. This is the method that the Meadow Companies have followed in the past.

The Meadow Companies are set up under the laws of the State of New Jersey and their managers have legal authority to operate the dikes and sluices.

Funds for operation and maintenance will be obtained by the Meadow Companies through assessment of their members and by the Township through taxation.

The structures will be jointly inspected, at least annually, by representatives of the Soil Conservation Service and the Salem-Cumberland Soil Conservation District.

The Salem-Cumberland Soil Conservation District will execute a maintenance agreement prior to the issuance of invitations to bid for the structural measures provided in this plan.

#### COST-SHARING

Cost-sharing for the total Project, including operation and maintenance is \$148,917 (56.9%) Federal, and \$112,690 (43.1%) non-Federal. Cost-sharing for installation of structural measures is \$148,917 (82%) Federal, and \$32,775 (18%) non-Federal. See Table 9.

It is agreed that the Federal and non-Federal costs shall be reconsidered annually, and the non-Federal share for agricultural water management purposes shall be increased or decreased on the percentage basis to reflect any changes of costs. Cost records shall be maintained by the Federal agencies and local organization during the period of project installation to substantiate their costs.

#### CONFORMANCE OF PLAN TO FEDERAL LAWS AND REGULATIONS

This project will have no effect on any proposed plan for the comprehensive development of the Delaware River Basin.

This plan will not bring any new land into the production of crops determined by the Secretary of Agriculture to be in surplus supply.

## SECTION 2 -- INVESTIGATIONS, ANALYSES, SUPPORTING TABLES AND MAPS

### Investigations and Analyses

#### Hydraulic

Sluiceways with tide gates were planned on the basis of one square foot of opening for each 90 acres of watershed. This would provide an area of discharge comparable to the sluices which have been in use for many years and which have proved adequate according to the information furnished by the Meadow Companies. Dikes were planned with 2-1/2 to 1 slopes on the water side and 1-3/4 to 1 slopes on the land side which would provide for a phreatic line on a 6 to 1 slope falling inside the toe of the slope. Top width was planned at twelve feet. The crest of the dikes was planned with a freeboard of three feet above highest recorded water level. Should the sluices and tide gates fail to function because of high water outside the dikes, the large water storage area available in the marshes of both the Locust Island and Silver Lake areas will prevent damage. From past experience this condition occurs very infrequently.

#### Hydrologic

The Silver Lake - Locust Island Watershed receives about 44 inches of rainfall in a normal year of which about 18 inches leaves the watershed as surface runoff. The other 26 inches is accounted for as evaporation, transpiration, infiltration, and deep percolation.

No stream gaging data are available for this watershed.

The storm of September 1, 1940 with 10.52 inches of rainfall in about twelve hours produced runoff as high as 600 c.s.m. and 1240 c.s.m. in nearby areas. This storm was the greatest of record for this part of New Jersey. The Alloways Creek flowed to the Delaware River for 24 hours regardless of tidal influence and over-topped the Locust Island Dike and flooded most of the watershed.

#### Geologic

Though the underlying formations dip gently at about 40 feet per mile in a southeast direction, the uneven depth of the mantle renders detailed soil investigations for foundations very necessary. In the marshy areas which were once deep channels, of Alloways Creek, a deep valley fill of rather clean coarse sand and gravel was first deposited. This was followed by the deposition of a deep silty alluvium, up to 20 feet thick in the dike area.

The silty alluvium throughout most of the dike area is too deep to allow removal down to a firm coarse sand base. Borings through and close to the dike indicate considerable compaction of the alluvium under the dike over the past 100 or more years. The deep alluvium extends far out on both sides of the dike and it is believed that this material will make a satisfactory dike. The coarse sand and fine gravel-strata underlying the whole area and within reach near ends would make excellent diking material. The coarse sand at 20 feet is quite permeable, but the deep silt cover makes it unimportant except in the break in the dike where the sand is exposed.

