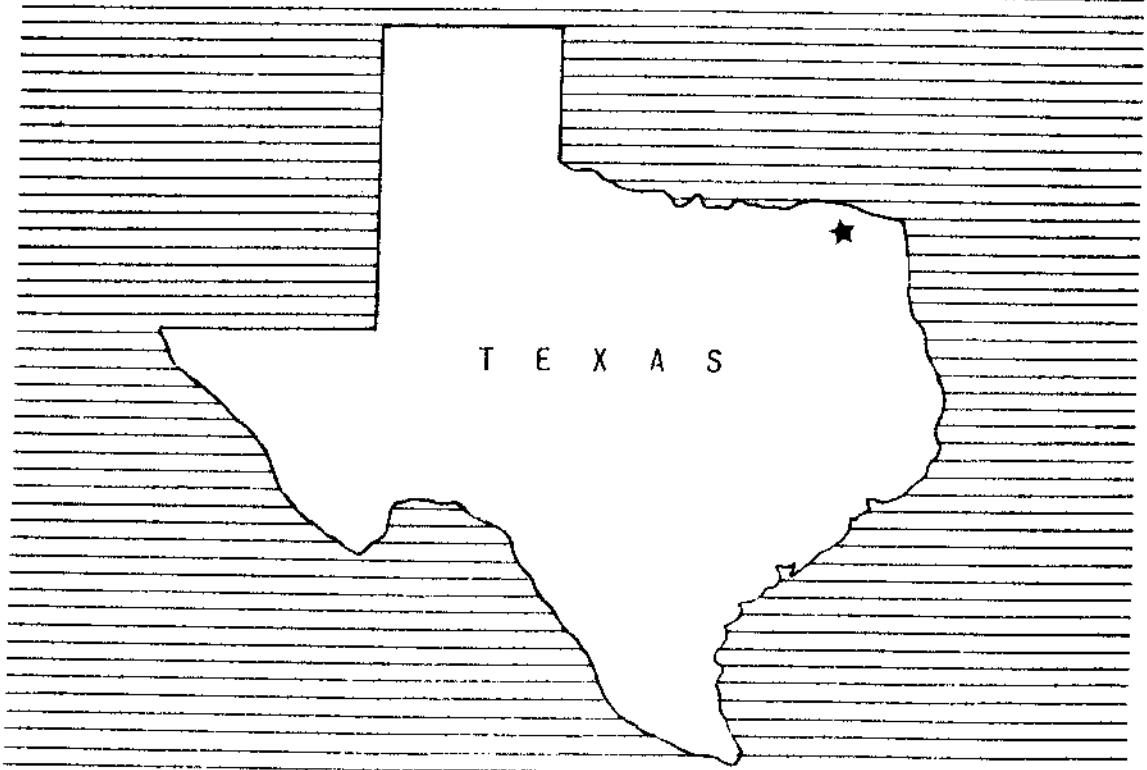
WATERSHED WORK PLAN

FOR

WATERSHED PROTECTION AND FLOOD PREVENTION

DEPORT CREEK WATERSHED

LAMAR AND RED RIVER COUNTIES, TEXAS



FEBRUARY 1975

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USDA-SCS-PORT ARTH., TEX. 1975

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ADDENDUM
DEPORT CREEK WATERSHED, TEXAS

INTRODUCTION

This addendum is based on the Water Resource Council's "Principles and Standards for Planning Water and Related Land Resources," which became effective October 30, 1973. It is prepared to be consistent with the requirements of the Water Resource Council's Procedure No. 1 for the phase-in of the Principles and Standards. The information presented is:

Part I - Benefits to Cost Comparison

An evaluation of the selected plan using current normalized prices, current construction costs, and the current interest rate.

Part II - Four Account Displays

Evaluated effects of the selected plan are displayed under separate accounts for (1) National Economic Development, (2) Environmental Quality, (3) Regional Development, and (4) Social Well-Being. The displays are consistent with the intent of the Principles and Standards.

Part III - Abbreviated Environmental Quality Plan

An environmental quality plan, consistent with the intent of the Principles and Standards, but which is abridged in detail, has been developed by an interdisciplinary team. It is an alternative plan to the selected plan and is formulated to enhance environmental quality by the management, conservation, preservation, creation, restoration, or improvement of the quality of certain natural and cultural resources and ecological systems. This plan was formulated from information and data obtained during the investigative and analysis phases of project planning. Formulation began with the inventory and recognition of the watershed problems and needs. Desired environmental effects, as translated from the problems and needs, provided a basis for examining appropriate water and land resource use and management opportunities. Opportunities that emphasized contributions to the component needs were selected and are shown as plan elements of the abbreviated environmental quality plan. The cost of $1,420,100 for its installation is a preliminary estimate.

Implementation of features of this environmental quality plan would require acceptance by the local people. Adequate legal authorities do exist for installation; however, funding for all plan elements is presently not available through existing legislative authorities.

PART I

This addendum shows the project cost, benefits, and benefit-cost ratio based on a 5-7/8 percent interest rate, current normalized prices and the 1974 price base. Annual project costs, benefits, and benefit-cost ratio are as follows:

1.	Project costs are	$12,700
2.	Project benefits are	34,170
3.	The project benefit-cost ratio is	2.7 to 1.0
4.	The project benefit-cost ratio excluding secondary benefits is	2.4 to 1.0

PART II
Selected Plan

NATIONAL ECONOMIC DEVELOPMENT ACCOUNT

Deport Creek Watershed, Texas

Components	Measures of effects 1/	Components	Measures of effects 1/
Beneficial effects:		Adverse effects:	
A. The value to users of increased outputs of goods and services		A. The value of resources required for a plan.	
1. Flood prevention	32,720	1. One floodwater retarding structure.	
		a. Project installation	10,780
		b. Project administration	1,140
		c. Operation and maintenance	250
Total beneficial effects	32,720	Total adverse effects	12,170
		Net beneficial effects	20,550

A2

1/ Average annual

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Selected Plan

REGIONAL DEVELOPMENT ACCOUNT

Deport Creek Watershed, Texas

Components	Measures of effects 1/ Region 2/	Rest of Nation
A. Income:		
Beneficial effects:		
1. The value of increased output of goods and services to users residing in the region.		
a. Flood prevention	$32,720	-
b. Redevelopment	500	-
c. Secondary	2,740	-
Total beneficial effects	$35,960	-

Components	Measures of effects 1/ Region 2/	Rest of Nation
A. Income:		
Adverse effects:		
1. The value of resources contributed from within the region to achieve the outputs.		
a. One floodwater retarding structure.		
Project installation (structural measure)	$ 3,910	$ 6,870
Project Administration	60	1,080
Operation and Maintenance	250	-
Total adverse effects	4,220	7,950
Net beneficial effects	$31,740	-$ 7,950

A3

1/ Average annual
2/ The region consists of Lamar and Red River Counties, Texas

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Selected Plan
REGIONAL DEVELOPMENT ACCOUNT (continued-2)
Deport Creek Watershed, Texas

Components	Measures of effects	
	Region 1/	Rest of Nation
B. Employment:		
Beneficial effects:		
1. Increase in the number and types of jobs.		
a. Employment for project construction.	5.5 man-years of semi-skilled employment during the installation	---
Total beneficial effects	5.5 man-years of semi-skilled employment over the installation period (3 years).	---

Components	Measures of effects	
	Region 1/	Rest of Nation
B. Employment:		
Adverse effects:		
1. Decrease in number and types of jobs.	0	0
Total adverse effects	0	0
Net beneficial effects	5-5 man-years of semi-skilled employment over the installation period (3 years).	

1/ The region consists of Lamar and Red River Counties, Texas

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Selected Plan

REGIONAL DEVELOPMENT ACCOUNT (Continued-3)

Deport Creek Watershed, Texas

Components	Measures of effects	
	Region 1/	Rest of Nation
C. Population Distribution		
Beneficial effects	Create 5.5 man-years of semi-skilled employment over the installation period (3 years).	---
Adverse effects	---	---
D. Regional Economic Base and Stability		
Beneficial effects	Create 5.5 man-years of semi-skilled employment over the installation period (3 years). Reduce flood hazard on about 500 acres of flood plain. Reduce flood hazard to owners and occupants of about 20 homes and 25 businesses in Deport.	
Adverse effects	---	---

1/ The region consists of Lamar and Red River Counties, Texas

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Selected Plan

SOCIAL WELL-BEING ACCOUNT

Deport Creek Watershed, Texas

Components	Measure of Effects
Beneficial and adverse effects:	
A. Real Income distribution	1. Create 5.5 man-years of semi-skilled employment over the installation period (3 years).
	2. Realize regional benefit distribution of $35,960 annually by income class as follows:

Income Class (dollars)	Percentage of Adjusted Gross Income in Class	Percentage Benefits in Class
Less than 3,000	9	1
3,000 - 10,000	45	13
More than 10,000	46	86

	3. Local annual costs of $4,220 will be borne by the city of Deport and financed by tax revenue. The percentage of contributions to local costs, by income classes is not readily available.
B. Life, health, and safety	1. Provide protection from the 100-year event to 20 houses and 25 businesses in Deport with population of 761 in 1970. Future threats of loss of life and displacements during floods will be eliminated.

February 1975

Selected Plan

ENVIRONMENTAL QUALITY ACCOUNT

Deport Creek Watershed, Texas

Components	Measures of effects
Beneficial and adverse effects:	
A. Areas of natural beauty.	1. Create 70 surface acres of water.
	2. Inundate 11 acres of hayland and 82 acres of pastureland.
B. Quality considerations of water and land resources.	1. Reduce average gross erosion rate from 3.8 tons to 3.2 tons per acre per year.
	2. Sediment originiating in the watershed will be reduced by an average of 2.3 acre-feet annually. Suspended sediment concentration carried by runoff water leaving the watershed will be reduced from 770 to 460 mg/l.
	3. Initially reduce the average annual volume of streamflow at the bottom of the watershed from 7,183 acre-feet to 7,081 acre-feet, or about 1.4 percent.
C. Biological resources and selected ecosystems.	1. Enhance habitat and food supply and provide improved watering areas for upland game and waterfowl.
	2. Create 70 surface acres of potential fish habitat.
	3. Provide 70 acres at the reservoir for migratory waterfowl resting areas.
D. Irreversible or irretrievable commitments.	1. Conversion of 130 acres of hayland and pastureland of dam, emergency spillway, and sediment pool.

PART III

ABBREVIATED ENVIRONMENTAL QUALITY PLAN
Deport Creek Watershed, Texas

Environmental quality largely determines the degree to which man is able to exist in harmony with his environment. This plan was developed for the Deport Creek Watershed in an effort to identify conditions which affect the quality of the watershed environment and to provide a plan of action to meet environmental quality objectives. Environmental quality objectives of the plan are the preservation or enhancement of areas of natural beauty, conservation and improvement of the soil, water, air and related resources, and the preservation and enhancement of biological resources and ecosystems of the watershed.

A study of existing conditions within the watershed indicates that damage caused by flooding and inadequate treatment of agricultural lands constitute the most significant environmental quality problems. Flooding causes monetary and property losses, disruption of normal human activity, and concern for life and property. Lack of adequate conservation land treatment has resulted in the deterioration of soil, plant, water, and related resources including ecosystems with wildlife habitat value.

This rural watershed lies in the northeastern portion of Texas and receives an average annual rainfall of 45 inches which is generally well distributed throughout the year. The area is ideally suited to agricultural operations because of abundant rainfall and a growing season of 235 days.

The upland portion of the watershed is gently rolling with nearly level topography in the bottomlands, and along Deport Creek. The area is well dissected with dry stream courses which provide adequate surface drainage.

Records show that about 95 percent of the watershed has been in row crop cultivation in the past. Early settlers cleared the land of timber as the final step in preparing the land for the plow. Today, less than 200 acres in the watershed support trees. This acreage consists of 10 widely separated areas along Deport Creek and its tributaries. Cotton and corn were the primary crops grown from the time settlers occupied the area until relatively recent times. During this period the yearly pattern of plowing, planting row crops, cultivation, harvesting, and a lack of knowledge concerning soil fertility and erosion hazards caused deterioration of the soil resource. Upland watercourses enlarged and deepened, top soil was moved from the fields and transported by runoff water from the uplands. This gradual process created adverse effects over the entire watershed. The upland soils became less productive because of soil loss and soil depletion. Deport Creek channel grew smaller because of sediment deposition. The flood plain area experienced damaging sediment deposition causing both crop and soil fertility losses. The loss of soil fertility, crop insects and diseases, and flooding all reduced crop production. These factors ultimately led to abandonment of large areas of cropland.

Inadequate soil fertility, ground cover and litter, and overgrazing with livestock have prevented the native grasses and forbs which originally occupied the area from becoming reestablished. As a result of past abuse about one half of the watershed, which was formerly cropped, is grassland. This land supports vegetation of low quality for livestock grazing and provides poor wildlife habitat. Land users have established improved grasses on about 20 percent of the watershed in recent years.

Agricultural lands within the watershed are hightly susceptible to erosion as evidenced by past damage which occurred as a result of improper cultural methods. Sound management and implementation of conservation practices to maintain and enhance soil, water, and related plant resources are needed to control erosion on uplands and limit sediment accumulation on flood plain areas. Presently, sheet erosion on uplands is the major source of sediment. Gully erosion, streambank erosion, and flood plain scour contribute very minor amounts of sediment. Cropland erosion rates (7.22 to 14.77 tons per acre, depending on crops grown) are substantially greater than on pastureland (0.72 tons per acre).

Frequent flooding of flood plain areas is a major environmental problem. Life, property, and source of livelihood are threatened in the flood prone agricultural, urban, commercial, and residential areas.

The limited capacity of Deport Creek in the city of Deport will not contain and convey runoff from high intensity rains. Weeds and undesirable woody species, such as black willow, grow in and along the channel. This type of vegetation, if not controlled will retard the movement of floodwater. A storm on April 25, 1967, occurred over a three hour period. Rainfall from this storm (3.51 inches recorded at Deport) caused a flood peak estimated to have a 14 year recurrence interval. The flood from this storm inundated 47 acres in the city of Deport, which includes much of the commercial area and property in the City.

Component needs for solving problems relating to specific environmental conditions are as follows:

1. Areas of Natural Beauty
   a. Enhance the appearance of the 61 farms in the watershed.
   b. Maintain a diversity of landscape.
   c. Improve appearance of Deport Creek within the city.
   d. Preserve existing areas of woody vegetation.

2. Quality of Water, Land, and Air Resources
   a. Improve the quality of streamflow of Deport Creek and its tributaries.
   b. Prevent future water borne pollution of Deport Creek from sewage effluent.
   c. Maintain and enhance the productivity of the land resource base.

d. Prevent destruction of houses, business, transportation systems, and sources of livelihood of human inhabitants by flooding.
e. Improve the quality of air by eliminating the lint, dust, and smoke associated with cotton gins.

3. Biological Resources and Ecosystems
   a. Provide a fishery resource.
   b. Improve the ecosystem of the native Blackland Prairie.
   c. Preserve and enhance the habitat for fish and wildlife by:
      (1) Eliminating destruction of existing habitat.
      (2) Provide a more dependable food supply for wildlife species.
      (3) Create additional cover for wildlife.
      (4) Create additional habitat for fish.

The plan elements for environmental quality consists of a system of management practices, land treatment measures, structural measures and land acquisition. Cropland treatment measures would include conservation cropping systems (use of diversified crops in rotation and the management of their residues), diversions, terraces, waterways, contour tillage and fertilizing as needed. Pastureland treatment would consist of grazing management to improve or maintain the more desirable forage plants, including rotating or systematically grazing pastures while others are rested to permit the better plants to gain vigor and grow, and grazing at intensities that would not damage the vigor of the forage plants. Fertilizer would be applied as needed; the amounts and kinds depending on the types of pasture grasses and the degree of use.

Plan additional farm ponds to provide dependable water sources for livestock and wildlife. Plantings of woody and seed bearing vegetation on selected areas of idle or eroded lands and along fence rows would provide food and cover for wildlife. Some 750 acres of cropland and 1,200 acres of pasture-land remain to be treated. Assist land users in the application and maintenance of these measures by the local soil and water conservation districts with technical assistance supplied by the Soil Conservation Service. Financial assistance on a cost-share basis, would be available through programs such as the Rural Environmental Conservation Program administered by the Agricultural Stabilization and Conservation Service. Loans for the application of needed soil and water conservation measures would be available through the Farmers Home Administration.

Installation of 0.72 miles of concrete-lined channel would reduce flood stages on a segment of Deport Creek in the urban area of Deport. The installation of a concrete-lined channel in lieu of a vegetated earth channel would reduce the area requirement for construction and allow more space for the development of a park or green-belt area. With proper planning,design, and construction a concrete-lined channel could be esthetically compatible with the surrounding area. Also, install below the urban area streambank stabilization measures consisting of necessary shaping, vegetation, and riprapping to prevent further erosion on four curve areas along Deport Creek. These elements would be implemented by county and city governments, the local soil and water conservation district, and private landowners.

Provide a city park for the inhabitants of the watershed by acquiring approximately 22 acres of land adjacent to the channel. This area would be shaped, landscaped, and developed to include an open green space atmosphere with walks, benches, a swimming pool, and a recreational building. The city government of Deport or the Bureau of Outdoor Recreation could undertake development of the city park.

Construct a secondary sewage treatment plant on an upland area. The treated effluent would be transported by an underground pipe system and discharged below Deport into Deport Creek to augment streamflow. Augmentation of streamflow within Deport Creek would enhance the fisheries habitat and provide livestock water. This element could be implemented by the city government.

Restrict development of the flood plain, within areas subject to damage by flooding, to recreation, agriculture, and wildlife areas. This element would be implemented through the county and city governments.

Air borne pollution caused by smoke, lint, and dust associated with cotton gins could be largely eliminated by making improvements to present plant facilities. This element would require implementation by the city government at the property owners expense.

