

SUPPLEMENTAL
WATERSHED WORK PLAN NO. III
FOR
WATERSHED PROTECTION, FLOOD PREVENTION, RECREATION,
AND
AGRICULTURAL AND NON-AGRICULTURAL WATER MANAGEMENT
CHOCTAW CREEK WATERSHED
GRAYSON COUNTY, TEXAS



March 1972

SUPPLEMENTAL WATERSHED WORK PLAN AGREEMENT NO. III

Between the

Choctaw Watershed Water Improvement District
Local Organization

Upper Elm-Red Soil and Water Conservation District
Local Organization

Grayson County Commissioners Court
Local Organization

City of Sherman
Local Organization

City of Denison
Local Organization

City of Bells
Local Organization

City of Howe
Local Organization

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

and the

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

Whereas, the Watershed Work Plan Agreement for the Choctaw Creek Watershed, State of Texas, executed by the Sponsoring Local Organizations named therein and the Service, became effective on the 12th day of October, 1966; and

Whereas, the Supplemental Watershed Work Plan Agreement for Choctaw Creek Watershed, State of Texas, executed by the Sponsoring Local Organization and the Service, became effective on the 17th day of August, 1971; and

Whereas, the Supplemental Watershed Work Plan Agreement No. II for Choctaw Creek Watershed, State of Texas, executed by the Sponsoring Local Organization and the Service, became effective on the 24th day of November, 1971; and

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

Whereas, it has been found necessary to modify the Watershed Work Plan, as supplemented, to change the scope of the project by deleting multiple-purpose Structures Nos. 13 and 34, and including Floodwater Retarding Structures Nos. 13A and 34A; and

Whereas, the City of Howe ceases to be a co-sponsor effective as of the date this Supplemental Watershed Work Plan is executed; and

Whereas, it has been found necessary to modify the Watershed Work Plan as supplemented, to increase the land area to be purchased under a cost-share arrangement at Multiple-Purpose Structure No. 38 from about 22 acres to about 40 acres.

Whereas, a Supplemental Watershed Work Plan No. III which modifies the Watershed Work Plan dated November 1965, the Supplemental Watershed Work Plan dated June 1970, and the Supplemental Watershed Work Plan No. II dated October 1971, for said watershed has been developed through the cooperative efforts of the Sponsoring Local Organization and the Service; which plan is annexed to and made a part of this agreement; and

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

1. Paragraph numbered 1 is modified with respect to Multiple-Purpose Structure No. 38 to read as follows:

<u>Works of Improvement</u>	<u>Sponsoring Local Organization</u> (percent)	<u>Service</u> (percent)	<u>Estimated Land Rights Cost</u> (dollars)
<u>Multiple-Purpose Structure No. 38 and Basic Recrea- tion Facilities (Denison)</u>			
Payment to landowners for about 40 acres, cost of modification of improve- ments, and land rights appraisal costs	50.00	50.00	60,000
Legal fees, survey costs flow easements, and other costs	100.00	-	2,300

The Sponsoring Local Organization agrees that all land acquired or improved with P.L. 566 financial or credit assistance will not be sold or otherwise disposed of for the evaluated life of the project except to a public agency which will continue to maintain and operate the development in accordance with the Operation and Maintenance Agreement.

2. Paragraph numbered 3 is modified to read as follows:

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

<u>Works of Improvement</u>	<u>Sponsoring Local Organization</u> (percent)	<u>Service</u> (percent)	<u>Estimated Construction Cost</u> (dollars)
Multiple-Purpose Structure No. 1 (Sherman)	53.20	46.80	718,300
Multiple-Purpose Structure No. 4 (Sherman)	64.00	36.00	462,000
Multiple-Purpose Structure No. 10A (Sherman)	11.33	88.67	82,360
Multiple-Purpose Structure No. 30 (Bells)	43.02	56.98	129,800
Diversion Works	100.00	0	75,000
Multiple-Purpose Structure No. 35 (Sherman)	59.13	40.87	597,300
Basic Recreation Facilities	50.00	50.00	281,600
Multiple-Purpose Structure No. 38 (Denison)	14.845	85.155	103,400
Basic Recreation Facilities	50.00	50.00	144,210
110,180 feet of stream Channel improvement	0	100.00	391,600
21,600 feet of Drainage Mains and Laterals (Choctaw WWID)	25.00	75.00	7,700
35 Single-Purpose Flood-water Retarding Structures	0	100.00	2,103,914
7 Grade Stabilization Structures	0	100.00	20,130