## Economics

The Historical Series Method was used to evaluate damages. Damages occur when the dikes are overtopped or breached. This occurred four times during a 24 year period. The areas inundated for each of these storms was used to compute the average annual damage. All benefits result from a reduction of damages and no restoration of production or enhancement benefits were evaluated. 4x  
copy by

Damage schedules were obtained from landowners or operators. Analysis of this information formed the basis for determining damage rates for various seasons of flooding. In the calculation of crop and pasture damage, expenses saved, such as costs of harvesting, were deducted from the gross value of the damage. The proper rates of damage were applied to the floods occurring during the historical series.

The flood plain land use was mapped in the field by elevation. Normal yields were based on data obtained from the schedules, supplemented by information obtained from the College of Agriculture of Rutgers University. Prices and costs used in determining benefits and operation and maintenance were obtained from Agricultural Price and Cost Projections, A. R. S. and A. M. S., June 1956. Installation costs were based on 1955 price levels.

Cost allocations were made on the basis of purpose. The Locust Island dike is for the purpose of flood prevention. The Silver Lake dike has a primary purpose of drainage with a secondary flood prevention purpose, and is thus classified as a multiple purpose structure. All costs of the Silver Lake dike are specific by purpose and allocation was made on that basis.

Because of the interdependency of the dikes to provide the benefits estimated, it was not possible to allocate specific benefits to purpose. Benefits were allocated to purpose on the same percentage as installation costs were allocated to purpose.

### INSTALLATION COST ALLOCATION

<u>Item</u>	<u>Flood Prevention</u>	<u>Drainage</u>	<u>Total</u>
Locust Island Dike	\$ 101,590		\$101,590
Silver Lake			
Dike		\$55,152.	55,152
Sluiceways	24,950		24,950
Total Installation Cost	\$ 126,540	\$55,152	\$181,692
% Total Installation Cost	69.7	30.3	100
<hr/>			
Primary Benefits	\$ 7,293	\$ 3,170	\$ 10,463
% Primary Benefits	69.7	30.3	100

Installation costs for drainage were shared on the basis of direct identifiable benefits to total benefits from drainage. Of the total benefits of \$4,603 annually \$2,568 or 55.8% were directly identifiable. Thus non-Federal funds will provide 55.8% of the installation costs for drainage. All benefits and operation and maintenance costs were long term.

TABLE 2 - ESTIMATED STRUCTURE COST DISTRIBUTION

Silver Lake-Locust Island Watershed, New Jersey

Price Base 1955

Structure	Federal Installation Cost					Non-Federal Installation Cost					Total	Est. Total	
	Con-tract	Contin-gencies	lation Service	& Misc.	Tot. Fed-eral	Con-tract	Contin-gencies	lation Services	Adm.of: Base-; Non-	Total			
Locust Island Dike													
Dike and Sluiceways	68000	8000	19760	3830	99590				1000	1000	2000	101590	
Silver Lake Dike													
Dike and Sluiceways	11308	1357	10774	938	24377	25692	3083		1000	1000	30775	55152	
	17000	2040	4950	960	24950							24950	
GRAND TOTAL	96308	11397	35484	5728	148917	25692	3083		2000	2000	32775	181692	

25692  
 122,000  
 14,480  
 136,480  
 3083  
 14450

January 1957

TABLE 3 - STRUCTURE DATA - DIKES

Silver Lake-Locust Island, New Jersey

Item	Unit	Locust Island Dike	Silver Lake Dike	Total
Drainage area	Sq.Mi.			8.7
Maximum height of dike	Ft.	10	10	
Volume of fill	Cu.Yds.	38000	34000	72000