The estimated installation costs of elements of the environmental quality plan are as follows:

1. Completion of the application of land treatment measures: $45,900
2. Improve 0.72 miles of channel work: $1,125,000
3. Streambank stabilization of 4 areas: $ 28,200
4. Creation of a city park: $88,000
5. Construct a secondary sewage treatment plant: $125,000
6. Install gin equipment to reduce air borne pollution: $8,000
7. Flood plain management program for Deport Creek: No installation costs.

The total installation cost of the environmental quality plan is estimated to be $1,420,100.

The environmental effects that would result from installation of the environmental plan are as follows:

1. Areas of Natural Beauty
   a. Enhance the appearance of the 61 farms and ranches in the watershed through the application and maintenance of land treatment measures.
   b. Maintain the diversity of the landscape through the preservation and enhancement of the land resource base which sustains this diversity.

c. Improve or enhance the scenic quality on about 1.5 miles of intermittant stream of Deport Creek by treatment of 1,200 feet of active streambank erosion.
d. Improve the scenic quality of gullied areas by shaping and revegetation.
e. Enhance the scenic quality of Deport by creating a 22 acre city park with quality landscaping features.

2. Quality of Water, Land, and Air Resources
   a. Reduce the sediment load transported by Deport Creek and its tributaries through reduction of sheet erosion, gully erosion, and streambank erosion.
   b. Prevent the deterioration of the land resource base by providing protection from erosion by installing needed vegetative and mechanical treatment measures.
   c. Maintain and enhance the productivity of the land resource base by applying agronomic and vegetative management practices.
   d. Reduce flooding on 55 acres of urban land in Deport.
   e. Reduce smoke and associated pollution of air within Deport.
   f. Prevent destruction of lives, urban properties, and sources of livelihood for about 45 owners of property in the flood plain of Deport Creek.
   g. Improve the quality of water in Deport Creek by more effective effluent treatment facilities.
   h. Encourage preservation of open space on the flood plain through zoning, restrictions, or management programs. Also reduce the possibility of increased damages due to future developments on the flood plain.
   i. Reduce the sediment load carried into the Sulphur River and Wright Patman Reservoir.

3. Biological Resources and Selected Ecological Systems
   a. Develop a fishery resource by stocking and managing 50 existing farm ponds which provide suitable habitat for game fish.
   b. Enhance the fishery habitat in farm ponds by reducing sediment content of runoff.
   c. Improve the grassland ecosystem by reseeding idle cropland to adapted native grasses.
   d. Preserve and enhance wildlife habitat by maintaining the existing 200 acres of timber and assisting land users in the establishment of 25 miles of fence rows for wildlife cover and food.
   e. Improve habitat for some wildlife species by improving plant composition on pastureland.
   f. Enhance habitat for various song birds by changing 22 acres of urban land to an open space recreational area.

g. Enhance the fishery habitat in the few deep holes in Deport Creek below U. S. Highway 271 by improving the quality of effluent waste water discharged into Deport Creek.

4. Irreversible or Irretrievable Commitments
   a. Require the loss of 22 acres of urban properties and 8 acres of pastureland.

WATERSHED WORK PLAN AGREEMENT

Between the

Lamar Soil and Water Conservation District
Local Organization

Red River County Soil and Water Conservation District
Local Organization

City of Deport
Local Organization

(hereinafter referred to as the Sponsoring Local Organization)

State of Texas

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 Deport Creek Watershed, State of Texas, under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress, 68 Stat. 666), as amended; 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 Deport Creek Watershed, State of Texas, 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 can be installed in about three years.

It is mutually agreed that in installing and operating and maintaining the works of improvement substantially in accordance with the terms, conditions, and stipulations provided for in the watershed work plan:

1. The Sponsoring Local Organization will acquire, with other than Public Law 566 funds, such land rights as will be needed in connection with the works of improvement (Estimated cost $69,350).

2. The Sponsoring Local Organization will provide relocation assistance advisory services, make the relocation payments to displaced persons, and otherwise comply with the real property acquisition policies contained in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646, 84 Stat. 1894) effective as of January 2, 1971, and the Regulations issued by the Secretary of Agriculture pursuant thereto. The cost of relocation payments will be shared by the Sponsoring Local Organization and the Service as follows:

	Sponsoring Local Organization (percent)	Service (percent)	Estimated Relocation Payments Costs (dollars)
Relocation Payments	45.2	54.8	0 1/

1/ Investigations have disclosed that under present conditions the project measures will not result in the displacement of any person, business, or farm operation. However, if relocations become necessary, relocation payments will be cost-shared in accordance with the percentages shown.

3. 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.

4. The percentages of construction costs of structural measures to be paid by the Sponsoring Local Organization and by the Service are as follows:

Works of Improvement	Sponsoring Local Organization (percent)	Service (percent)	Estimated Construction Cost (dollars)
One Floodwater Retarding Structure	0	100	114,710

5. The percentages of the engineering costs to be borne by the Sponsoring Local Organization and the Service are as follows:

Works of Improvement	Sponsoring Local Organization (percent)	Service (percent)	Estimated Engineering Costs (dollars)
One Floodwater Retarding Structure	0	100	6,880

6. The Sponsoring Local Organization and the Service will each bear the costs of Project Administration which it incurs, estimated to be $1,000 and $19,210 respectively.

7. The Sponsoring Local Organization will obtain agreements from owners of not less than 50 percent of the land above the reservoir and floodwater retarding structure that they will carry out conservation farm or ranch plans on their land.

8. 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.

9. 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.

10. 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.

11. The costa shown in this agreement represent preliminary estimates. In finally determining the costs to be borne by the parties hereto, the actual coats incurred in the installation of works of improvement will be used.

12. This agreement is not a fund obligating document. 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.

A separate agreement will be entered into between the Service and the Sponsoring Local Organization before either party initiates work involving funds of the other party. Such agreement will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.

13. 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 except for cause. The Service may terminate financial and other assistance in whole, or in part, at any time whenever it is determined that the Sponsoring Local Organization has failed to comply with the conditions of this agreement. The Service shall promptly notify the Sponsoring Local Organization in writing of the determination and the reasons for the termination, together with the effective date. Payments made to the Sponsoring Local Organization or recoveries by the Service under projects terminated for cause shall be in accord with the legal rights and liabilities of the parties.

14. 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.

15. The program conducted will be in compliance with all requirements respecting nondiscrimination as contained in the Civil Rights Act of 1964 and the regulations of the Secretary of Agriculture (7 C.F.R. 15.1-15.12), which provide that no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any activity receiving Federal financial assistance.

16. This agreement will not become effective until the Service has issued a notification of approval and authorizes assistance.

Lamar Soil and Water Conservation District
Local Organization

By Alfred C. Mackin, Jr.
Alfred C. Mackin, Jr.
Title Chairman

136 Grand, Paris, Texas 75460
Address Zip Code

Date June 24, 1975

The signing of this agreement was authorized by a resolution of the governing body of the Lamar Soil and Water Conservation District
Local Organization

adopted at a meeting held on June 24, 1975

Tom Watson
Tom Watson
Secretary, Local Organization

136 Grand, Paris, Texas 75460
Address Zip Code

Date June 24, 1975

Red River County
Soil and Water Conservation District
Local Organization

By Robert F. Smith
Robert F. Smith
Title Chairman

Route 4, Clarksville, Texas 75426
Address Zip Code

Date June 25, 1975

The signing of this agreement was authorized by a resolution of the governing body of the Red River County Soil and Water Conservation District
Local Organization

adopted at a meeting held on June 25, 1975

Secretary, Local Organization
Jack Franklin
Date June 25, 1975

Box 95, Bogata, Texas 75417
Address Zip Code

City of Deport
Local Organization

By Charles Foster
Charles Foster
Title Mayor

Box 354-A, Deport, Texas 75435
Address Zip Code

Date June 26, 1975

The signing of this agreement was authorized by a resolution of the governing body of the City of Deport
Local Organization
adopted at a meeting held on June 26, 1975

Walter A. Gifford
Secretary, Local Organization
Walter A. Gifford

Box 354-A, Deport, Texas 75435
Address Zip Code

Date June 26, 1975

Appropriate and careful consideration has been given to the environmental statement prepared for this project and to the environmental aspects thereof.

Soil Conservation Service
United States Department of Agriculture

Approved by:

Edward E. Thomas
State Conservationist

JUL - 3 1975
Date

WATERSHED WORK PLAN

FOR

WATERSHED PROTECTION AND FLOOD PREVENTION

DEPORT CREEK WATERSHED

Lamar and Red River Counties, Texas

Prepared Under the Authority of the Watershed Protection and Flood Prevention Act, (Public Law 566, 83rd Congress, 68 Stat. 666), as amended.

Prepared by:

Lamar Soil and Water Conservation District
(Sponsor)

Red River County Soil and Water Conservation District
(Sponsor)

City of Deport
(Sponsor)

With Assistance by:

U.S. Department of Agriculture
Soil Conservation Service

February 1975

USDA-SCS-FORT WORTH, TEX. 1975

WATERSHED WORK PLAN

DEPORT CREEK WATERSHED

February 1975

SUMMARY OF PLAN

This work plan for watershed protection and flood prevention for Deport Creek Watershed has been prepared by the Lamar Soil and Water Conservation District, the Red River County Soil and Water Conservation District, and the city of Deport as sponsoring local organizations. Technical assistance has been provided by the Soil Conservation Service, United States Department of Agriculture. The Fish and Wildlife Service, United States Department of Interior, in cooperation with the Texas Parks and Wildlife Department, made a reconnaissance study of the fish and wildlife resources of the watershed. The Department of Anthropology, Archeology Research Program, Southern Methodist University, conducted field investigations in an effort to locate archeological resources.

Financial assistance in developing the work plan was provided by the Texas State Soil and Water Conservation Board.

Deport Creek watershed comprises an area of 9.62 square miles in portions of Lamar and Red River Counties. It is estimated that 21.1 percent of the watershed is cropland, 75.0 percent is pastureland and hayland, and 3.9 percent is in miscellaneous uses such as the city of Deport, public roads, farmsteads, and stream channels.

The principal problem within the watershed is one of extensive and frequent flooding on portions of the 500 acres of flood plain which results in damage to crops, grasses, soils, agricultural properties, public roads, bridges, homes, and businesses. Total floodwater, sediment, and indirect damages are estimated to average $34,680 annually.

Project objectives are the proper use, treatment, and management of soil and water resources in the watershed, the protection of flood plain lands and property, and the stimulation of economic development of the area as a result of project installation. The project as formulated meets these objectives.

Landowners and operators will establish and maintain needed land treatment measures on 750 acres of cropland and 1,200 acres of pastureland during the three-year installation period. Secondary treatment for wildlife habitat management will also be applied. The installation cost of these land treatment measures is estimated to be $45,900, which will be from funds other than Public Law 566.

The structural measure in this plan is one floodwater retarding structure to be installed within the three-year installation period. The total estimated cost of this measure is $211,150, of which the local share is

$70,350 and the Public Law 566 share is $140,800. The local share of the cost consists of land rights and project administration.

By resolution of the city council of the city of Deport, the floodwater retarding structure at Site No. 1 is to be named the Tom Jeffus Water Retention Structure.

Installation of the project will contribute to the conservation, orderly development, and productive use of the watershed's soil, water, and related resources.

Watershed lands will be protected from erosion, sediment yielded to flood plain areas will be reduced, and downstream sediment accumulation will be curtailed. The project will provide protection to 500 acres of flood plain within the watershed and will benefit directly 15 owners and operators of agricultural land in the flood plain, the owners and occupants of 20 residential units, and the owners and operators of 25 business units in the flood plain.

Additional opportunities for employment will be created effecting a greater potential for increased income to households and demand for services.

Installation of the floodwater retarding structure will require 412 acres of agricultural land. A total of 107 acres of this area will be needed for dam, emergency spillway, and sediment pool up to the lowest ungated outlet. The existing vegetation on this 107 acres will be destroyed during construction. Approximately 116 acres of wildlife habitat will be altered. Dove nesting habitat and habitat for cottontails, squirrels, fur animals, bobwhites, and songbirds will be destroyed with the installation of the floodwater retarding structure. The 70 acres of water impoundment created in the sediment pool can be used as a source for livestock and wildlife water and waterfowl feeding and resting area.

Average annual damages will be reduced from $34,680 to $190 by the proposed project. Average annual benefits accruing to the structural measure in the watershed will be $35,960 which includes $32,720 damage reduction benefits, $500 redevelopment benefits, and $2,740 secondary benefits. The ratio of total average annual benefits accruing to the structural measure ($35,960) to the average annual cost of this measure ($12,170) is 3.0:1.0.

Land treatment measures will be installed and maintained by owners and operators of the land upon which the measures will be applied under agreements with the Lamar and the Red River County Soil and Water Conservation Districts.

The city of Deport will be responsible for the operation and maintenance of the floodwater retarding structure. Cost of operation and maintenance of the structural measure is estimated to be $250 annually.

WATERSHED RESOURCES - ENVIRONMENTAL SETTING

Physical Data

Deport Creek Watershed is within the Arkansas-White-Red River Basin Region. The watershed area of 6,160 acres or about 9.62 square miles is located in northeast Texas approximately 100 miles northeast of Dallas, Texas. Deport Creek rises about five miles north of the city of Deport in Lamar County, flows in a southerly direction through Deport, thence in a southeasterly direction for about two miles and joins Mustang Creek in Red River County. Willis Branch and several other small unnamed tributaries drain into Deport Creek (figure 4, Project Map). Mustang Creek enters the Sulphur River in southern Red River County about 3.2 miles upstream from the Sulphur River gauge near Talco, Texas. The Sulphur River flows through Wright Patman Reservoir about 45 miles downstream from the confluence with Mustang Creek. The Sulphur River joins the Red River, a tributary of the Mississippi River, in extreme southwestern Arkansas.

Stream channels in the watershed are well defined and in their natural state above Deport. In 1950, the city of Deport and the Corps of Engineers completed channel work beginning within the City and extending downstream about two miles. This channel work was done to remove sediment accumulations within the stream channel. Significant straightening or realignment of the channel was not planned. Streamflow of Deport Creek and its tributaries is intermittent. There are a few deep holes in Deport Creek below U.S. Highway 271 that hold sewage effluent discharged from the City's sewage treatment facilities. The sewage effluent is presently a source of pollution to Deport Creek. The Texas Water Quality Board has notified the city of Deport the sewage treatment facilities being used and the effluent discharged into the creek do not meet the standards established by the Board.

Approximately 500 acres within the watershed, excluding stream channels, are in the flood plain area subject to inundation by a 100-year frequency flood. Flooding occurs frequently in this area, damaging agricultural and nonagricultural properties. The principal problems in the watershed are floodwater and attendant damages that occur on 445 acres of agricultural flood plain and 55 acres of urban flood plain within the city of Deport.

Geologic strata, listed in ascending order, that crop out in the watershed are the Ozan Formation, Wolfe City Formation, Pecan Gap Chalk, and the Marlbrook Marl. These are all sedimentary beds in the Taylor Group of the Upper Cretaceous System. Quarternary and Recent deposits of clay and silt are in the flood plain. The Ozan Formation crops out in the northern one-half of the watershed and is comprised predominantly of calcareous marine clay. The extreme eastern sandy marl outcrop of the Wolfe City Formation is in the west-central area of the watershed. The Pecan Gap Chalk and Marlbrook Marl are found in the southern portion of the watershed. The regional dip of the Cretaceous beds is to the south and the strike is east-west. There is no faulting or folding in the watershed vicinity.

The topography in the watershed ranges from nearly level in the flood plain to moderately sloping on the uplands. Elevations range from approximately 515 feet above mean sea level along the northern watershed divide to 395 feet at the mouth of the watershed.

The climate is warm and sub-humid. Mean monthly temperatures range from 83 degrees Fahrenheit in August to 43 degrees in January. The normal growing season is 235 days, extending from March 25 to November 14. The average annual precipitation is about 45 inches. Rainfall is generally well distributed throughout the year. However, the greatest amounts usually occur during April and May.

The entire watershed lies within the Texas Blackland Prairie Land Resource Area. The dominant upland soil series are Houston Black, Heiden, Burleson, Wilson, and Austin. With the exception of the Austin Series, these clay and clay loam soils are fine textured, deep, and very slowly to slowly permeable. The Austin Series is fine textured, deep, and moderately permeable. Bottomland soils are in the Gowen and Trinity Series which are fine textured and slowly to moderately permeable.

Land use within the watershed is shown in the following tabulation:

Land Use	Acres	Percent
Cropland	1,300	21.1
Pastureland and Hayland	4,620	75.0
Miscellaneous *	240	3.9
Total	6,160	100.0

* Includes roads and highways, city of Deport, farmsteads, etc.

Much of the present pastureland was in cultivation in the past. This land has been retired from cultivation and natural succession has occurred. Existing vegetation is characterized by broomsedge bluestem (Andropogon virginicus), silver bluestem (Andropogon saccharoides), annual weeds, and annual grasses.

Hydrologic cover conditions on grassland are less than one percent poor, over 33 percent fair, and 66 percent good. Some grasses commonly found in the watershed are big bluestem (Andropogon gerardi), little bluestem (Andropogon scoparius), indiangrass (Sorghastrum nutans), sideoats grama (Boutoloua curtipendula), hairy grama (Boutoloua hirsuta), threeawns (Aristida spp.), johnsongrass (Sorghum halepense), and bermudagrass (Cynodon dactylon). Elm (Ulmus spp.), pecan (Carya illinoensis), hackberry (Celtis laevigata), osage-orange (Maclura pomifera), willow (Salix nigra), persimmon (Diospyros virginiana), and wild plum (Prunus spp.) are some common woody species found in the watershed.

Water for livestock and domestic uses in the area is from small surface impoundments and wells. Municipal water for the city of Deport is obtained from surface impoundments. The quality and quantity is considered to be adequate for present and anticipated future conditions.

There are no known mineral resources of economic significance within the watershed. However, according to the Bureau of Mines, USDI, there are sand, gravel, stone and possibly clay of significance in the vicinity of the watershed. The Bureau also indicated that Red River County yielded petroleum valued at about $67,000 in 1972. There are no records for the same period on file with the Bureau relative to petroleum production in Lamar County.