3. Paragraph numbered 4 is modified to read as follows:

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

<u>Works of Improvement</u>	<u>Sponsoring Local Organization</u> (percent)	<u>Service</u> (percent)	<u>Estimated Engineering Cost</u> (dollars)
Multiple-Purpose Structure No. 1 (Sherman)	53.20	46.80	32,323
Multiple-Purpose Structure No. 4 (Sherman)	64.00	36.00	20,790
Multiple-Purpose Structure No. 10A (Sherman)	11.33	88.67	5,766
Multiple-Purpose Structure No. 30 (Bells)	43.02	56.98	7,801
Diversion Works	100.00	-	2,625
Multiple-Purpose Structure No. 35 (Sherman)	50.62	49.38	27,757
Basic Recreation Facilities	50.00	50.00	12,672
Multiple-Purpose Structure No. 38 (Denison)	-	100.00	7,145
Basic Recreation Facilities	50.00	50.00	6,490
110,180 feet of Stream Channel Improvement	-	100.00	20,900
21,600 feet of Drainage Main and Laterals	-	100.00	1,194
35 Single-Purpose Flood- water Retarding Structures	-	100.00	162,220
7 Grade Stabilization Structures	-	100.00	2,926

4. Paragraph numbered 5 is modified to read as follows:

The Sponsoring Local Organization and the Service will each bear the costs of Project Administration which it incurs, estimated to be \$224,823 and \$624,506 respectively.

5. The Sponsoring Local Organization and the Service further agree to all other terms, conditions, and stipulations of said Watershed Work Plan Agreement, as supplemented, not modified herein.

Choctaw Watershed Water Improvement District
Local Organization

By T. G. McGraw
T. G. MCGRAW
Title President
Address 318 W. Lamar
Sherman, TX 75090
Date Sept 27 1972

The signing of this agreement was authorized by a resolution of the governing body of the Choctaw Watershed Water Improvement District Local Organization adopted at a meeting held on June 7 1967

V. President F.N. ROGERS
(Secretary, Local Organization)
Address Sherman Tx 75090
Zip Code
Date Sept 27 '72

Upper Elm-Red Soil and Water Conservation District
Local Organization

By J.H. Bayer
J.H. BAYER
Title Chairman
Address Maerater 76252
Zip Code

Date 11-8-72

The signing of this agreement was authorized by a resolution of the governing body of the Upper Elm-Red Soil and Water Conservation District Local Organization adopted at a meeting held on 11-8-72

Clyde E. Hale
(Secretary, Local Organization)
CLYDE E. HALE
Address P.O. 1234 SHERMAN TEX 75090
Zip Code
Date 11-8-72

Grayson County Commissioners Court

Local Organization

By *Les Taibbe*
LES TAIBBLE

Title *County Judge*

Address *Sherman Tex 75090*
Zip code

Date *10-3-72*

The signing of this agreement was authorized by a resolution of the governing body of the Grayson County Commissioners Court Local Organization

adopted at a meeting held on *10-3-72*

Paul E. Lee
(Secretary, Local Organization)
PAUL E. LEE

Address *Sherman Tex 75090*
Zip Code

Date *10-3-72*

City of Sherman

Local Organization

By *S. E. Gillespie*
S. E. GILLESPIE

Title *MAYOR*

Address *P.O. Box 1106*
SHERMAN TEXAS 75090
Zip Code

Date *10-2-72*

The signing of this agreement was authorized by a resolution of the governing body of the City of Sherman Local Organization

adopted at a meeting held on *OCT 2, 1972*

Jack Spears
(Secretary, Local Organization)
P.O. Box 1106 JACK SPEARS

Address *SHERMAN, TEXAS 75090*
Zip Code

Date *10-2-72*

City of Denison
Local Organization

By Robert L. Cherry
ROBERT L. CHERRY

Title Mayor

Address Denison, Tex 75820
Zip code

Date 10/4/72

The signing of this agreement was authorized by a resolution of the governing body of the City of Denison Local Organization adopted at a meeting held on Oct. 4 1972