January 1957

TABLE 4 -- SUMMARY OF PHYSICAL DATA

Silver Lake--Locust Island Watershed, New Jersey

Item	Unit	Quantity	
		:Without :Program	: With : Program
Watershed area	Sq. Mi.	8.7	XXXX
Watershed area	Acre	5590	XXXX
Area privately owned	Acre	5590	XXXX
Area of cropland	Acre	2683	2683
Area of pasture	Acre	335	335
Area of woodland	Acre	335	335
Area of wildlife	Acre	2125	2125
Homesteads and other	Acre	112	112
Area subject to damage	Acre	1686	0
Annual rainfall	Inch	44	XXXX

January 1957

1/20

TABLE 5 - SUMMARY OF PLAN DATA

Silver Lake-Locust Island Watershed, New Jersey

Price Base - Costs 1955  
O&M and Benefits Long-Term

Item	Unit	Quantity
Years to complete program	Year	5
Total installation cost		
Federal	Dollar	148,917
Non-Federal	Dollar	48,960
Annual O&M Cost		
Federal	Dollar	0
Non-Federal	Dollar	2,217
Average annual monetary benefits	Dollar	10,463
Agricultural	Percent	97.14
Non-agricultural	Percent	2.86
Structural measures		
Flood prevention	Each	1
Drainage	Each	1
Reduction of floodwater damage	Dollar	7,293
By Land treatment measures		
Watershed protection	Percent	0
Drainage benefits	Dollar	3,170

January 1957

TABLE 6 .- ANNUAL COSTS

Silver Lake-Locust Island Watershed, New Jersey

Price Base 1955

Measures	AMORTIZATION OF			OPERATION & MAINTENANCE			Total
	INSTALLATION COSTS			COSTS			
	Federal	Non-	Total	Federal	Non-	Total	
	:	:	:	:	:	:	
Silver Lake							
Dike	3512	70	3582	1124	1124	4706	
Locust Island							
Dike	1739	1085	2824	1123	1123	3947	
TOTAL	5251	1155	6406	2247	2247	8653	

Amortization of structures over 50-year period.

Funds figured at 2 $\frac{1}{2}$ % interest.

Operation and maintenance based on long term price projection or 97.7% of current prices.

January 1957

TABLE 7 - SUMMARY OF MONETARY BENEFITS

Silver Lake-Locust Island Watershed, New Jersey

Price Base Long Term

Item	: Est. Average Annual Damage		:Average		
	:With-: After Land:	:After	:With:	:Annual	
	:Out : Treatment	:All Land:	:Pro-:	:Monetary	
	:Pro- : for W/S	:Treat-	:ject:	:Benefits	
	:ject : Protection:	ment	:	:	
Floodwater Damage					
Crop and Pasture	5023	5023	5023	0	5023
Other Agricultural	1241	1241	1241	0	1241
Non-Agricultural	300	300	300	0	300
Indirect Damage	729	729	729	0	729
Total, All Damage	7293	7293	7293	0	7293
<b>TOTAL FLOOD PREVENTION BENEFITS</b>					7293
<b>Agricultural Water Management</b>					
Drainage					2853
Indirect					317
Secondary <sup>1/</sup>					1433
<b>TOTAL AGRICULTURAL WATER MANAGEMENT BENEFITS</b>					4603
<b>TOTAL PRIMARY BENEFITS</b>					10463
<b>TOTAL MONETARY BENEFITS</b>					11896

<sup>1/</sup> Not used in project justification.

January 1957

TABLE 8 - BENEFIT COST ANALYSIS

Silver Lake-Locust Island, New Jersey

Price Base Benefits Long-Term - Cost 1955

Measures	: AVERAGE ANNUAL BENEFITS :						: Average : Benefit	: Cost Ratio
	: Flood :		: Agricultural :		: Total :	: Annual :		
	: Prevention:		: Water Mgt. :					
	:Flood-:In-:	:Drain-:	In-:	:Total :	: Annual :	: Cost :		
:water :	:direct :	age:	direct :					
Locust Island								
Dike	5264	585			5849	4706	1.24:1	
Silver Lake								
Dike	1300	144	2853	317	4614	3947	1.17:1	
TOTAL	6564	729	2853	317	10463	8653	1.21:1	

1/ Does not include secondary benefits of \$1433 annually.