Economic Data

The agricultural economy of the watershed is dependent on the production and sale of cash crops and livestock. The sale of livestock accounts for 70 percent of the on-farm income within the watershed. The remaining 30 percent is derived from the sale of cotton, grain sorghum, and hay crops.

Flood plain yields of hayland are about four tons per acre and pastureland yields about three animal unit months of grazing.

During recent years, the trend in both upland and flood plain has been toward increased livestock production. This has resulted in the shifting of cropland from cash crops to hay crops and improved pastureland.

Some unimproved and brushy pastureland has been established to improved grasses and hay crops.

There are 61 farm units, wholly or partially within the watershed. These units average about 98 acres in size with about 25 percent being smaller than 50 acres. There has been a gradual increase in size and a decrease in the number of farms. About 20 percent of the agricultural land is owner-operated.

The estimated current market price of land ranges from $200 to $400 per acre. The range in land prices depends primarily on location, accessibility, and productive capability.

Approximately 20 percent of the farms in the watershed gross less than $2,500 annually from agricultural sales. Approximately 20 percent of the farm operators worked off the farm for 100 days or more in 1973.

It is estimated that less than 10 percent of the agricultural land in the benefited area is devoted to farms using 1-1/2 man-years or more of hired labor.

"Labor work Force Estimates for Texas Counties April 1974", the latest statistics available from the Texas Employment Commission, shows a labor force of 22,030 for Lamar and Red River Counties. Approximately 4.4 percent, or 970 workers, are unemployed. This is below the state and national rate of unemployment. Approximately 34.3 percent, 7,560 workers, are employed in the agricultural sector. The nonagricultural sector employs workers; 4,950 workers in the manufacturing sector and $8,550 in the nonmanufacturing sector.

The city of Deport, located near the center of the watershed, has a population of 761 (1970 census). It is the center of economic activity for the surrounding farm area, providing goods and services which are important in the local community. Additional services and marketing facilities are provided in Paris, Texas, located approximately 17 miles northwest of Deport. The city of Paris also provides employment opportunities for residents of the watershed area.

Approximately 19 miles of federal, state, and county roads, all of which are hard surfaced, serve the watershed residents.

Fish and Wildlife Resources

The Fish and Wildlife Service, in cooperation with the Texas Parks and Wildlife Department, describe the fish and wildlife resources as follows:

> "There are no fish in the watershed. No suitable permanent habitat exists in Deport Creek or surrounding farm ponds.
>
> The blackland prairie traditionally does not support dense game populations. Species present in the watershed include bobwhite, mourning dove, cottontail, fox squirrel, raccoon, opossum, skunk, gray fox, coyote, armadillo, and various songbirds. No big-game animals or rare or endangered species are present. Bobwhites are generally in low abundance. Mourning doves are common with the area providing good nesting and roosting cover and feed. Cottontails are numerous in brushy areas along the creek. Other species occur in low numbers. Hunting pressure in general is light, being done with landowner permission only. Bobwhites and doves are hunted lightly, while hunting for other game is inconsequential. Hunting activity or demand for hunting would not be expected to change in the future. Little trapping is done in the area."

Recreational Resources

Deport Creek has no dependable water source for water-based recreational use, however, there are several large reservoirs with existing developments for water-based recreation within a 100-mile radius of Deport Creek Watershed. Some of these reservoirs and impoundments are Lavon Reservoir, Lake Tawakoni, Franklin County Lake, Lake Texoma, Lake O' the Pines, and Wright Patman Reservoir. Some water-based recreation is also available about 30 miles north of the watershed along the Red River.

There was no local interest in developing additional resources for recreation .

Archeological and Historical Values

There are no historic sites listed or in the process of nomination to the National Register of Historic Places. There are no known archeological resources of significance within the watershed.

Soil, Water, and Plant Management Status

The current trend in the watershed and surrounding area is to convert marginal upland and areas subject to frequent flooding from cropland to pastureland. This trend had its origin in the late 1940's and early 1950's. About 75 percent of the watershed is presently hayland or pastureland and 21 percent is cropland. The remaining four percent of the watershed in miscellaneous uses is not expected to change significantly.

Of the 61 farm and ranch units wholly or partially within the watershed, 41 of these units are under agreement with the Lamar and Red River County Soil and Water Conservation Districts. Soil Conservation Service field offices at Paris and Clarksville are assisting the districts in preparing and applying soil and water conservation plans. There have been 41 conservation plans developed covering 4,040 acres or approximately 66 percent of the watershed. Soil and water conservation plans are developed by landowners or operators in cooperation with the appropriate soil and water conservation district with technical assistance provided by the Soil Conservation Service. These plans set a course of action for the use, maintenance, and improvement of the soil, water, and related resources of an entire individual land unit. Included in these plans are appropriate soil, plant, and water inventories with needed interpretations, maps, statements concerning critical conservation problems, a record of decisions for the conservation and development of soil and water resources as made, and alternatives for sound land uses and conservation treatment.

Presently about 21 percent of the agricultural land in the watershed is considered to be adequately treated. Land is adequately treated when it is used within its capabilities and all planned treatment essential to its protection and improvement have been applied. Approximately 75 percent of the agricultural land is adequately protected from erosion. There are no serious erosion problems due to improper use of land in the watershed. Needed land treatment measures have been applied to date by landowners and operators at an estimated expenditure of $43,830 (table 1A).

Gradient terraces have been installed on most of the cropland where terracing is needed. This type of terracing has proven to be very effective in controlling erosion and conserving water, but does not allow the most efficient use of large modern farm equipment for producing cotton and grain sorghums which are major crops in the area.

WATER AND RELATED LAND RESOURCE PROBLEMS

Land Management

Although 75 percent of the watershed is adequately protected from erosion, there is a need to increase fertility and further reduce erosion on cropland, and increase the density of vegetative cover on pastureland. The application of conservation cropping systems and crop residue use are needed on about 1,200 acres. There is also a need for contour farming and the installation of parallel terraces to permit more efficient use of modern farm machinery. Grassed waterways and outlets are needed to contain and convey rainfall runoff without excessive erosion.

Pastureland and hayland management is needed on 3,470 acres and pastureland and hayland planting on about 500 acres. Control of invading woody vegetation is yet to be accomplished on 220 acres. Critical area planting is needed on about eight acres to control and reduce erosion. The construction of additional farm ponds to provide watering points for livestock and wildlife will reduce livestock concentrations near existing ponds and watering facilities.

The application and maintenance of land treatment measures is a continuing process of educating and assisting new landowners, as well as the older landowners, to develop an awareness of the needs of the land. The application of needed measures has been slow in relation to the change in land use from cropland to pastureland.

Floodwater Damage

An estimated 500 acres of the watershed, excluding stream channels, are flood plain. This is the area that would be inundated by a 100-year frequency flood. The present flood plain land uses are as follows: Pastureland and hayland, 88.2 percent; and miscellaneous uses including the city of Deport, farmsteads, and public roads, 11.8 percent.

Flooding occurs frequently in portions of the watershed causing damages to agricultural and nonagricultural properties. Major floods, inundating more than half the flood plain, occur on the average of once every two years. Minor floods, inundating less than half the flood plain, occur on the average of at least once a year. Cumulative totals of recurrent flooding show an average of 258 acres flooded annually during the evaluation period. Damage to flood plain lands from swamping caused by deposition of sediment has resulted in reduction of yields.

There are 15 owners and operators who have experienced floodwater damage on agricultural land in the flood plain. In the urban portion of the flood plain, floodwater damages have occurred on properties involving 20 residential units and 25 commercial units.

The flood plain of Deport Creek within Deport is subject to frequent flooding. Properties in the flood plain reflect a high percentage of commercial development. These commercial properties are subject to more frequent damage than most of the residential units within the flood plain. For the past 10 to 20 years, developments within the flood hazard areas have been considerably less than in other areas of Deport. Because of the flood threat, owners are reluctant to maintain or upgrade their homes and businesses because of fear of greater flood losses.

The most damaging flood in recent years occurred on April 25, 1967. The total storm rainfall recorded at Deport was 3.51 inches and occurred over a three hour period. The recurrence interval of the resulting flood peak was estimated to be about 14 years. The resulting flood inundated approximately 385 acres of flood plain in the watershed, of which 47 acres are located inside the urban area of Deport. Under the present level of develop-

Flooding in Deport following a 7.5-inch rain on December 10, 1971. Peak flow about three feet higher occurred six hours earlier. Location-Main Street looking north.

Flooding of business property on Main Street, Deport, by floodwaters of December 10, 1971, storm.

ment, direct monetary floodwater damage from such a flood is estimated to be $23,300, of which $21,490 would be to urban properties.

Other recent large floods that caused considerable floodwater damages occurred in 1971, 1966, and 1960.

Direct floodwater damages to existing urban properties that would result from a 100-year frequency flood event are estimated at $88,270.

For the floods evaluated, which includes floods up to the 100-year frequency, total direct floodwater damage is estimated to average $29,010 annually (table 5). Of this amount, $830 is crop and pasture damage, $170 is other agricultural damage, $50 is road and bridge damage, and $27,690 is damage to urban and other nonagricultural development. Of the damage to urban properties, $24,710 is to commercial property, $1,470 is to residential property, and $1,510 is to city streets and bridges.

Erosion Damage

The estimated average annual gross erosion rate for the entire watershed is 3.80 tons per acre. Sheet erosion accounts for 98 percent of this rate and streambank and gully erosion the remaining two percent. Estimated annual soil losses on cropland range from 7.22 tons per acre on land used for small grain production to 14.77 tons per acre on areas producing row crops such as cotton and grain sorghum. The average annual soil loss on pastureland and hayland is 0.72 tons per acre.

Upland soils in the watershed can tolerate average annual soil losses (average annual erosion rate) of two to five tons per acre. This soil loss tolerance or permissible soil loss is the maximum rate of soil erosion that will permit a high level of crop productivity to be sustained economically and indefinitely. A soil loss tolerance value is assigned to each soil series using the numbers one through five, which represent the permissible tons of soil erosion per acre per year where food, feed, and fiber plants are to be grown. These values are not applicable to construction sites or to other non-farm areas.

The Houston Black, Heiden, Burleson, and Wilson soil series can endure average annual erosion rates of four to five tons. The Austin series of which there are about 15 acres in the watershed, can tolerate an average annual erosion rate of two tons per acre. All of the area comprized of the Austin series is used as pastureland.

Approximately 90 percent of the 3,648 acres draining into the planned floodwater retarding structure is used as hayland and pastureland. The estimated average annual erosion rate for the area is only 1.88 tons per acre. Land use in the area has changed from predominantly cropland in prior years to the present usage resulting in a considerable decrease in erosion rates. The average annual erosion rate on the 2,512 acres below the planned floodwater retarding structure (6.59 tons per acre) is greater than the rates on the area above the structure. This reflects the greater percentage of cropland relative to pastureland and hayland.

Active gully erosion in the watershed is very minor and limited to small isolated areas. With intensified application of land treatment under the going program, erosion on these areas will be effectively reduced.

Erosion is very low on agricultural lands in the flood plain. The productive capacity on 20 acres is annually being reduced approximately five percent with recovery rates about the same as the recurring damsge. Due to the nature of the damage, rapid recovery rates, land use, and soils in the area, the monetary value of this damage was not evaluated.

Streambank erosion is significant only on sharp bends and meanders in the lower reaches of Deport Creek and on small areas of tributary banks where protective vegetative cover is sparse.

Sediment Damage

Sediment damage to agricultural lands in the flood plain has been extensive in the past and aggradation in Deport Creek has occurred to the extent that it has been necessary to mechanically remove sediment accumulations from the channel. These sediment deposits also caused swamping conditions below U.S. Highway 271 (figure 4).

Presently sediment accumulation and resulting damages are very minor. Land use changes above U.S. Highway 271 from cropland to grassland have had a pronounced influence in reducing erosion and subsequent sediment damages. In addition to a low rate of sediment accumulation, the deposition that is occurring is dominantly clay and silt practically identical to the flood plain soils. The limited area affected and slight loss of productive capacity resulting from this deposition has not been evaluated.

Swamping on 17 acres is presently the most significant damage resulting from deposition of sediment. This swamping is found on areas that have not recovered from damages sustained during prior years when sediment deposition was occurring at a much higher rate. The areas and estimated annual loss in productive capacity are: five acres 40 percent, five acres 50 percent, five acres 70 percent, and two acres 80 percent. The average annual monetary value of this damage is $270.

The estimated average annual gross erosion rate for the entire watershed is 1.49 acre-feet per square mile, resulting in an average annual sediment yield of 5.74 acre-feet at valley section No. D-1 (figure 4). This amounts to an average sediment concentration in 37 centimeters (14.5 inches) of annual runoff of 770 milligrams per liter.

Indirect Damages

Indirect damages such as interruption or delay of travel, rerouting of school buses and mail routes, disruption of farm operations, business losses in the area, and similar losses are estimated to average $5,670 annually.

Municipal and Industrial Problems

The city of Deport obtains its municipal and industrial water supply from

the city of Paris through the Lamar County water system. Paris obtains its water from Pat Mayse Lake. This source is adequate in quality and quantity to meet anticipated future needs. No demographic studies have been made for the expected future population of Deport. However, based on past trends for the period from 1960 to 1970, it is reasonable to expect that the 1990 population would be approximately 1,100.

Economic and Social Problems

Additional employment opportunities are needed for the 970 unemployed workers in Lamar and Red River Counties. The population of Deport increased from 639 persons in 1960 to 761 persons in 1970, an increase of 19.1 percent. Further increases in population could be anticipated with a concentrated effort in community development and additional employment opportunities.

PROJECTS OF OTHER AGENCIES

There are no existing or proposed water resource development projects of any other agency within the watershed.

In 1950, the city of Deport, in concert with the Corps of Engineers, developed a plan for and completed channel work beginning in Deport and continuing downstream on Deport Creek for about two miles.

The "Comprehensive Basin Study, Red River Below Denison Dam", was completed in 1968 by representatives of the U.S. Departments of Agriculture; Army; Commerce; Health, Education, and Welfare; Interior; the Federal Power Commission; and the states of Arkansas, Louisiana, Oklahoma, and Texas. The objectives of the study were to identify physical and economic problems of the Red River Basin below the Denison Dam area in regard to water and related land resources, to define short and long-term needs for development of these resources, and to develop and recommend projects and programs, federal and nonfederal, for their solution. In addition to describing a flexible plan to guide water and related land resource development for the future, the studies defined and evaluated projects and programs in detail sufficient for authorization or implementation of federal projects having urgent and interrelated needs.

Subsequently, in May 1971, the draft of the, "USDA Implementation Plan Report for the Red River Basin Below Denison Dam", was completed. This draft report requested authorization, through proper federal channels, for 18 watershed projects that are listed in the Comprehensive Basin Study, Red River Below Denison Dam report of 1968. Among the 18 watershed projects on which authorization was requested, is the Sulphur River Watershed. The drainage area of Deport Creek is within the Sulphur River Watershed. Action as outlined in the Implementation Plan Report for the Red River Basin Below Denison Dam has been suspended as of June 1974.

A tentative plan for Deport Creek Watershed was included in the 1968 report. In addition to watershed protection and flood prevention, the tentative plan included storage in the single floodwater retarding structure for recreational and municipal water.

The works of improvement (without recreation and municipal water storage) included in this work plan will have no known detrimental effects on any existing or proposed downstream works of improvement and will constitute a harmonious element in full development of the Sulphur River Basin.

PROJECT FORMULATION

Prior to the initiation of planning and during the planning phase, informational meetings were held. These meetings were attended by representatives of the city of Deport, the Lamar and the Red River County Soil and Water Conservation Districts, the Deport Chamber of Commerce and other interested individuals. It was recognized at these meetings that favorable public opinion toward a watershed project was needed before submitting an application for planning assistance to the Texas State Soil and Water Conservation Board. It was also emphasized at these meetings that under the auspices of Public Law 566, a watershed project would be a local endeavor with federal assistance. With the ensuing endorsement by those present to take positive action, the City Council of Deport agreed to serve as a steering committee to draft an application for planning assistance and to coordinate and carry out local responsibilities during planning.

Subsequent meetings were held by the sponsoring local organizations to inform the general public and involved landowners and to gain opinions and information from interested individuals. A tour and hearing were conducted to observe the status of land treatment, damages from past floods, and potential benefited areas from a flood prevention program. Landowners and operators were shown how their properties were involved in the potential floodwater retarding structure with the use of maps and on-site observations.

Newspapers serving the watershed area published articles announcing public meetings and reported information and conclusions resulting from the meetings. In addition, the individuals whose land was directly involved with potential floodwater retarding structures were notified and invited on an individual basis to attend meetings.

Representatives of the Fish and Wildlife Service, U. S. Department of the Interior, and the Texas Parks and Wildlife Department made joint studies with biologists from the Soil Conservation Service. They described the fish and wildlife resources in the project, the effects of the project, and recommendations for maintaining and enhancing the fish and wildlife resources of the watershed.

The Department of Anthropology, Archeology Research Program, Southern Methodist University, conducted field investigations in the area needed for the construction and functioning of the floodwater retarding structure to determine if any archeological resources would be affected by the structure.

Meetings with the sponsoring local organizations and the steering committee were held during the planning process to coordinate, evaluate, exchange information, and reach agreements on a system of measures that

would serve the needs of the people and the watershed resources. Newspapers serving the watershed area have published articles announcing public meetings and have reported information and follow-up articles which have generated public awareness.

Objectives

An initial study was made by representatives of the Soil Conservation Service and sponsoring local organizations to determine watershed problems and possible solutions. After determining the location and extent of the problems and discussing potential solutions, project objectives were formulated. Watershed protection and flood prevention were the primary objectives expressed by the sponsors.

In addition to expressing the desire for establishment of a complete program for soil and water conservation on the watershed, the following specific objectives were agreed to:

1. Establish land treatment measures which contribute directly to watershed protection and flood prevention. Included is the application by the end of the three-year project installation period of measures that will adequately protect, soil, water, and plant resources on at least 85 percent of the agricultural land in the watershed. These resources are considered to be adequately protected when their deterioration, either naturally or caused by man, is effectively curtailed.