Louise Blanton
(Secretary, Local Organization)
LOUISE BLANTON

Address Denison, Tex 75820
Zip Code

Date Oct. 4, 1972

City of Bells
Local Organization

By A.L. Isom
A.L. ISOM

Title Mayor

Address Bells, Tex 75414
Zip Code

Date Oct 3, 1972

The signing of this agreement was authorized by a resolution of the governing body of the City of Bells Local Organization adopted at a meeting held on Oct 3, 1972

H.C. Young
(Secretary, Local Organization)
H.C. YOUNG

Address Bells, Tex 75414
Zip Code

Date Oct 3, 1972

City of Howe
Local Organization

By James W. Hall
JAMES W. HALL

Title Mayor

Address Howe, Texas 75059
Zip Code

Date 10/5/72

The signing of this agreement was authorized by a resolution of the governing body of the City of Howe Local Organization

adopted at a meeting held on 10-5-72

George Barnes
(Secretary, Local Organization)
GEORGE BARNES

Address Howe Tx 75059
Zip Code

Date 10/5/72

Local Organization

By _____

Title _____

Address _____
Zip Code

Date _____

The signing of this agreement was authorized by a resolution of the governing body of the _____ Local Organization

adopted at a meeting held on _____

(Secretary, Local Organization)

Address _____
Zip Code

Date _____

Soil Conservation Service
United States Department of Agriculture

By Edward E. Thomas
(State Conservationist)

Date 11/14/72

SUPPLEMENTAL
WATERSHED WORK PLAN NO. III
FOR
WATERSHED PROTECTION, FLOOD PREVENTION, RECREATION,
AND
AGRICULTURAL AND NON-AGRICULTURAL WATER MANAGEMENT

CHOCTAW CREEK WATERSHED
Grayson County, 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:

Choctaw Watershed Water Improvement District
Upper Elm-Red Soil and Water Conservation District
Grayson County Commissioners Court
City of Sherman
City of Denison
City of Bells

With Assistance By:

U.S. Department of Agriculture
Soil Conservation Service
March 1972

SUPPLEMENTAL
WATERSHED WORK PLAN NO. III

CHOCTAW CREEK WATERSHED
Grayson County, Texas
March 1972

PURPOSE OF THE SUPPLEMENTAL WORK PLAN

It has become necessary to modify the watershed work plan, as supplemented, for Choctaw Creek watershed to make the following changes:

1. Delete multiple-purpose structures Nos. 13 and 34 and add floodwater retarding structures Nos. 13A and 34A. Floodwater retarding structure No. 13A will be relocated upstream slightly to obtain a more economical single-purpose structure. Floodwater retarding structure No. 34A will be at the same location as multiple-purpose structure No. 34.
2. Modify the take line for multiple-purpose structure No. 38.
3. Delete the City of Howe as a sponsor. They will have no responsibility for any part of the watershed project.

The following are changes and modifications made in appropriate parts of the work plan.

Basis for Project Formulation

Since the original work plan was prepared, the city of Howe has determined that it will be unable to fulfill its financial responsibilities for the inclusion of municipal water supply capacity in multiple-purpose structure No. 13. The city believes that its present source of water will be sufficient for the near future. They tentatively plan on buying water from Sherman when they need additional water.

The landowner who requested that irrigation storage capacity be included in multiple-purpose structure No. 34 no longer desires this capacity; therefore, the Choctaw Watershed Water Improvement District is not able to fulfill its responsibilities.