January 1957

TABLE 9 - COST-SHARING SUMMARY

Silver Lake-Locust Island Watershed, New Jersey

Type of Cost	Price Base - 1955					
	: Federal		: Non-Federal		: Total	
	: Cost		: Cost		: Cost	
	:Dollars:	Pct	:Dollars:	Pct	:Dollars:	Pct
Land Treatment						
Non-Federal Land <u>1/</u> For Watershed Protection			16,185	100	16,185	6.2
Subtotal			16,185	100	16,185	6.2
Structural Measures						
Installation						
Flood Prevention	124,540	98.4	2,000	1.6	126,540	48.4
Ag. Water Management	24,377	44.2	30,775	55.8	55,152	21.1
Subtotal	148,917	82.0	32,775	18.0	181,692	69.5
Total Installation Cost	148,917	75.3	48,960	24.7	197,877	75.6
Operation & Maintenance <u>2/</u>			63,730	100	63,730	24.4
Total Structural Cost	148,917	60.7	96,505	39.3	245,422	93.8
Total Project Cost	148,917	56.9	112,690	43.1	261,607	100

1/ This cost is exclusive of reimbursement from ACP or Federal funds other than those available under P.L. 566.

2/ Capitalized at the estimated borrowing rate of organization guaranteeing operation and maintenance 2-1/2%.

January 1957

TABLE 9A - ALLOCATION OF INSTALLATION COSTS OF STRUCTURAL MEASURES

Silver Lake-Locust Island Watershed, New Jersey

Item	Price Base 1955		
	Purpose		
	Flood Prevention	Agricultural Water Management	Total
Step A			
Single Purpose			
Locust Island Dike	101,590		101,590
Multiple Purpose			
Silver Lake Dike	24,950	55,152	80,102
<b>Total</b>	<b>126,540</b>	<b>55,152</b>	<b>181,692</b>
Step B			
Federal	124,540	24,377	148,917
Non-Federal	2,000	30,775	32,775
<b>Total</b>	<b>126,540</b>	<b>55,152</b>	<b>181,692</b>

January 1957

TABLE 9B -- CLASSIFICATION OF AGRICULTURAL WATER MANAGEMENT BENEFITS

Silver Lake-Locust Island Watershed, New Jersey

Price Base -- 1955

Purpose	Direct Identifiable		Other			Total
	Dollars	Percent	Incidental	Indirect	Secondary	
Drainage	2568	55.8	265	317	1433	4603

1/ Not used for project justification

January 1957

PROBLEM LOCATION MAP

SILVER LAKE - LOCUST ISLAND  
WATERSHED

SALEM CO., N. J.

U. S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

ASSISTING SALEM - CUMBERLAND SOIL CONSERVATION DISTRICT



L-1424

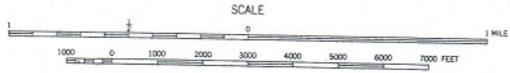


Figure No. 2

WATERSHED WORK PLAN AGREEMENT

between the

SALEM - CUMBERLAND SOIL CONSERVATION DISTRICT  
Local Organization

LOCUST ISLAND MEADOW CO.  
Local Organization

THROFARE MEADOW CO.  
Local Organization

State of NEW JERSEY  
(hereinafter referred to as the Sponsoring Local Organization)

and the

Soil Conservation Service  
United States Department of Agriculture  
(hereinafter referred to as the Service)

Whereas, application has heretofore been made to the Secretary of Agriculture by the Sponsoring Local Organization for assistance in preparing a plan for works of improvement for the Silver Lake -  
Locust Island Watershed, State of New Jersey  
under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83d Congress; 68 Stat. 666), as amended by the Act of August 7, 1956 (Public Law 1018, 84th Congress; 70 Stat. 1088); and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act, as amended, has been assigned by the Secretary of Agriculture to the Service; and

Whereas, there has been developed through the cooperative efforts of the Sponsoring Local Organization and the Service a mutually satisfactory plan for works of improvement for the Silver Lake -  
Locust Island Watershed, State of New Jersey,  
hereinafter referred to as the watershed work plan, which plan is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the Sponsoring Local Organization and the Secretary of Agriculture, through the Service, hereby agree on the watershed work plan, and further agree that the works of improvement as set forth in said plan will be installed, within 5 years, and operated and maintained substantially in accordance with the terms, conditions, and stipulations provided for therein.