2. Attain as large a reduction in average annual flood damages to agricultural properties above and below the city of Deport as feasible considering the effects upon the environment, wildlife, existing improvements such as highways and commercial businesses, and topographic conditions.

3. Attain at least a 90 percent reduction in average annual flood damages to the urban properties in Deport with consideration given to the 100-year frequency storm.

Environmental Considerations

The sponsors considered the impacts, both favorable and adverse, in developing the plan for meeting the project objectives. The objectives selected were those that would contribute to the conservation, development, and productive use of the watershed's soil, water, and related resources.

The sponsors selected measures which would help to achieve these objectives and included all practical measures to minimize adverse impacts.

Land treatment measures planned for the watershed are those that will contribute directly to the preservation and enhancement of the environment in the watershed. Emphasis will be given to those measures which will reduce soil and water losses, assure proper functioning of the structural measure, reduce flooding, and preserve and improve the fish and wildlife resources of the watershed.

The Fish and Wildlife Service, in cooperation with the Texas Parks and Wildlife Department, made a detailed study of the watershed and submitted three recommendations for the preservation, enhancement, and use of fish and wildlife resources in the watershed. The sponsoring local organizations and the Service considered these recommendations in formulating the land treatment and structural measures in the work plan. After careful study these recommendations were determined to be desirable and were used to develop the work plan. Two recommendations were incorporated in the land treatment to be installed and the remaining recommendation will be satisfied during and following construction of the floodwater retarding structure.

During work plan development, studies were made by the sponsoring local organizations and the Service to minimize the displacement or relocation of individuals, farms and businesses. There are no apparent relocations or displacements that will be caused by installation of the project.

Alternatives

The considered alternatives to the proposed project action were: (1) a program of applying land treatment measures for watershed protection, (2) land treatment, flood plain zoning, flood insurance, and flood proofing, (3) land treatment and channel work, and (4) foregoing the implementation of a project.

A discussion of each alternative follows:

Alternative No. 1 - Alternative No. 1 consisted of applying land treatment measures as proposed in the project action. Average annual floodwater, sediment, and indirect damages would be reduced from $34,680 to $32,910 or a reduction of 5.1 percent. Depth of flooding from the one percent chance flood event would be reduced in the urban area of Deport approximately 0.1 foot. The volume of sediment delivered to the mouth of the watershed would be reduced from 5.7 acre-feet to 4.9 acre-feet, a reduction of 14 percent. The adverse impacts that would be caused by installation of the floodwater retarding structure would be eliminated. The estimated cost of this alternative is $45,900.

Alternative No. 2 - Alternative No. 2 consisted of land treatment, as proposed in the project action, flood plain zoning, flood insurance, and flood proofing.

The heart of the business development of Deport is located on Main and Grey Streets, situated low in the flood plain adjacent to Deport Creek. The city of Deport could relocate some existing improvements, such as businesses and homes out of the flood prone areas. This would be expensive and City funds to meet this type of obligation are very limited. It would be impractical to relocate improvements such as streets, water and sewer lines, etc. Flood proofing could reduce some of the damages, but would be expensive. It would not be practical to flood proof all improvements subject to damage, as the cost of flood proofing some improvements would exceed their value. The City could restrict new construction in the flood hazard areas by zoning. This would prevent the problem from increasing, but would not alleviate the existing problem. For the past twenty years there has been limited construction in the flood plain. Flood insurance could be made available to reduce the economic impact to an individual or business. However, flood insurance will not reduce damages; it simply spreads losses over a long period of time. This alternative would alleviate minor losses of wildlife habitat resulting from project installation while allowing continued deterioration of natural and human resources caused by flooding of agricultural and urban flood plain areas.

Alternative No. 3 - Alternative No. 3 consisted of applying land treatment and channel work. The land treatment measures would be the same as in the proposed action. The channel work would consist of increasing the capacity of 0.72 miles of the main stem channel through the urban area of Deport and below U.S. Highway 271 far enough that influence from backwater would not affect upstream properties. The channel would be concrete lined and would provide flood protection to urban properties for events up to and including the one percent chance flood. The land area required to construct and spread earth spoil would be 22 acres, all of which is within the present city limits of Deport. The 22 acre area does not support any trees or vegetation that adds to the aesthetic beauty of the city. The small trees growing on or in the Deport Creek channel are willow and hackberry and are less than three inches in diameter. The 22 acres dedicated for this purpose would not require the destruction of significant vegetation or wildlife habitat. At the end of the concrete lined channel and for a short distance downstream there would be floodwater depths greater than those which are presently occurring. The estimated cost of this alternative is $1,188,500, consisting of $45,900 for land treatment and $1,142,600 for channel work.

Alternative No. 4 - Alternative No. 4 consisted of foregoing the implementation of a project.

Flooding would continue, resulting in damage to the agricultural and urban areas of Deport.

The need to use 412 acres of land needed to construct the structural measure and the resultant adverse impact would be eliminated.

The creation of 70 acres of surface water which could be used by wildlife and livestock would be foregone.

The opportunity to realize about $23,790 in average annual net benefits would be foregone.

In selecting sites for floodwater retarding structures, consideration was given to locations which had the greatest potential for providing an acceptable level of flood protection to areas subject to damage with a minimum amount of impact on the natural environment. The size, number, design, and cost of the structures was influenced to a high degree by the physical, topographic, and geologic conditions in the watershed.

Comprehensive surveys and investigations were made on one floodwater retarding structure site. Less detailed studies were made at one other additional floodwater retarding structure site located on Willis Branch. Studies indicated that a structure at this location would not provide significant floodwater reduction benefits and harmonious benefit-cost ratio to its tributary and the main stem flood plain of Deport Creek. Therefore, this site was not included in the work plan.

The project as formulated will meet the sponsors objectives by providing the desired level of protection to flood plain lands at least cost and commitment of natural resources.

Alternatives for similar watershed protection and flood prevention in the watershed without the technical and financial assistance provided under the authority of Public Law 566 are nonexistent at the present time. The burden of funding the planning and construction entirely from local financing would preclude the initiation of such a project.

WORKS OF IMPROVEMENT TO BE INSTALLED

Conservation Land Treatment

The use of each acre of land within its capabilities and its treatment in accordance with its needs has long been accepted as one of the foundations for the building of a strong and free community, state, or nation. Sponsors of this project are keenly aware of this concept and deem the installation and maintenance of needed land treatment measures as essential.

Conservation land treatment consists of individual measures and practices, or a combination of measures and practices, that are planned, installed, and maintained on privately owned land by individuals or groups of

Coastal Bermudagrass Pastures Furnish
Livestock Forage and Provide Soil Protection

Native Grasslands Furnish Hay and Grazing for Domestic Livestock

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USDA-SCS-FORT WORTH, TEX. (33)

landowners and operators or by local organizations. Land treatment measures planned for the watershed are those that will contribute directly to the preservation and enhancement of the environment in the watershed. Emphasis will be given to those measures which will reduce soil and water losses, assure proper functioning of the structural measure, reduce flooding, and preserve and improve the fish and wildlife resources of the watershed.

In addition to effectively maintaining those land treatment measures already established (table 1A), it is planned to establish or complete the installation of needed land treatment measures on about 750 acres of cropland and 1,200 acres of pastureland (table 1) during a three-year installation period. With the installation of the planned land treatment, 54 percent of the watershed will be adequately treated. Conservation land treatment applied and to be applied in this watershed will be on privately owned lands. The land user will make the decision on the use of his land and the treatment measures which he will install on his lands. Cost share assistance in the application of conservation measures is available to landowners on an annual or long-term contract basis through the Rural Environmental Conservation Program administered by the Agricultural Stabilization and Conservation Service.

Soil surveys, which are essential to sound planning and application of land treatment measures, have been completed for the watershed. A soil survey is the classification, mapping, correlation, and interpretation of various types of soils in an area. Soils are classified considering their physical, chemical, and mineralogical characteristics. The classified soils are located and outlined on a map or aerial photograph of the area being surveyed, and correlated to determine the relationship of the various soils in the area to one another and to similar or identical soils identified in other areas. Soil survey interpretations indicate the limitations and suitability of a soil for selected uses.

Conservation measures to be applied on cropland include conservation cropping system, crop residue management, stubble mulching, diversions, terraces, and grassed waterways or outlets in combinations necessary to provide adequate treatment. Conservation cropping systems primarily include strip cropping and crop rotation of small grain, cotton, grain sorghums, forage sorghums, and legumes.

Crop residue management utilizes plant residues left on or near the soil surface to protect cultivated lands during critical erosion periods. Stubble mulching is management of plant residues on a year-long basis whereby harvesting, tilling, planting, and cultivating operations are performed in a manner to keep protective vegetation on the soil surface. A diversion is a channel with a supporting ridge on the lower side constructed across the slope of the field that is designed and located to protect land from erosion producing storm runoff from adjacent areas. Terraces are structural land treatment measures consisting of an earth embankment or ridge constructed across the slope of the land to retard and increase infiltration of runoff and reduce erosion. Grassed waterways or outlets are natural or constructed waterways or outlets shaped or graded and established to suitable vegetation as needed for the safe disposal of runoff from a field, diversion, or terrace.

Conservation measures which will be applied on pastureland include planting of adapted species of perennial or biennial grazing crops and the reseeding of native or adapted grasses and their management for long time production and use. Some small areas within the watershed that are subject to accelerated erosion will require special treatment of surface shaping and vegetative plantings. Additional farm ponds will be constructed to provide dependable water sources for livestock and wildlife.

Landowners and operators will be encouraged to plan and establish land treatment that will maintain wildlife habitat. Farmers applying conservation cropping systems will be urged to use strip cropping and crop rotation of small grains, sorghums, and cotton in such a manner that food and cover for bobwhites and doves will be increased. Plantings of woody and seed bearing vegetation on suitable areas such as idle or eroded lands, along fence rows, and around stock ponds will be encouraged. Land users will be encouraged to seek the advice of the Texas Parks and Wildlife Department or the Soil Conservation Service on stocking and managing of fish in farm ponds and the sediment pool of the floodwater retarding structure. These measures can contribute to supplemental farm and ranch income from the sale of hunting and fishing leases.

Landowners and operators will continue to install and maintain measures needed in the watershed following the project installation period.

Structural Measure

One floodwater retarding structure will be constructed in Deport Creek watershed. The location of the structure to be installed is shown on the project map (figure 4). The floodwater retarding structure will be an earth dam or embankment with a principal spillway and plunge basin, an emergency spillway, a floodwater retarding pool, and a sediment pool. The function of the embankment is to temporarily impound floodwater upstream in the retarding pool. The water in the retarding pool flows, during a predetermined period, through the principal spillway which is a concrete vertical inlet and conduit through the base of the embankment. Principal spillway flow is released into a plunge basin on the downstream side of the embankment. The plunge basin dissipates the energy of the principal spillway flow. The emergency spillway is designed to convey runoff that exceeds the planned capacity of the floodwater retarding pool past the embankment and back to the stream channel. The sediment pool is capacity below the principal spillway elevation allocated for storage of sediment expected to accumulate during a 100-year period.

Figure 1 shows a typical section of a floodwater retarding structure.

The planned floodwater retarding structure will temporarily store or retard 7.09 inches of runoff from 5.70 square miles of drainage area. It will control runoff from about 59 percent of the entire watershed and approximately 83 percent of the drainage area above Deport. The total storage capacity of the structure is 2,478 acre-feet of which 322 acre-feet is for sediment storage and 2,156 acre-feet is for floodwater retarding storage.

Major problems which will materially affect construction of the floodwater retarding structure are not anticipated. Minor construction problems to be encountered are zoning of available borrow material within the embankment and lack of on-site rock riprap material for the plunge basin.

The embankment will be earth fill with vegetative cover. Ample volumes of clay, silty clay, and very clayey fine sand suitable for construction of the embankment are available within short haul distances. About 75 percent of the embankment fill will come from required excavation of soil materials in the emergency spillway area and the remaining 25 percent from the sediment pool area.

Soil materials in the embankment foundation area are deep clay and silty clay with minor amounts of fine to coarse sand. It is not anticipated that foundation drainage measures will be required as the permeability of these materials is low.

The principal spillway for the floodwater retarding structure will be a monolithic rectangular reinforced concrete inlet and a prestressed concrete lined steel cylinder pipe outlet barrel on a compressible soil foundation. Principal spillway flow will discharge into a rock or concrete lined plunge basin.

The structure is designed to store submerged and aerated sediment expected to accumulate, in the sediment and retarding pools, respectively, during a 100-year period. The principal spillway crest will be set at the 100-year sediment pool elevation. As required by Texas Water Rights statutes, the principal spillway will be ported at the elevation which will limit impoundment of water in the sediment pool to 200 acre-feet. The ports at this elevation will be the lowest ungated outlet. Capacity created in the sediment pool by excavation of earth fill materials for the embankment will be included in the 200 acre-feet limitation.

The floodwater structure will have provisions to release impounded water in order to perform maintenance, and if it becomes necessary, to avoid encroachment upon prior downstream water rights.

Materials at finished grade in the emergency spillway will be silty clay with minor amounts of sand. Principal spillway capacity and floodwater retarding storage will provide a one percent chance for emergency spillway use.

The embankment, emergency spillway, disturbed areas, and odd areas on or adjacent to the structure will be vegetated to control erosion, provide wildlife food and cover, to minimize habitat loss resulting from construction, and to enhance the remaining habitat. Plant species will be selected, sited, and planned in accordance with SCS Technical Specifications for Establishment of Wildlife Habitat on or Adjacent to Watershed Works of Improvement. The type of vegetation to be used will include annual and perennial vegetation of native and introduced grasses, forbs, and fruit bearing shrubs and trees. Sod forming vegetation such as bermudagrass will be used as the base vegetation on embankments and spillways. Plantings will be sited and planned in detail during the final design stage in consideration of specific site conditions. The selection of exact species to be used will be from the adapted species of seed and plant stock available at the time of construction. The embankment and emergency spillway will be fenced to protect the vegetation from damage by grazing. The sediment pool will be cleared up to the elevation of the lowest ungated outlet. The exception to this criterion will be trees four inches or more in base diameter and at least 75 feet from the main channel of Deport Creek will be left uncut in and along

three tributaries that will be inundated. The purpose of leaving trees below the lowest ungated outlet elevation is to provide roosting and nesting areas for birds and cover for fish and waterfowl.

All applicable state laws will be complied with in the design and construction of the structural measure as well as those pertaining to the storage, maintenance of quality, and use of water.

During construction, contractors will be required to adhere to strict standards set forth in a construction contract to protect the environment by minimizing soil erosion and water and air pollution. These standards will be in compliance with U.S. Department of Agriculture, Soil Conservation Service Engineering Memorandum 66, "Guidelines for Minimizing Soil Erosion and Water and Air Pollution During Construction". Excavation and construction operations will be scheduled and controlled to prevent exposure of extraneous amounts of unprotected soil to erosion and the resulting translocation of sediments. Measures to control erosion will be specified at the work site and will include, as applicable, use of temporary vegetation, mulches, diversions, mechanical retardation of runoff, and traps. Harmful dust and other pollutants inherent to the construction process will be held to minimum practical limits. Haul roads and excavation areas, and other work sites will be sprinkled with water as needed to keep dust within tolerable limits. Contract specifications will require that fuel, lubricants, and chemicals be adequately labeled and stored safely in protected areas, and disposal at work sites will be by approved methods and procedures. Clearing and disposal of brush and vegetation will be carried out in accordance with applicable laws, ordinances, and regulations in respect to burning. Each contract will set forth specific stipulations to prevent uncontrolled grass or brush fires. Disposal of brush and vegetation will be by burying, hauling to approved off-site locations, or controlled burning, as applicable.

Stringent requirements for safety and health in conformance with the Construction Safety Act will be included in the construction contract.

Necessary sanitary facilities, including garbage disposal facilities, will be located to prohibit such facilities being a pollution hazard to wells or other water sources in conformance with federal, state, and local water pollution control regulations. Special provisions in the construction contract will incorporate by reference, and thereby make the contract provisions conform to, "Safety and Health Regulations for Construction, Part I and Part II", U.S. Department of the Interior, Bureau of Reclaimation. Soil Conservation Service guidelines that provide for incorporating of the Bureau of Reclaimation regulations into construction contracts are in the Soil Conservation Service's "Administrative Services Handbook", Chapter 6. Conformance to all environmental control requirements will be monitored constantly by a construction inspector who will be on-site during all periods of construction operation.

The impoundment in the sediment pool will not be suitable for water skiing, boating, and swimming due to an average depth of three feet below the lowest ungated outlet. Without intensive fish pond management, proliferation of aquatic vegetation and nongame fish will severely limit the use of

the impoundment as a sport fishery. Consequently, the sponsors at the present time have no plans for using the site for recreational purposes and do not intend to provide public access to the impoundment.

Sponsors have given assurance that adequate sanitary facilities meeting local and state health standards will be provided should the impoundment in the sediment pool be used for public recreational purposes.

The minimum land rights required will be those necessary to construct, operate, maintain, and inspect floodwater retarding structure; to provide for flowage of water in, upon, or through the structure; and provide for the permanent storage and temporary detention, either or both, of any sediment or water.

Under present conditions, no farm operation, business, or person will be displaced by installation of the planned floodwater retarding structure. However, if relocations or displacements become necessary, they will be carried out under the provisions of Public Law 91-646, Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970.

Installation of the floodwater retarding structure will require construction of permanent road barricades and change in location or modification of fences, county roads, and two telephone lines.

Installation and proper functioning of the floodwater retarding structure will require a total of 412 acres of land which includes 43 acres of cropland, 160 acres of hayland, and 209 acres of pastureland of which 35 acres are wooded. The dam and emergency spillway will require about 37 acres of which 3 acres are hayland and 34 acres are pastureland which includes 2 acres of wooded area. The sediment pool will require 93 acres of which 11 acres are hayland and 82 acres are pastureland which includes 22 acres of wooded area. About 1.75 miles of ephermeral stream channel will be inundated in the sediment pool. The retarding pool will require 282 acres of land, of which 43 acres are cropland, 146 acres are hayland, and 93 acres are pastureland which has 11 acres of wooded area.

Areas on which vegetation will be removed with installation of the dam, emergency spillway, and sediment pool is characterized by established pastures of coastal bermudagrass, hayland, and idle cropland. Vegetation on idle cropland consist primarily of broomsedge bluestem, silver bluestem, threeawns, annual grasses, and forbs. About 24 acres along and adjacent to the stream channel is wooded. The primary species are elm, hackberry, pecan, and willow.

The watershed work plan has been coordinated with the Texas State Historical Commission and the National Park Service, USDI. An archeology survey of the floodwater retarding structure site was conducted by the Department of Anthropology Research Program, Southern Methodist University, under the direction of Mr. S. Alan Skinner as principal investigator. The survey report stated that no evidence of prehistoric occupation was noted in the survey area, confirming information from local artifact collectors that no sites are known to exist in this area. It was the opinion of the investigators that no archeological resources will be affected by the proposed floodwater retarding structure.

However, if evidence of significant archeological features are observed before or during construction, the Secretary of the Interior will be notified so he may have investigations carried out to evaluate and salvage, if warranted, the resources. This will be done in compliance with Public Law 86-523.

EXPLANATION OF INSTALLATION COSTS

Land treatment measures will be applied by local interests at an estimated cost of $45,900 (table 1). This includes approximately $6,360 of Public Law 46 funds to be provided by the Soil Conservation Service under the going program for technical assistance during the three-year installation period. The costs of application of the various measures and practices, which will be borne by landowners and operators, are based on current prices being paid in the area.

The total installation cost of the structural measure is estimated to be $211,150 of which $140,800 will be borne by Public Law 566 funds and $70,350 will be borne by local interests.

The Public Law 566 costs for project installation include $114,710 for construction, $6,880 for engineering services, and $19,210 for project administration.

The local costs for project installation include $61,500 for the value of easements on the land required for installation of the floodwater retarding structure; $7,350 for construction of road barricades and change in location or modification of telephone lines, fences, and county roads; $500 for legal fees; and $1,000 for project administration.

Construction costs include the engineer's estimate and contingencies. The engineer's estimate was based on unit cost of structural measures in similar areas modified by special conditions inherent to the site location. Ten percent of the engineer's estimate was added as a contingency to provide funds for unpredictable construction costs.

Engineering services and project administration costs were based on an analysis of previous work in similar areas. Engineering services costs consist of, but are not limited to, detailed surveys, geologic investigations, and laboratory analyses, reports, designs, and cartographic services.

Public Law 566 project administration costs consist of construction inspection, contract administration, and maintenance of Soil Conservation Service records and accounts.

Local costs for project administration includes sponsors' costs related to contract administration, overhead and organizational administrative costs, and whatever construction inspection they desire to make at their own expense.

The value of land rights was determined by appraisal in cooperation with representatives of the sponsoring local organizations.

The following is the estimated schedule of obligations for the three-year installation period:

Schedule of Obligations

Fiscal Year	Measures	Public Law 566 Funds (dollars)	Other Funds (dollars)	Total (dollars)
First	Land Treatment	-	15,300	15,300
Second	Land Treatment	-	15,300	15,300
	Structure No. 1	140,800	70,350	211,150
Third	Land Treatment	-	15,300	15,300
TOTAL		140,800	116,250	257,050

This schedule may be changed from year to year to conform with appropriations, accomplishments, and any mutually desirable changes.

EFFECTS OF WORKS OF IMPROVEMENT

Flood Prevention, Erosion and Sediment

This installation of the project measures, both land treatment and structural measure, will achieve the project objectives of watershed protection and flood prevention.

The application of the planned land treatment measures will improve the productivity of the soil by reducing erosion and improving the fertility and infiltration properties of the soil. The measures will also reduce downstream floodwater and sediment damages by reducing erosion and the peak rate of runoff from the upland.

Owners and operators of flood plain land will be able to improve their management of flood plain lands, due to reduced flooding, by proper fertilization and other management practices necessary to reach optimum use of flood plain land. Improved pastureland and hayland will provide a more dependable feed source of livestock and reduce the expenditures required for the purchase of feed. It is not expected that any of the flood plain land will be shifted from pastureland to cropland.

Application of the planned land treatment is expected to reduce annual gross erosion from 23,410 tons to 19,880 tons, a reduction of approximately 15 percent.

When the project is complete, a 70 percent reduction in swamping damage on 17 acres of flood plain will be effected. It is estimated that the concentration of suspended sediment leaving the watershed in average annual surface runoff will be reduced from 770 to 460 milligrams per liter as a result of the combined program of land treatment and the floodwater retarding structure.

Sediment originating in the watershed will be reduced by an average of 2.3 acre-feet annually, a 40 percent reduction.

The project will provide protection to 500 acres of flood plain within the watershed and will benefit directly 15 owners and operators of agricultural land in the flood plain, the owners and occupants of 20 residential units, and the owners or operators of 25 commercial units in Deport.

Average annual flooding will be reduced from 258 acres to 26 acres, a reduction of 90 percent. Reduction in area inundated varies with respect to location within the watershed. The general locations of the areas to be benefited as a result of reduced flooding, caused by the combined program of land treatment and the structural measure, are presented in the following tabulation:

Average Annual Area Inundated

Evaluation Reach (figure 4):	Location	Without Project (acres)	With Project (acres)	Reduction 1/ (percent)
1	Deport Creek below City of Deport	200	26	87
2	Urban Area - City of Deport	24	0	100
3	Deport Creek above City of Deport	34	0	100
Total		258	26	90

The number of acres inundated in each evaluation reach without and with the project by various frequency floods is presented in the following tabulation:

Area Inundated by Selected Recurrence Intervals

Evaluation Reach (figure 4)	Average Recurrence Interval: 2-Year		5-Year		25-Year		100-Year	
	Without Project (acres)	With Project (acres)	Without Project (acres)	With Project (acres)	Without Project (acres)	With Project (acres)	Without Project (acres)	With Project (acres)
1	206	0	266	47	319	162	385	207
2	19	0	35	0	50	0	55	5
3	36	0	43	0	49	0	60	0
Total	261	0	344	47	418	162	500	212

1/ Reduction based on consideration of floods up to and including the 100-year frequency event.

Had the project been installed at the time of the April 1967 flood, acres flooded would have been reduced from about 390 acres to 130 acres, a reduction of 67 percent. Direct monetary damages would have been reduced from an estimated $23,300 to $470, a reduction of 98 percent.

A maximum initial reduction in average annual runoff of 102 acre-feet is expected from the effects of evaporation from the sediment pool of the floodwater retarding structure. This will result in an initial reduction, at the bottom of the watershed, in the average annual volume of streamflow from 7,183 acre-feet to 7,081 acre-feet, or about 1.4 percent. The average annual discharge of 998,400 acre-feet at the USGS gauge on the Sulphur River near Talco, Texas, will be reduced about one-hundreth of one percent. This minor reduction in streamflow is not expected to have a significant effect on the downstream Lake Wright Patman. The reduction in runoff is expected to have very little effect on the water quality of the Sulphur River.

Figure 3 shows the urban area of Deport inundated by the flood of April 1967, and the area that would be inundated by a 100-year frequency flood without and with project conditions. The proposed project will provide flood-free protection from the 100-year event to all existing residential and business properties. With the project, urban damages from such a flood will be eliminated. The actions of people during times of floods, whether major or minor, cannot be predicted. However, with any reasonable precautions, the hazard to life from floodwaters will be eliminated. The disruption and relocation of residents during periods of flood threats will be virtually eliminated along with costs necessary for evacuation and emergency shelter and relief operations.

The following tabulation shows effects of the project on flood damages by evaluation reaches. All figures indicate average annual reductions:

Evaluation Reach (figure 4):	Average Annual Damage Reduction 1/				
	Crop and Pasture (percent)	Other Agricultural (percent)	Non-Agricultural (percent)	Sediment Swamping (percent)	Total (percent)
1	89	94	100	70	86
2	-	-	100	-	100
3	100	-	-	-	100
Weighted Average	90	94	100	70	99

Analysis of information collected indicated that no significant changes would be made in the use of agricultural land within the flood plain, either in the form of restoration of former productivity or in more intense use. There are no alloted crops and no changes are expected.

1/ Reduction based on consideration of floods up to and including the 100-year frequency event.

Indirect damage reduction benefits will accrue to the project. These benefits include the reduction or elimination of expenses associated with interruption or delay of travel, rerouting of school buses and mail routes, disruption of farming operations, business losses in the area, and similar losses.

During construction of the structural works of improvement, air and water pollution will increase slightly from dust and sediment inherent to the construction process. This increase will be kept within tolerable limits. At the end of construction and with the establishment of vegetation for erosion control, the dust and sediment increase intrinsic to construction operations will have completely subsided.

Fish and Wildlife and Recreation

The installed project will have an impact on fish and wildlife resources in the watershed. Presently there is no significant permanent fish habitat in the watershed or immediate surrounding area. The construction of farm ponds will provide potential habitat. Although less than ideal, the 70 acre impoundment in the sediment pool of the floodwater retarding structure can be managed as fish habitat.

Land treatment practices which will improve conditions for wildlife include conservation cropping system which encourages diversification of types of crops grown to provide year-round cover and food sources; and crop residue management, which promotes leaving crop residue and waste grain on the soil surface for use by game birds and migrating waterfowl. The impoundment in the sediment pool of the floodwater retarding structure and ponds installed for watering livestock will also provide needed sources of water for wildlife. The application of brush management practices will alter habitat in upland pasture areas. The recommended method of applying this measure will be to retain units and patterns of brush of good habitat value in favorable locations for use as cover and concealment. Habitat in a portion of the 93 acre sediment pool of the floodwater retarding structure will be inundated. This inundation will displace wildlife on about 70 acres, or in the area up to the elevation of the lowest ungated outlet in the sediment pool. The establishment of annual and perennial vegetation of native and introduced grasses, forbs, and fruit bearing shrubs and trees selected for wildlife cover and food value on disturbed areas above and below the dam will provide nesting and food for quail, dove, and non-game species.

The Fish and Wildlife Service and the Texas Parks and Wildlife Department state in their report, "A fair sport fishery could be established in the proposed floodwater retarding reservoir. However, without intensive fish pond management, dense growths of aquatic vegetation, seasonally high turbidity, and high non-game fish populations may quickly degrade the fishery quality. Since fishing would be by landowner permission only, use of the impoundment for this activity would probably be low. No commercial fishing is expected."

"With the project, bobwhites, cottontails, squirrels, fur animals, and songbirds would be displaced by the proposed structure and brush clearing. Dove-nesting habitat would be destroyed. The impoundment should attract shorebirds and waterfowl. About 20 miles to the north on the Red River is a major waterfowl concentration area which should be a source of birds for the watershed. A small amount of waterfowl hunting is expected with the

proposed project. Dove hunting would vary with surrounding conditions. Should farm ponds become dry, doves would congregate at the sediment pool and provide good shooting. Hunting for other species is expected to remain insignificant. Fur-animal trapping with the project is expected to continue to be of minor importance.

Anticipated problems resulting from overpopulation by nongame fishes might be prolonged with the proper initiation of a fishery. Adhering to fish-stocking recommendations of the Texas Parks and Wildlife Department or the U.S. Soil Conservation Service would help in establishing a better fishery.

The abundance of fish and wildlife species in a given area is largely dependent on land-management practices. Standard soil and water conservation practices such as deferred grazing, crop residue management, and grassed waterways can do much to enhance an area for wildlife. Enhancement measures of value to fish and wildlife would include construction of farm ponds; creating dense, woody fence row coverts; leaving rows of small grains at field borders; disking at pasture-brush interfaces to promote forb growth; pruning overgrown woody vegetation to a useful height where low cover is lacking; and planting wildlife food and cover plants where there is no desirable amount or pattern of food and cover interspersion. Landowners should be made aware of the potential economic value of game species and be encouraged to integrate fish and wildlife management with overall farming operations. The program of brush clearing would leave little woody vegetation in and around the sediment pool. It would be beneficial to have some overwater cover in the sediment pool for fish and waterfowl cover, and wading bird roosting. Leaving trees four inches or more in base diameter uncut in the three inundated tributaries at a distance of 75 feet and more from the main channel would provide this cover. In addition, any acreage of brush and trees adjoining the sediment pool should remain uncleared to provide transition cover between the water and surrounding woodland and cropland. Trees becoming a debris problem may be removed."

Archeological, Historic, and Scientific

There are no archeological or historic sites listed in or nominated to the National Register of Historic Places that will be adversely affected by the installation of measures included in the project. An archeology survey of the floodwater retarding structure site was conducted by the Department of Anthropology, Archeology Research Program, Southern Methodist University, under the direction of Mr. S. Alan Skinner as principal investigator. It was the opinion of the investigators that no archeological resources will be affected by the proposed floodwater retarding structure.

Economic and Social

Secondary benefits, including improved economic conditions in the area, will result from the installation of a complete project for flood prevention. During the construction stage of the proposed project, additional requirements for building materials, petroleum products, and other necessities will stimulate the economy. This construction will create approximately 5.5 man-years of employment, which will further strengthen the economy during this phase.

The reduction of damages by structural means will provide an impetus for a higher quality of living and social upgrading by watershed residents. It is expected that an estimated $2,740 in the form of increased income to households will be realized by the local economy annually.

Additional intangible benefits will accrue to the project through the opportunity to shift public funds from the repair of damages to public roads and utilities to investment in schools and other public facilities that improve the quality of living. Likewise private funds now going to repair of flood damage can be shifted to raising the standard of living of the residents in the affected area. The elimination or reduction of flooding will allow owners of residential and commercial units to upgrade their properties, thereby creating a more pleasant environment in which to live and work. Significant intangible public health benefits will accrue in the city of Deport including reduced hazards of loss of life and injury, elimination of health hazards associated with damage to water supply and waste disposal systems, improved vector control, and the prevention of other factors accompanying floods which tend to disrupt the maintenance of public health.

The floodwater retarding structure will require a total of 412 acres of land. The required 37 acres for dam and emergency spillway consists of 3 acres of hayland and 34 acres of pastureland, 2 acres of which are wooded. The sediment pool will require 93 acres consisting of 11 acres of hayland and 82 acres of pastureland, 22 acres of which are wooded. An additional 282 acres will be dedicated to the retarding pool. This area includes 43 acres of cropland, 146 acres of hayland, and 93 acres of pastureland, 11 acres of which are wooded.

There are no areas such as feedlots in the watershed with large concentrations of livestock. Livestock within the drainage area of the floodwater retarding structure are on pastureland. Long-time observations at floodwater retarding structures constructed on the same or similar soils and having comparable conditions in their drainage areas have not evidenced a significant degree of fouling of water in the sediment pools by livestock. Therefore, appreciable contamination from livestock to water in the sediment pool is not anticipated.

The installation of the project will have no adverse effects on mineral resources in the area.

PROJECT BENEFITS

The estimated average annual monetary floodwater, sediment, and indirect damages (table 5) within the watershed will be reduced from $34,680 to $190 by the proposed project. This is a reduction of 99.4 percent.

Benefits to landowners and operators from the planned land treatment measures were not evaluated in monetary terms.

Reduction in monetary flood damages vary with respect to locations within the watershed.

The following tabulations show the general locations of damage reduction benefits attributed to the combined program of land treatment and structural measures.

Evaluation Reach (figure 4)	Location	Average Annual Damage: Without Project (dollars)	With Project (dollars)	Reduction 1/ (percent)
1	Deport Creek below City of Deport	1,360	190	86.0
2	Urban Area - City of Deport	33,230	0	100.0
3	Deport Creek above City of Deport	90	0	100.0
Total		34,680	190	99.4

Direct Monetary Floodwater Damage at Present Level of Development (1973)

Evaluation Reach (figure 4)	Average Recurrence Interval: 2-Year Without Project (dollars)	2-Year With Project (dollars)	5-Year Without Project (dollars)	5-Year With Project (dollars)	25-Year Without Project (dollars)	25-Year With Project (dollars)	100-Year Without Project (dollars)	100-Year With Project (dollars)
1	850	0	1,350	160	1,890	650	2,430	1,170
2	2,140	0	9,090	0	44,260	0	88,270	0
3	80	0	100	0	120	0	160	0
Total	3,070	0	10,540	160	46,270	650	90,860	1,170

Redevelopment benefits stemming from employment of unemployed or underunemployed local labor during project installation and operation and maintenance will amount to an amortized value of $500 annually.

It is estimated that the project will produce local secondary benefits, which exclude indirect benefits in any form, averaging $2,740 annually. Secondary benefits from a national viewpoint were not considered pertinent to the economic evaluation.

1/ Reduction based on consideration of floods up to and including the 100-year frequency event.

COMPARISON OF BENEFITS AND COSTS

Total average annual cost of the structural measure (amortized total installation and project administration cost, plus operation and maintenance) is $12,170. This measure is expected to produce total average annual benefits of $35,960 resulting in a benefit-cost ratio of 3.0:1.0 (table 6).

The ratio of total average annual project benefits, excluding secondary benefits, accruing to the structural measure ($33,220) to the average annual cost of the structural measure ($12,170) is 2.7:1.0.

PROJECT INSTALLATION

Landowners and operators will establish planned land treatment (table 1) in cooperation with the Lamar and Red River County Soil and Water Conservation Districts to provide technical assistance in planning and installing land treatment measures.

Educational meetings will be held in cooperation with other agencies to outline services available. The Extension Service will assist in this phase of the program by preparing press, radio, and television releases; by conducting general informational meetings; and by using other methods of informing landowners and operators.