It is mutually agreed that in installing and operating and maintaining the works of improvement described in the watershed work plan:

1. The Sponsoring Local Organization will acquire without cost to the Federal Government such land, easements, or rights-of-way as will be needed in connection with the works of improvement. (Estimated cost \$ 2,000.00.)
2. The Sponsoring Local Organization will acquire or provide assurance that landowners or water users have acquired such water rights pursuant to State Law as may be needed in the installation and operation of the works of improvement.
3. The percentages of construction costs of the works of improvement to be paid by the Sponsoring Local Organization and by the Service are as follows:

<u>Works of Improvement</u>	<u>% Sponsoring Local Organization Will Pay</u>	<u>% Service Will Pay</u>	<u>Estimated Construction Cost</u>
Flood Protection			
Locust Island Dike	0	100	\$76,000
Silver Lake Sluiceways	0	100	\$19,040
Drainage			
Silver Lake Dike	69.438	30.562	\$41,440

4. The Service will bear the cost of all installation services applicable to works of improvement for flood prevention, drainage, and other agricultural water management. (Estimated cost \$ 41,212.)
5. The Sponsoring Local Organization will bear all costs of administering contracts except the cost of engineering services applicable to works of improvement for flood prevention, drainage, and other agricultural water management. (Estimated cost \$ 2,000.)
6. The Service will provide the following engineering and other services in connection with the installation of the works of improvement; Surveys, designs, layout, inspection, preparation of estimates and completion surveys and reports.

7. The Sponsoring Local Organization will provide assistance to landowners and operators to assure the installation of the land treatment measures shown in the watershed work plan.
8. The Sponsoring Local Organization will encourage landowners and operators to operate and maintain the land treatment measures for the protection and improvement of the watershed.
9. The Sponsoring Local Organization will be responsible for the operation and maintenance of the structural works of improvement by actually performing the work or arranging for such work in accordance with agreements to be entered into prior to issuing invitations to bid for construction work.
10. The costs shown in this agreement represent preliminary estimates. In finally determining the costs to be borne by the parties hereto, the actual costs incurred in the installation of works of improvement will be used.
11. This agreement does not constitute a financial document to serve as a basis for the obligation of Federal funds. Financial and other assistance to be furnished by the Service in carrying out the watershed work plan is contingent on the appropriation of funds for this purpose. Where there is a Federal contribution to the construction cost of works of improvement, a separate agreement in connection with each construction contract will be entered into between the Service, the Sponsoring Local Organization and the Contracting Local Organization prior to the issuance of the invitation to bid. Such agreement will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.
12. The watershed work plan may be amended or revised, and this agreement may be modified or terminated, only by mutual agreement of the parties hereto.

13. No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

Salem-Cumberland Soil Conservation  
Local Organization District

By 1st Harvey M. Beal

Title Chairman

Date March 21, 1957

The signing of this agreement was authorized by a resolution of the governing body of the Salem-Cumberland Soil Conservation District  
Local Organization  
adopted at a meeting held on 21, March 1957

1st Robert E. Gardner  
(Secretary, Local Organization)

Date 21, March 1957

Thorofare Meadow Company  
Local Organization

By 1st Lewis W. Fogg

Title Manager

Date April 1, 1957

The signing of this agreement was authorized by a resolution of the governing body of the Thorofare Meadow Company  
Local Organization  
adopted at a meeting held on April 1, 1957

1st Frank A. Shimp  
(Secretary, Local Organization)