It is expected that application of additional land treatment will progress during the project installation period as shown in the following tabulation:

Land Use	Fiscal Year			Total
	1st	2nd	3rd	
	(acres)	(acres)	(acres)	(acres)
Cropland	250	250	250	750
Pastureland and Hayland	400	400	400	1,200
Total	650	650	650	1,950

The governing bodies of the Lamar and Red River County Soil and Water Conservation Districts will assume aggressive leadership in getting the land treatment program underway. Landowners and operators will be encouraged to apply and maintain soil and water conservation measures on their farms and ranches. In addition, landowners and operators where the floodwater retarding structure will be located will be encouraged to apply and maintain measures for the enhancement of wildlife. The Soil

Conservation Service will provide technical assistance in the planning and application of soil, plant, and water conservation measures.

Special emphasis will first be placed on getting a higher degree of land treatment in the drainage area of the floodwater retarding structure. Then the emphasis will be on drainage areas not controlled by the structure.

The city of Deport has the right of eminent domain under applicable state law and has the financial resources to fulfill its responsibilities and agrees to use such authority and funds, if necessary, to acquire all land rights needed for project installation.

The Soil Conservation Service, in compliance with a request from the sponsors, will provide the necessary administrative and clerical personnel; facilities, supplies, and equipment to advertise, award, and administer contracts; and will be the contracting agency to let and service contracts. The city of Deport will represent sponsoring local organizations in coordination with the Soil Conservation Service on matters concerning construction.

The city of Deport will have the following responsibilities pertaining to the planned floodwater retarding structure:

1. Obtain the necessary land rights;

2. Provide for the change in location or modification of utility lines and systems, fences, and other privately owned improvements necessary for installation of the floodwater retarding structure;

3. Determine and certify legal adequacy of easements and permits for construction of the structural measure; and

4. Obtain a court order providing that the county roads affected by the embankment, emergency spillway, and detention pool of the floodwater retarding structure be closed, raised, or relocated at no expense to the federal government.

Technical assistance will be provided by the Soil Conservation Service in preparation of plans and specification, construction inspection, preparation of contract payment estimates, final inspection, execution of certificate of completion, and related tasks necessary to install the planned structural measure.

The floodwater retarding structure will be constructed during the second year of a three-year project installation period. In order for construction to proceed according to schedule, all land rights for the floodwater retarding structure are to be secured by the end of the first six month period following approval of the work plan for operations.

FINANCING PROJECT INSTALLATION

Federal assistance for carrying out works of improvement described in this work plan will be provided under authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress; 68 Stat. 666), as amended.

The costs of applying land treatment measures will be borne by land users, with technical assistance by the Soil Conservation Service under the going program (Public Law 46).

Cost share assistance in the application of conservation measures is available to land users on an annual or long-term contract basis through the Rural Environmental Conservation Program administered by the Agricultural Stabilization and Conservation Service.

Funds for the local share of the cost of this project relative to the structural measure will be provided by the city of Deport. The city of Deport has the financial ability to make arrangements to carry out their responsibilities. The City plans to sell bonds to raise its share of the installation cost.

It is anticipated that approximately 85 percent of the number of easements required for the installation of the floodwater retarding structure will be donated. Out-of-pocket costs for land rights, legal expenses, and project administration are estimated to $25,000.

The structural measure will be constructed during the second year of a three-year project installation period pursuant to the following conditions:

1. Requirements for land treatment in the drainage area of the floodwater retarding structure have been satisfied.

2. All land rights have been obtained for the floodwater retarding structure consistent with the requirements of the "Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970" and USDA Rules and Regulations (Title 7, Part 21).

3. A court order has been obtained from the Lamar County Commissioners Court showing that the county roads affected by the embankment, emergency spillway, and detention pool of the floodwater retarding structure will be raised or closed and alternate routes designated at no expense to the federal government.

4. Telephone lines have been relocated or permission has been obtained to inundate the properties involved.

5. Project agreements have been executed.

6. Operation and maintenance agreements have been executed.

Financial and other assistance to be furnished by the Soil Conservation Service is contingent upon the appropriation of funds for this purpose.

Various features of cooperation between the cooperating parties have been covered in appropriate memorandums of understanding and working agreements.

The soil and water conservation loan program sponsored by the Farmers Home Administration is available to eligible landowners and operators in the area. Present FmHa clients will be encouraged to cooperate in the program.

PROVISIONS FOR OPERATION AND MAINTENANCE

Land Treatment Measures

Planned land treatment measures will be maintained by landowners and operators of farms on which measures are applied under agreement with the Lamar Soil and Water Conservation District and the Red River County Soil and Water Conservation District. Representatives of the districts will periodically survey the status of land treatment measures and encourage land users to apply necessary maintenance.

Structural Measures

The city of Deport will be responsible for operation and maintenance of the floodwater retarding structure. Funds will come from a sinking fund maintained by the city of Deport for this purpose. The estimated average annual cost of operation and maintenance for this floodwater retarding structure is $250.

An operation and maintenance agreement will be executed by the parties hereto prior to the signing of the initial project agreement and the issuance of invitations to bid on construction of the structural measures. The agreement will set forth specific details on procedure in line with recognized assignments of responsibility and will be in accordance with the Texas Watersheds Operation and Maintenance Handbook. The agreement will also include specific provisions for retention and disposal of property acquired or improved with Public Law 566 financial assistance.

The floodwater retarding structure will be inspected at least annually and after each heavy rain by representatives of the city of Deport and the Lamar and Red River County Soil and Water Conservation Districts. A Soil Conservation Service representative will participate in these inspections for a period of at least three years following construction. The Soil Conservation Service will participate in inspections as often as it elects to do so after the third year. Items of inspection will include, but are not limited to, conditions of the principal spillway and its appurtenances, the emergency spillway, and the earth fill for the floodwater retarding structure. A written report will be made of each inspection. A copy of each report will be provided by the responsible organization to each organization having operation and maintenance responsibilities and to the designated Service representative within ten days of the date on which the inspection was made.

Upon completion of the floodwater retarding structure by the contractor, subject to the establishment of vegetation, the city of Deport will assume responsibility for maintenance of the structure. They will perform promptly, or have performed promptly, all maintenance of the structure as determined to be needed by either the sponsors or the Service, including that required to prevent soil erosion and water pollution.

Sponsors will control the handling, storage, and application of herbicides and pesticides that may be necessary for operation and maintenance of the structural measure. Approved and authorized reagents and compounds will be used. Their application will be compatable with current laws regulating their use. In addition to sound and prudent judgement, ordinances and standards concerned with the disposal or storage of unused chemicals, empty containers, contaminated equipment, etc., will be observed and applied.

The Soil Conservation Service, through the Lamar and Red River County Soil and Water Conservation Districts, will participate in operation and maintenance only to the extent of furnishing technical assistance to aid in inspections and technical guidance and information necessary for the operation and maintenance program.

Provisions will be made for unrestricted access by representatives of the sponsoring local organizations and the Soil Conservation Service to inspect the structural measure and its appurtenances at any time and for sponsoring local organizations to perform operation and maintenance. Easements insuring this unrestricted ingress and egress will be furnished by the sponsoring local organizations.

The city of Deport will maintain a record of all maintenance inspections made, maintenance performed, and cost of such maintenance and have it available for inspection by Soil Conservation Service personnel.

The necessary maintenance work will be accomplished by contracts, force accounts, or equipment owned by the sponsoring local organizations.

TABLE 1 - ESTIMATED PROJECT INSTALLATION COST

Deport Creek Watershed, Texas

Installation Cost Item	Unit	Number Non-Federal Land	Estimated Cost (Dollars) 1/ Public Law: 566 Funds Non-Federal Land	Other Funds Non-Federal Land	Total
LAND TREATMENT					
Land Areas 2/					
Cropland	Acre	750	-	7,290	7,290
Pastureland	Acre	1,200	-	32,250	32,250
Technical Assistance			-	6,360	6,360
TOTAL LAND TREATMENT			-	45,900	45,900
STRUCTURAL MEASURES					
Construction					
Soil Conservation Service					
Floodwater Retarding Structure	No.	1	114,710	-	114,710
Subtocal - Construction			114,710		114,710
Engineering Services					
Soil Conservation Service					
Floodwater Retarding Structure	No.	1	6,880	-	6,880
Subtotal - Engineering Servicos			6,880		6,880
Project Administration					
Soil Conservation Service					
Construction Inspection			9,180	500	9,680
Other			10,030	500	10,530
Subtotal - Project Administration			19,210	1,000	20,210
Other Costs					
Land Rights			-	69,350	69,350
Subtotal - Other Costs				69,350	69,350
TOTAL STRUCTURAL MEASURES			140,800	70,350	211,150
TOTAL PROJECT			140,800	116,250	257,050

1/ Price Base: 1974

2/ Includes only areas estimatcd to be adequately treated during the project installation period. Treatment will be applied throughout the watershcd, and dollar amounts apply to total land areas, not just to adequately treated areas.

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TABLE 1A - STATUS OF WATERSHED WORKS OF IMPROVEMENT
(at time of work plan preparation)

Deport Creek Watershed, Texas

Measures	Unit	Number Applied to Date	Total Cost (Dollars) 1/
LAND TREATMENT			
Conservation Cropping System	Acre	78	-
Crop Residue Management	Acre	103	-
Contour Farming	Acre	104	-
Grassed Waterway	Acre	7	1,750
Critical Area Planting	Acre	4	800
Pasture and Hayland Management	Acre	1,150	18,400
Pasture and Hayland Planting	Acre	505	17,730
Pond	No.	1	380
Brush Management	Acre	61	3,660
Terrace-gradient 2/	Feet	22,780	1,140
TOTAL LAND TREATMENT			43,830

1/ Price Base: 1974

2/ Applied at least 10 years preceeding work plan development

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TABLE 2 - ESTIMATED STRUCTURAL COST DISTRIBUTION

Deport Creek Watershed, Texas
(Dollars) 1/

Item	Installation Costs P. L. 566 Funds			Installation Costs Other Funds		Total Installation Cost
	Construction	Engineering	Total P. L. 566	Land Rights	Total Other	
Floodwater Retarding Structure						
1	114,710	6,880	121,590	69,350	69,350	190,940
Subtotal	114,710	6,880	121,590	69,350	69,350	190,940
Project Administration			19,210		1,000	20,210
GRAND TOTAL	114,710	6,880	140,800	69,350 2/	70,350	211,150

1/ Price Base: 1974

2/ Includes $2,500 for change in location or modification of fences, $3,500 for county roads, $1,000 for telephone lines and $350 for construction of permanent road barricades.

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TABLE 3 - STRUCTURAL DATA

STRUCTURE WITH PLANNED STORAGE CAPACITY
Deport Creek Watershed, Texas

Item	Unit	Structure Number: 1	Tota
Class of Structure		C	xx
Drainage Area (Total)	Sq. Mi.	5.70	5.
Controlled	Sq. Mi.	5.70	5.
Curve No. (1-day) (AMC II)		82	xx
Elevation Top of Dam	Ft.	446.1	xx
Elevation Crest Emergency Spillway	Ft.	439.5	xx
Elevation Crest Principal Spillway	Ft.	429.7	xx
Elevation Crest Lowest Ungated Outlet	Ft.	428.5	xx
Maximum Height of Dam	Ft.	29	xx
Volume of Fill	Cu. Yd.	126,424	126,42
Total Capacity	Ac. Ft.	2,478	2,47
Sediment (100-year)	Ac. Ft.	322	32
Sediment Submerged 1/	Ac. Ft.	304	30
Sediment Aerated	Ac. Ft.	18	1
Sediment Pool (Lowest Ungated Outlet)	Ac. Ft.	200	20
Retarding Pool	Ac. Ft.	2,156	2,15
Surface Area			
Sediment Pool (Lowest Ungated Outlet)	Acres	70	7
Sediment Pool-Principal Spillway Crest	Acres	93	9
Retarding Pool	Acres	375	37
Principal Spillway Design			
Rainfall Volume (areal) (1-day)	In.	10.00	xx
Rainfall Volume (areal) (10-day)	In.	17.10	xx
Runoff Volume (10-day)	In.	12.50	xx
Capacity (Maximum)	cfs	200	xx
Frequency Operation-Emergency Spillway	% chance	1	xx
Size of Conduit	In.	42	xx
Emergency Spillway Design			
Rainfall Volume (ESH) (areal)	In.	13.20	xx
Runoff Volume (ESH)	In.	10.88	xx
Storm Duration	Hrs.	6	xx
Type		Veg.	xx
Bottom Width	Ft.	250	xx
Velocity of Flow (V_e)	Ft./Sec.	6.2	xx
Slope of Exit Channel	Ft./Ft.	0.020	xx
Maximum Water Surface Elevation	Ft.	441.4	xx
Freeboard			
Rainfall Volume (FH) (areal)	In.	30.70	xx
Runoff Volume (FH)	In.	28.22	xx
Storm Duration	Hrs.	6	xx
Maximum Water Surface Elevation	Ft.	446.1	xx
Capacity Equivalents			
Sediment Volume	In.	1.06	xx
Retarding Volume	In.	7.09	xx

1/ Includes volume in sediment pool (Lowest ungated outlet)

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TABLE 4 - ANNUAL COST

Deport Creek Watershed, Texas
(Dollars) 1/

Evaluation Unit	Amortization of Installation Cost 2/	Operation and Maintenance Cost	Total
Floodwater Retarding Structure Number			
1	10,780	250	11,030
Project Administration	1,140	-	1,140
GRAND TOTAL	11,920	250	12,170

1/ Price Base: 1974

2/ 100-years at 5.625 percent interest

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TABLE 5 - ESTIMATED AVERAGE ANNUAL DAMAGE REDUCTION BENEFITS

Deport Creek Watershed, Texas
(Dollars) 1/

Item	Estimated Average Annual Damage: Without Project	With Project	Damage Reduction Benefits
Floodwater			
Crop and Pasture	830	80	750
Other Agricultural	170	10	160
Nonagricultural 2/			
Road and Bridge	50	0	50
Urban			
Residential Property	1,470	0	1,470
Commercial Property	24,710	0	24,710
Streets and Bridges	1,510	0	1,510
Subtotal	28,740	90	28,650
Sediment			
Swamping	270	80	190
Indirect	5,670	20	5,650
TOTAL	34,680	190	34,490

1/ Price Base: Agricultural damages - Current normalized prices; All Others - Current prices (1974)

2/ Evaluation of damages resulting from floods up to and including a 100-year frequency event. Floods larger than the 100-year frequency event still will cause additional damage after project installation.

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TABLE 6 - COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURE

Deport Creek Watershed, Texas
(Dollars)

Evaluation Unit	AVERAGE ANNUAL BENEFITS 1/				Average Annual Cost 2/	Benefit Cost Ratio
	Damage Reduction	Redevelop-ment	Secondary	Total		
Floodwater Retarding Structure Number						
1	32,720 3/	500	2,740	35,960	11,030	3.3:1.0
Project Administration					1,140	
GRAND TOTAL	32,720	500	2,740	35,960	12,170	3.0:1.0

1/ Price Base: Agricultural benefits - Current normalized prices; All others - Current prices (1974)

2/ From Table 4

3/ In addition, it is estimated that land treatment measures will provide flood damage reduction benefits of $1,770 annually.

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INVESTIGATIONS AND ANALYSES

Land Use and Treatment

The status of land treatment for the watershed was developed by the Lamar Soil and Water Conservation District and the Red River County Soil and Water Conservation District with assistance from the Soil Conservation Service field offices at Paris and Clarksville, Texas. Conservation needs data were compiled from existing conservation plans within the watershed and expanded to represent the needs of the entire watershed. The quantity of each land treatment practice, or combination of practices, necessary for each essential conservation treatment was estimated for each land use by capability class. The estimated number of acres, by land use, to be treated during the project installation period are shown in Table 1. Hydraulic, hydrologic, sedimentation, and economic investigations provided data as to the effects of land treatment measures in terms of reduction of flood damage. Although measurable benefits would result from application of planned land treatment measures, it was apparent that other flood prevention measures would be required to attain the degree of flood damage reduction desired by local people.

Hydraulics and Hydrology

Hydrologic soil and cover conditions were determined by detailed mapping of 100 percent of the watershed.

Present hydrologic cover conditions were determined on the basis of the percentage of vegetative ground cover and litter. Future hydrologic cover conditions were estimated on the basis of the expected percentage of needed land treatment to be applied during the installation period and the probable effectiveness of the application.

Rating curves were developed by water surface profiles using the IBM 1130 computer from surveyed valley sections located in joint consultation by the hydraulic engineer, economist, and geologist.

Present and with project conditions were developed using rainfall data from U.S. Weather Bureau Technical Paper No. 40 and SCS hydrologic routing procedures as outlined in Technical Release No. 20.

The frequency method for evaluation was used to develop damages for present and with project conditions. Area and depth inundation tables and curves for both the urban and agricultural areas were developed from water surface profile data.

Engineering

Studies were made in the agricultural areas of the flood plain and in the urban area of Deport to locate those areas subject to flood damage.

A floodwater retarding structure site on Willis Branch was investigated. Studies showed that the drainage area of the site is less than 0.5 square mile and that a floodwater retarding structure at this location would not provide significant reduction in peak flows on Deport Creek. The site has

poor storage characteristics and would involve fixed improvements with the possibility of several relocations. For these reasons, this site was not included in the final work plan.

More comprehensive surveys and investigations were made of a possible floodwater retarding structure site on the main stem of Deport Creek. This structure was selected for inclusion in the final work plan. The structure location is shown in Figure 4. Table 3 provides specific site information.

Sediment and floodwater storage, structure classification, and emergency spillway layout and design meet or exceed criteria outlined in Engineering Memorandum SCS-27.

A detailed investigation was made of state, county, and city road or street crossings below the floodwater retarding structure.

Multiple routings of both principal and emergency spillways were made to determine the principal spillway sizing, height of embankment, detention storage requirement, and to analyze the effects of release flows on downstream improvements.

When the structural measure for flood prevention had been determined, a table was developed to show the total cost of the structure (table 2).

A second cost table was developed to show separately the annual installation cost, annual maintenance cost, and the total annual cost of the structural measure (table 4).

Sedimentation

Sedimentation investigations were made in accordance with procedures outlined in South Regional Technical Service Center, EWP Technical Guide No. 12, July 1968.

Determination of the 100-year sediment storage requirement for the planned floodwater retarding structure was made according to the following procedure:

Detailed studies of soils, slopes, and cover were made within the drainage area of the structure.

Average annual sheet erosion, for present and future conditions were computed using the soil loss equation by Musgrave. The Musgrave equation was the standard by which soil losses were determined at the time the project was being planned. Presently, the Universal Soil Loss equation is in standard use by the Soil Conservation Service. The use of the Universal equation can be expected to produce similar results when compared to the Musgrave equation.

Computations of gully and streambank erosion were based on estimated lateral bank erosion rates, bank heights, and length of channels affected by erosion.

Sediment delivery ratio and trap efficiency adjustments were applied to computed average annual erosion to arrive at an estimate of sediment volume to be deposited in the reservoir.

Allowances were made for differences in density between soil in place and sediment. The densities for aerated and submerged sediment were based on 75 and 35 pounds per cubic foot, respectively.

Allocation of sediment to the pools of the structure was based on sediment texture and reservoir topography.

The allowances by weight were 90 percent to the sediment pool and 10 percent to the detention pool.

Flood Plain Sediment and Scour Damages

Investigations and computations were made to determine the nature and extent of physical damage to flood plain lands and the effect of the project on reduction of these damages. Detailed mapping on the entire flood plain was accomplished. Factors such as depth and texture of sediment, soil condition, depth and width of scoured areas, channel degradation or aggradation, and channel bank erosion were considered. Damaged areas were measured and summarized using a damage table developed to show percent loss of productive capacity from sediment deposition or severity of swamping and by depth and width of scour. Adjustments for recoverability of productive capacity were made on the basis of field studies and interviews with farmers.

The estimated average annual sediment yield from sheet erosion, gully erosion, and streambank erosion was based on detailed sediment source studies. Sediment yields to VS-D1 were computed for without-project conditions, with land treatment measures applied, and with the combination of land treatment and floodwater retarding structure installed. The relative importance of each sediment source was considered for computing reductions in sediment yields.

Geology

The geologic strata, listed in ascending order, that crop out in the watershed are: the Ozan Formation which is predominantly a marine clay, the Wolfe City Formation which is sand and sandy marl, the Pecan Gap Chalk, and the Marlbrook Marl. These beds are in the Taylor Group of the Upper Cretaceous System. The regional dip is to the south and the strike is east-west. There is no faulting in the watershed vicinity.

Preliminary geologic investigations were made at the floodwater retarding structure site to obtain information on the nature and extent of embankment and foundation materials, types of materials in the emergency spillway area, emergency spillway stability, and other problems that might be encountered during construction. These investigations included surface observations of valley slopes, alluvium, channel banks, exposed geologic formations, and hand auger borings.

Information from these investigations was used in making cost estimates for the structure and to assure that the site is feasible for construction.

The floodwater retarding structure is located on the Ozan Formation. The emergency spillway, on the left abutment, will extend into the Pecan Gap Chalk. No major design or construction problems are anticipsted. The foundation will be in thick, slowly permeable clay. All required excavation will be common and all borrow and fill materials are within short haul distances. However, these fine grain materials, CL and CH soils as classified under the Unified Soils Classification System, have a high shrink-swell potential which will require consideration.

Detailed investigations, including exploration with core drilling equipment, will be made on the site prior to final design. Laboratory analysis will be made to determine suitability and methods of handling foundation and embankment materials.

Economics

Basic methods used in the economic investigations and analyses are outlined in the "Economics Guide for Watershed Protection and Flood Prevention", U. S. Department of Agriculture, Soil Conservation Service, March 1964.

Because of the diversity of damageable values and flood plain characteristics, the flood plain was divided into three evaluation reaches (figure 4). Of these, one was in the urban area of Deport.

Determination of Nonagricultural Damages

Because the major floodwater damages in this watershed are to nonagricultural property, the frequency method of analysis was used. Information was collected in the field on damages experienced from the floods of April 1967 and December 1971 and from several other smaller floods. At the same time an evaluation was made of the damages that would occur from a flood which could be expected on an average of once in 100 years. Under without project conditions, a flood of this magnitude would result in high water elevations in Deport of approximately one foot higher than the high water elevations recorded in 1967. High water marks from the experienced floods were used to determine peak stages which, in turn, were related to stages calculated for the evaluation series. Stage damage curves were developed to cover the range of damage producing floods. Average annual damages under the present atate of development were calculated.

An analysis was made of existing data pertaining to the economic development of the Deport area. In addition, data developed by the Office of Business Economics (OBE), U.S. Department of Commerce, for Area 08124, which includes the city of Deport, was analyzed to determine the factors which have contributed to the overall growth of the area. Bank deposits were also considered. A comparison of pertinent historic data relative to economic activities in Deport and the total OBE area indicates that population, per capita income, and the resulting total personal income for Deport will increase at about the same rate or at a slightly faster rate than thst projected for the OBE area.

The urbsn flood plain of Deport Creek is subject to frequent flooding. Properties in the flood plain reflect a high percentsge of business development. Future incressed development in this srea will be tied lsrgely to incresses in total personal income as business development is relsted to incresses in the total population of an urban ares and increases in per capits income. For this reason, it is believed that projections of totsl personal income best reflect the number snd values of properties that would be subject to flood dsmage even in the absence of a project. Therefore, damage to the existing development was increased by 267.7 percent to reflect the gradual accrual of these values discounted to present worth.

Estimates of damages to city streets, roads, and highways in the flood plain were obtained from city, county, and state highway officials and supplemented by information from local residents.

Determination of Agricultural Damages

Agricultural damage calculations were based on information obtained from owners and operators of approximately 25 percent of the acreage in the flood plain. Schedules covered flooding and flood damage; past, present, and intended future use; and yield data. Verification of information gained in the field was obtained from local agricultural technicisns.

The frequency method of analysis of damages was used, and the occurrence of more than one flood in a growing season was considered in determining crop and pasture damage. The computed damages were discounted for the recurrence with allowance for partial recovery between floods.

Other agricultural dsmages to fences, farm roads, snd the cost of removing debris from fields were estimated from information collected in the field and correlated with area and depth of flooding.

Monetary damage to the flood plain from swamping damages caused by sediment deposition was based on the loss in value of production. Reduction in monetary damages was based on the effectiveness of land treatment measures, trap efficiency of the planned structural measure, and the average annusl srea flooded under each progressive phase of the project.

Redevelopment Benefits

Redevelopment benefits which would accrue during project installation and from operation and maintenance were calculsted by spplying prevailing wage rates to the amount of local labor clssses and types that will be used by the contractor. This estimate was converted to an average annual equivalent value by the application of appropriate amortization factors. The estimate of the amount of unemployed or underemployed local labor which will be used wss based on an analysis of recent contracts. Red River County has been designated as a county eligible for assistance under provisions of the Economic Development Act.

Negative Project Benefits

Areas that will be used for project construction and the area to be inundated by the reservoir pool were excluded from damage calculations. Net income from production to be lost in these areas after installation of the project was compared with the appraised value of the land amortized over the period of project life. No production in the sediment pool was considered and the land covered by the detention pool was assumed to be pastureland under project conditions. The annual value of the loss of net income from these areas was less than the amortized value of the land; therefore, the easement value was used in economic justification.

Indirect Damage Reduction Benefits

Expenses associated with disruption of agricultural operations, interruption of travel, rerouting of school buses and mail routes, business losses and similar losses will be incurred. Indirect damages were estimated to be 10 percent of crop and pasture, other agricultural, sediment, and nonagricultural road and bridge damages, and 20 percent of the urban property damage.

Secondary Benefits

The value of local secondary benefits stemming from the project were estimated to be equal to 10 percent of direct primary benefits. This excludes all indirect benefits from the computation of secondary benefits.

Increased employment resulting from the proposed project was estimated by the use of multipliers as calculated in "An Input-Output Analysis of the Texas Economy Emphasizing Agriculture" by Lonnie L. Jones and Gholam Mustafa, Texas A&M University, November 1971.

Archeological

An archeology survey of the floodwater retarding structure site was conducted by the Department of Anthropology, Archeology Research Program, Southern Methodist University, under the direction of Mr. S. Alan Skinner as principal investigator.

The survey report stated that no evidence of prehistoric occupation was noted in the survey area, confirming information from local artifact collectors that no sites are known to exist in this area. It was the opinion of the inveatigators that no archeological resources will be affected by the proposed floodwater retarding structure.

Fish and Wildlife

The Fish and Wildlife Service, in cooperation with the Texas Parks and Wildlife Department, completed a reconnaissance study of Deport Creek watershed. This report was valuable in work plan development pertaining to fish and wildlife. The major portion of this report is contained in the EFFECTS OF WORKS OF IMPROVEMENT section of this work plan. Data from field office files and information gathered from local people with knowledge of fish and wildlife was used in assessing the impact of the project on fish and wildlife resources.

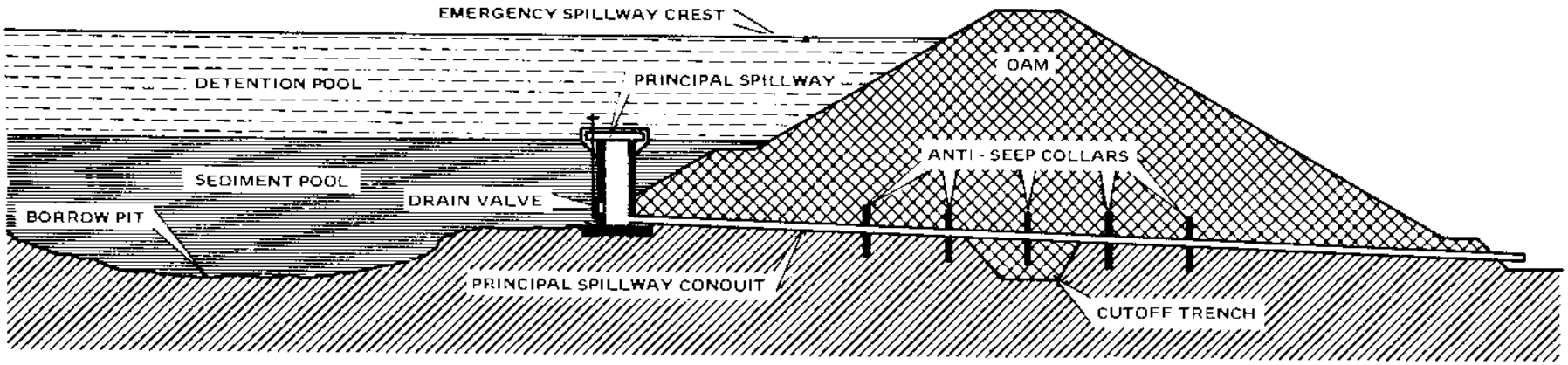
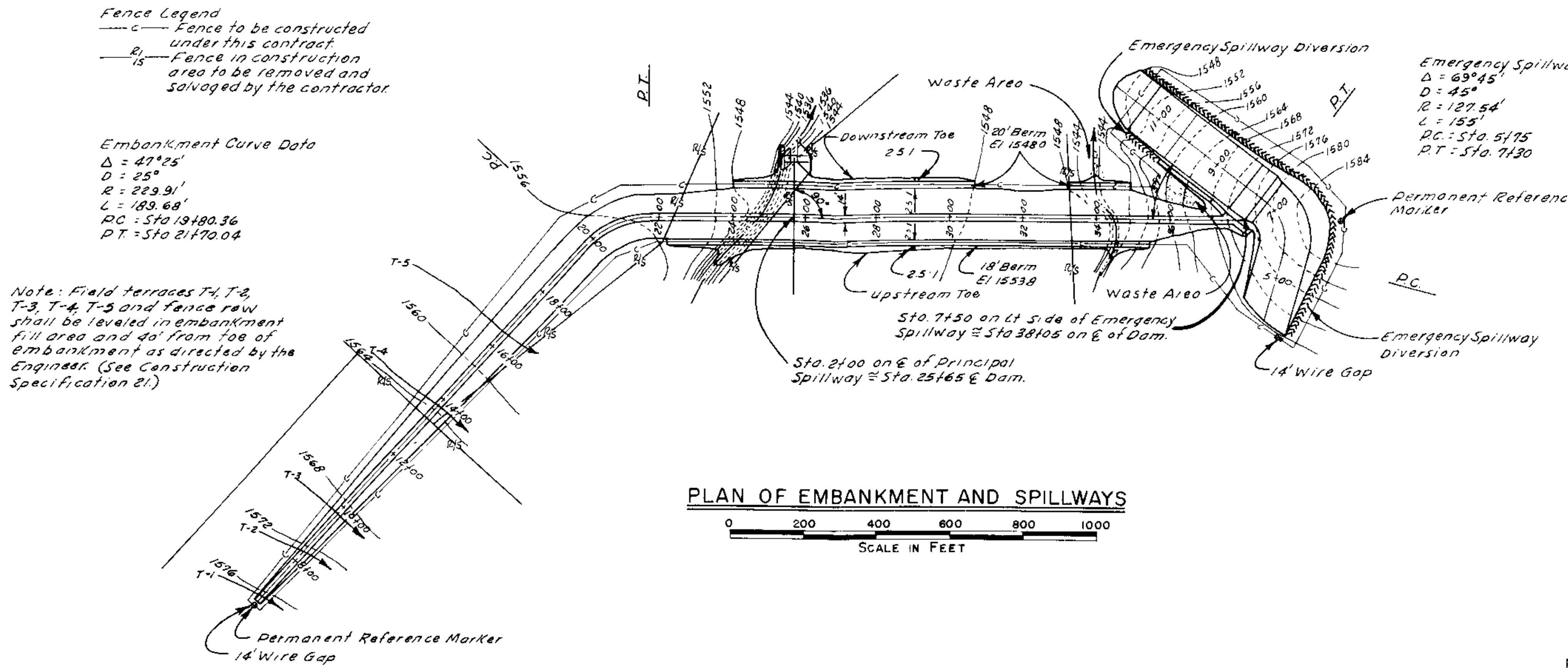


Figure 1

SECTION OF A TYPICAL FLOODWATER RETARDING STRUCTURE

U. S. D. A., SOIL CONSERVATION SERVICE

REV. 5-74 4-L-10071-C



PLAN OF EMBANKMENT AND SPILLWAYS

A minimum of 6" of topsoil shall be placed in the Emergency Spillway and on all Earth Fill Areas (See Construction Specification 26A)

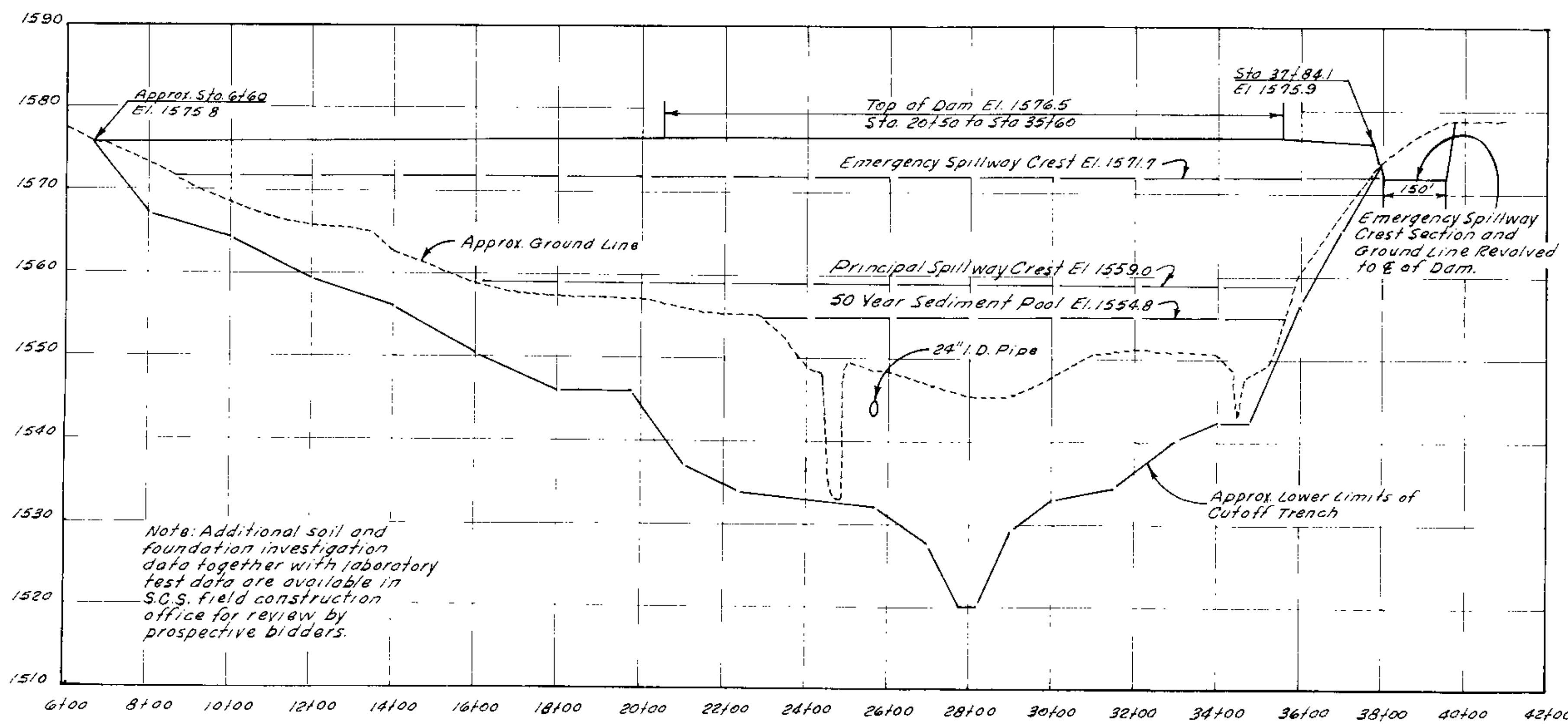
Emergency Spillway Diversions shall have 18 ft minimum base width; 3:1 side slopes; and 18" effective height. Effective height may be secured by grading a channel across high points to reduce the height of fill required in low areas. Where a channel section is required, the minimum bottom width shall be 12 feet.