Date April 1, 1957

Locust Island Meadow Company  
Local Organization

By W/ William Morris Hires

Title Ast. Manager

Date April 2, 1957

The signing of this agreement was authorized by a resolution of the governing body of the Locust Island Meadow Company  
Local Organization  
adopted at a meeting held on April 2, 1957

W/ Francis H. Sheppard  
(Secretary, Local Organization)

Date April 2, 1957

Soil Conservation Service  
United States Department of Agriculture

By W/ Gladwin Young  
Administrator

Date 5-22-57

1927  
SUPPLEMENTAL WATERSHED WORK PLAN AGREEMENT

Between the

SALAM - GUMBERLAND SOIL CONSERVATION DISTRICT  
Local Organization

Locust Island Meadow Company  
Local Organization

Thorofare Meadow Company  
Local Organization

Township of Lower Alloways Creek  
Local Organization

State of New Jersey  
(hereinafter referred to as the Sponsoring Local Organization)

and the

Soil Conservation Service  
United States Department of Agriculture  
(hereinafter referred to as the Service)

Whereas, the Watershed Work Plan Agreement for Silver Lake - Locust Island Watershed, State of New Jersey, executed by the sponsoring local organization named therein and the Service, became effective on the 22 day of ~~XXXIX~~ May 19 57; and

Whereas, in order to carry out the watershed work plan for said watershed, it has become necessary to modify said Watershed Work Plan Agreement;

Now, therefore, the Sponsoring Local Organizations and the Service hereby agree upon the following modifications of the terms, conditions, and stipulations of said Watershed Work Plan Agreement:

1. The Township of Lower Alloways Creek is added as another sponsor.
2. The section headed "PROVISIONS FOR OPERATION AND MAINTENANCE" on pages 14 and 15 of the watershed work plan is revised as per attachment. This relieves the Salem Cumberland Soil Conservation District from responsibility for operation and maintenance of structural measures and its specified execution of maintenance agreements directly between the SGS and the Locust Island Meadow Company, the Thorofare Meadow Company, and the Township of Lower Alloways Creek.

The Sponsoring Local Organization and the Service further agree to the terms, conditions, and stipulations of said Watershed Work Plan Agreement, as modified herein.

Salem-Cumberland Soil Conservation District  
Local Organization

By /s/ Newton S. Layton

Title Chairman

Date Sept. 4, 1958

The signing of this agreement was authorized by a resolution of the governing body of the Salem-Cumberland Soil Conservation District  
Local Organization  
adopted at a meeting held on September 4, 1958

/s/ Frank S. Coles  
(Secretary, Local Organization)

Date September 4, 1958

Thorofare Meadow Company  
Local Organization

By /s/ Lewis W. Fogg

Title Manager

Date Sept. 3, 1958

The signing of this agreement was authorized by a resolution of the governing body of the Thorofare Meadow Company  
Local Organization  
adopted at a meeting held on September 3, 1958

/s/ Frank A. Shimp  
(Secretary, Local Organization)

Date Sept. 3, 1958

Locust Island Meadow Company  
Local Organization

By /s/ A. Harris Baker

Title Manager

Date Sept. 3, 1958

The signing of this agreement was authorized by a resolution of the governing body of the Locust Island Meadow Company  
Local Organization  
adopted at a meeting held on September 3, 1958

/s/ Glendon McPherson  
(Secretary, Local Organization)

Date September 3, 1958

Lower Alloways Creek Township  
Local Organization

By /s/ Jesse P. Finlaw

Title Mayor

Date September 5, 1958

The signing of this agreement was authorized by a resolution of the governing body of the Lower Alloways Creek Township  
Local Organization  
adopted at a meeting held on September 5, 1958

/s/ Oliver F. Ayars  
(Secretary, Local Organization)

Date September 5, 1958

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

By: /s/ Selden Lee Tinsley

Title: State Conservationist

Date: September 8, 1958