Stream Channel within embankment area shall be shaped and cleared of objectionable material. (See Sheet 14 and Construction Specification 21.)

Dozer pits excavated during Soil and Foundation Investigation and not removed by normal construction operations, shall be filled, leveled and graded by the contractor. (See Construction Specification 23A.)

All suitable materials within the limits of the Sediment Pool Area shall be used prior to enlarging the Borrow outside these limits as directed by the Engineer.

Elevation	Surface Acres	Storage Acre Feet	Storage Inches
1544	0	0	.00
1548	5.4	11	.04
1552	17.5	57	.23
1554.8	28.0	125	.50
1556	32.0	156	.63
1559	49	280	1.12
1560	54.7	329	1.32
1564	73.4	585	2.35
1568	103.2	938	3.76
1571.7	129.0	1372	5.50
1572	129.6	1404	5.63
1576	172.0	2007	8.05
Top of Dam (Effective) Elev.			1575.8
Emergency Spillway Crest Elev.			1571.7
Principal Spillway Crest Elev.			1559.0
Sediment Pool Elev. (50 Yr)			1554.8
Drainage Area, Acres			2991
Sediment Storage, Acre Feet			365
Floodwater Storage, Acre Feet			1007
Max. Emergency Spillway Cap., cfs.			3144
Max. Prin. Spillway Discharge @ El. 1571.7, cfs			70

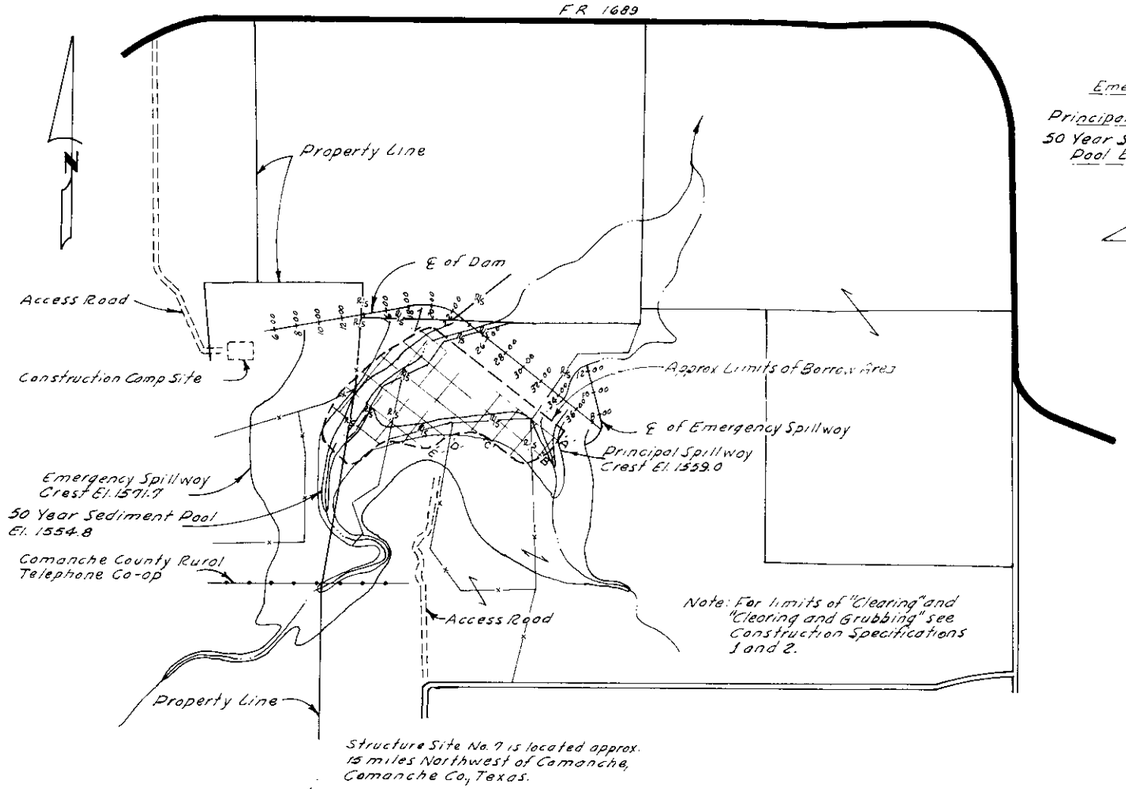


PROFILE ON ℄ OF DAM

FIGURE 2
TYPICAL
FLOODWATER RETARDING STRUCTURE
EMBANKMENT AND EMERGENCY SPILLWAY
PLAN AND PROFILE

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

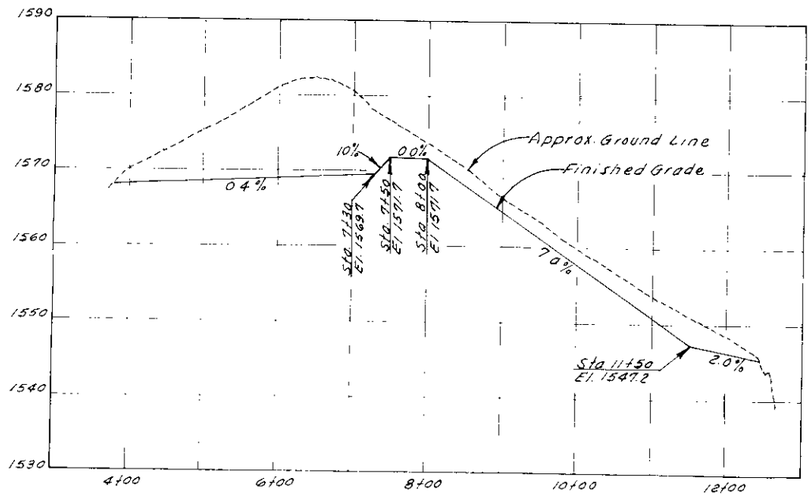
4-E-30,427



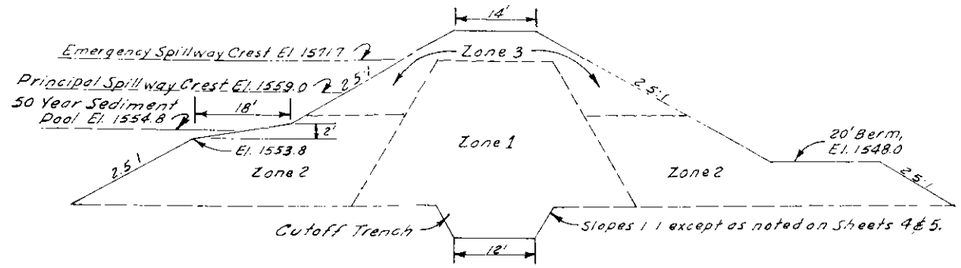
Structure Site No. 7 is located approx. 15 miles Northwest of Comanche, Comanche Co, Texas.

GENERAL PLAN OF RESERVOIR AND VICINITY MAP

0 660 1320 1980 2640 3300
SCALE IN FEET



PROFILE ON ℄ OF EMERGENCY SPILLWAY

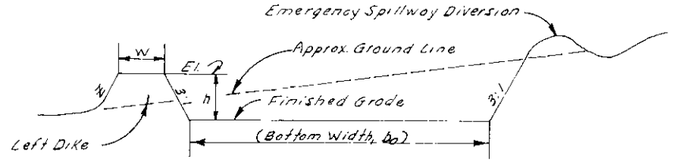


TYPICAL SECTION

Materials Placement Data									
Embankment Zone No. 1/	Type or Unified Classification of Materials	Field Control Test ASTM Test Number	Field Control Test ASTM Test Method	Placement and Compaction Requirements: Max. Allowable Particle Size	Max. Uncompacted Layer Thickness	Specified Compaction Class	Min. Dry Density Percent of Field Test Max Dry Density	Moisture Limits, Relative to Field Test Optimum %, From	Moisture Limits, Relative to Field Test Optimum %, To
1 or Any	CL, Sandy Silty Clay	D-698	A or B	6"	9"	A	95	-1	Up
2	CL-ML, Sandy Silty Clay	D-698	A or B	6"	9"	A	95	Opt	Up
3	Sandstone	D-698	A or B	6"	9"	A	95	Opt	Up

1/ The zone boundaries shown in the typical section are approximate. They may be varied as permitted by the Engineer, to allow the use of all suitable and needed materials from the required excavations.

ZONED EMBANKMENT DATA



Left Dike: From Sta 7+30 to embankment, El. 1575.2, W = 14' and Z = 2.5:1.

From embankment to Sta. 8+50, dike is transitional.

From sta 8+50 to Sta. 10+20 h = 2.5' W = 12' and z = 3:1. From Sta. 10+20 to Sta. 10+25, dike is transitional to diversion.

For payment purposes, transition from dike to diversion shall be considered as dike.

Bottom Width From approx. Sta. 4+00 to Sta 7+30, b_o = 138'. From Sta. 7+30 to Sta. 7+50, b_o is transitional. From Sta. 7+50 to approx. Sta. 12+00, b_o = 150'.

Material forming dike shall be placed and paid for as "Earth Fill, Embankment." See Materials Placement Data and Construction Specification 23A.

TYPICAL SECTION – EMERGENCY SPILLWAY

FIGURE 2A
TYPICAL
FLOODWATER RETARDING STRUCTURE
GENERAL PLAN OF RESERVOIR AND SECTION–ZONED EMBANKMENT

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

		DATE
Designed	D.C. F.E.W.-3	4-71
Drawn	D.C. "	4-71
Traced	D.C. "	5-71
Checked	W.L.B.E.J.D.K.	6-71

SHEET 3 OF 5 SHEETS

4-E-30,427

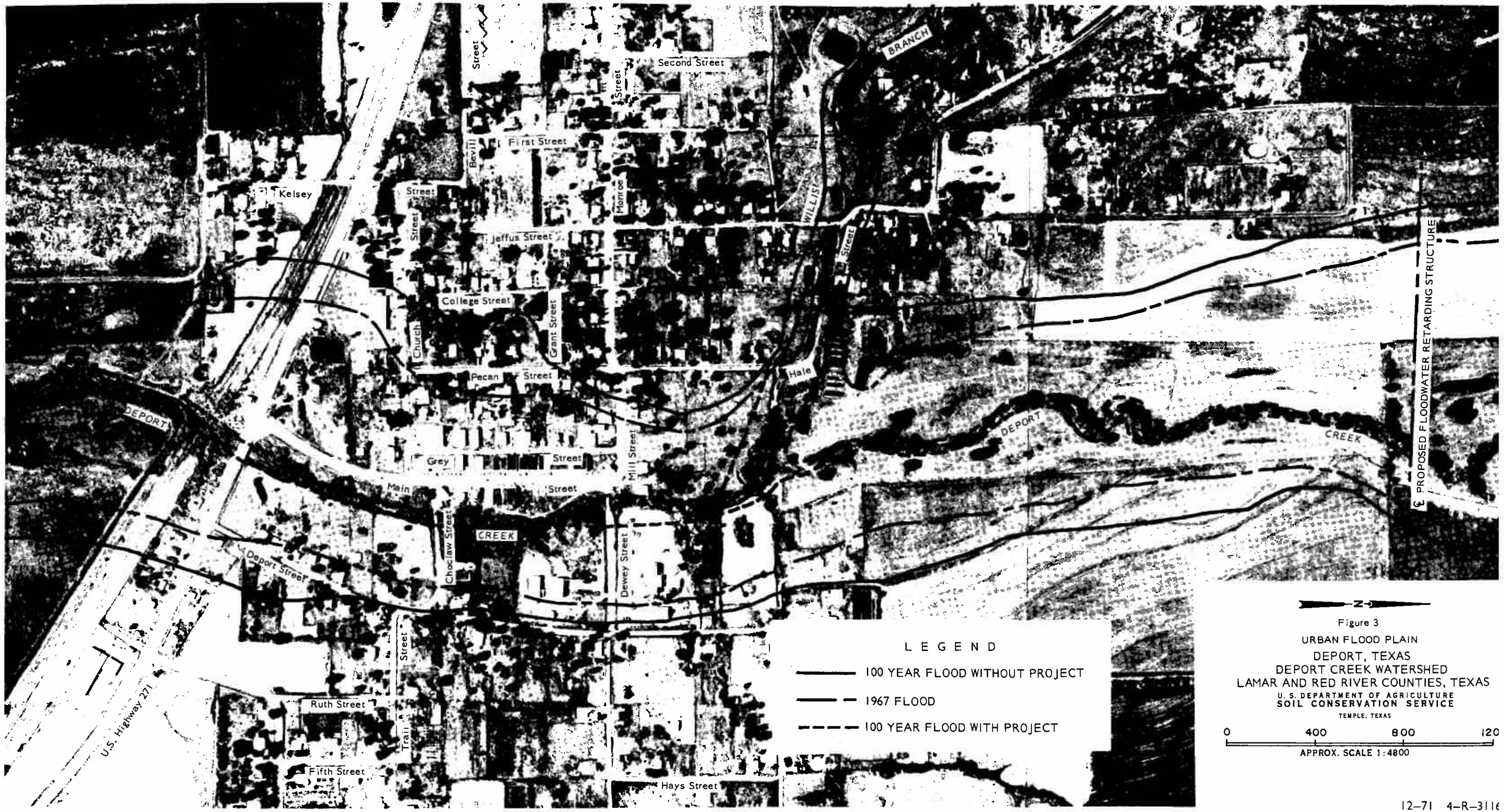


Figure 3

URBAN FLOOD PLAIN

DEPORT, TEXAS

DEPORT CREEK WATERSHED

LAMAR AND RED RIVER COUNTIES, TEXAS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
TEMPLE, TEXAS

0 400 800 120

APPROX. SCALE 1:4800

12-71 4-R-3116

USDA SCS FORT WORTH TEX 1974

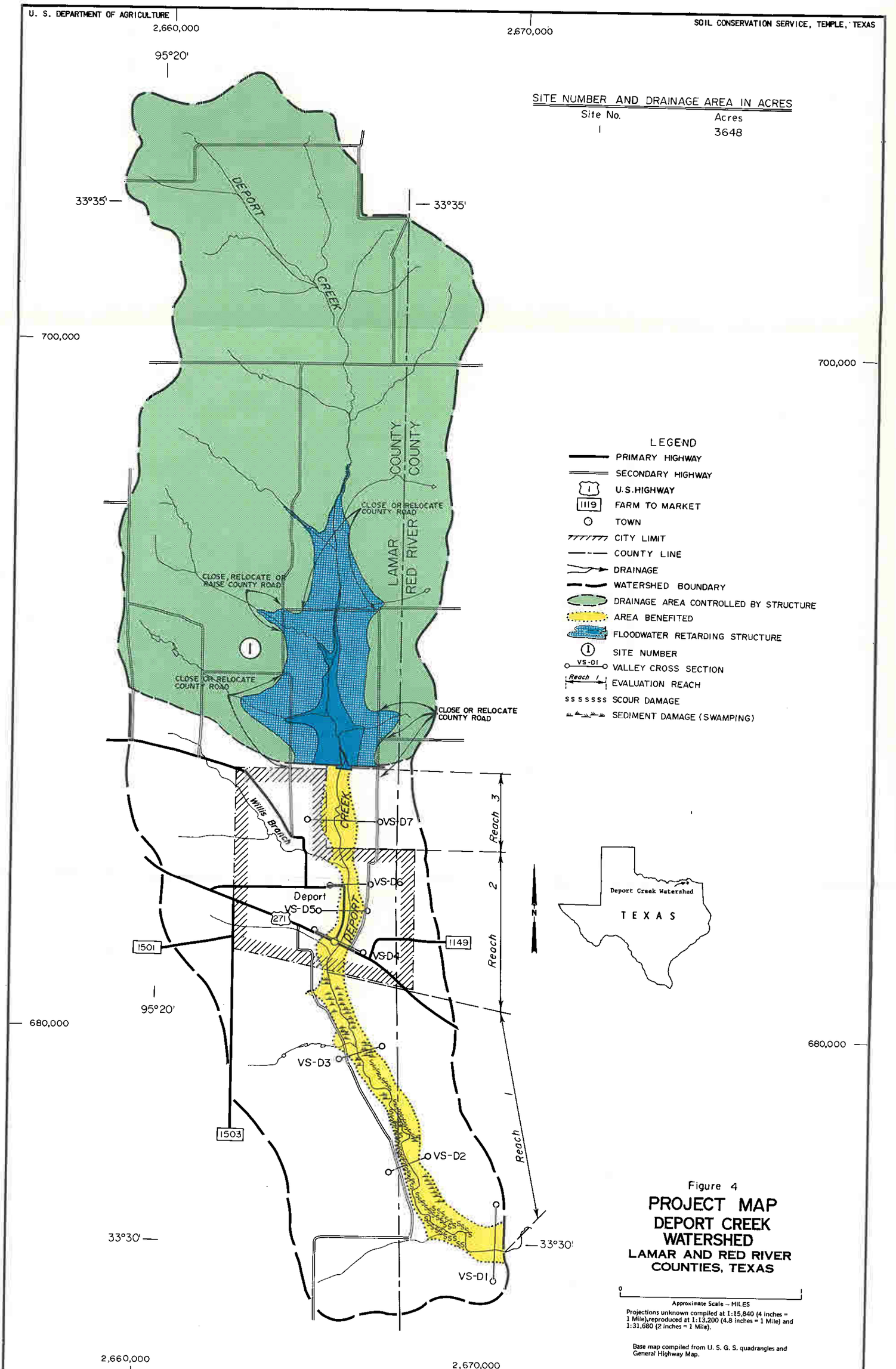


Figure 4

PROJECT MAP
DEPORT CREEK WATERSHED
LAMAR AND RED RIVER COUNTIES, TEXAS

Revised May 1974

MARCH 1971

4-R-30902

4-R-30245