The city of Denison has determined that the recreational features of multiple-purpose Site 38 will be improved if the land to be purchased for recreational uses could be increased from 22 acres to about 40 acres. This increase in recreational land will provide about 16 more acres for recreational use and provide better access to the reservoir. The area around the site is rapidly being developed as a residential area and the additional area needs to be acquired for recreational uses to prevent

private property development that would impair the public's full use of the reservoir within and immediately contiguous to the storage pool. The change would also provide public access to the development from the west end of the reservoir. There is a large residential development in this area. Access to the reservoir in this area is needed.

The price base was changed from USDA, ARS-AMS, projections dated September 1957 to adjusted normalized prices, "Interim Price Standards for Planning and Evaluating Water and Land Resources," Water Resources Council, April 1966.

Works of Improvement To Be Installed

The works of improvement to be installed will change to 35 floodwater retarding structures, 6 multiple-purpose structures, about 20.87 miles of stream channel improvement, 7 grade stabilization structures, and 4.09 miles of drainage main and laterals (figure 10). In addition, the recreation area at multiple-purpose Site 38 will be increased from 22 acres to about 40 acres (figure 6). The additional area is land that the city would have acquired flowage easements on in order to construct the reservoir.

It is not planned to increase the basic recreational facilities planned for the reservoir.

The city and the Service will cost-share on the cost of acquiring the additional land.

It is not anticipated that these changes will result in any changes in the number or type of displacements caused by the project.

Explanation of Installation Costs

The total installation cost of the structural measures (including recreational facilities) is estimated to be \$8,538,368, of which Public Law 566 costs will be \$4,875,592 and the local share will be \$3,662,776.

The Public Law 566 costs consist of \$3,715,963 for construction, \$249,841 for engineering services, \$245,090 for land rights, \$40,192 for relocation payments, and \$624,506 for project administration. The local costs consist of \$1,401,351 for construction, \$60,768 for engineering services, \$1,918,726 for land rights, \$6,100 for water rights, \$51,008 for relocation payments, and \$224,823 for project administration.

For any displacement prior to July 1, 1972, Public Law 566 funds will provide the first \$25,000 for each displacement.

The cost of acquiring the land rights was revised to reflect current land values.

The cost-sharing summary for multiple-purpose Site 38 is shown on the following tabulation:

Item	: Total : Estimated Sponsors' : Estimated PL 566		: Cost : Cost : Cost		
	: Dollars	: Percent	: Dollars	: Percent	: Dollars
Construction	103,400	14.845	15,350	85.155	88,050
Engineering	7,145	-	-	100.00	7,145
Land Rights					
Purchase of About 39 Acres and Modifications	58,500	50.00	29,250	50.00	29,250
Flowage Easements	1,200	100.00	1,200	-	-
Legal Fees and Land Surveys	1,000	100.00	1,000	-	-
Water Rights	100	100.00	100	-	-
Relocation Payments	10,500	55.93	5,873	44.07	4,627
Subtotal - Reservoir	181,845		52,773		129,072
Recreation Development					
Land Rights					
Purchase of 1 Acre	1,500	50.00	750	50.00	750
Legal Fees	100	100.00	100	-	-
Facilities					
Construction	144,210	50.00	72,105	50.00	72,105
Engineering	6,490	50.00	3,245	50.00	3,245
Subtotal - Recreation Development	152,300		76,200		76,100
TOTAL PROJECT	334,145		128,973		205,172

Effects of Works of Improvement

The change in the take line of multiple-purpose structure No. 38 will provide better access to the recreation development and help prevent private property development within and immediately contiguous to the pools. The increased area will provide a much better over-all facility. It is not planned to increase the basic recreational facilities at this time; therefore, it was assumed that the recreational benefits would not change.

The elimination of storage capacity for irrigation in Site 34 and municipal water in Site 13 will cause these benefits to be lost to the project.

The loss of 0.29 square miles of drainage area control caused by locating floodwater retarding structure 13A upstream from the site of multiple-purpose structure No. 13 will result in a very minor change in the effect of the project on reducing damage by floodwater. The change in percent reduction in floodwater damages in evaluation reach 6 will be less than 0.2 of 1 percent.

The changes in the project will not have any significant effect on any other evaluation reaches.

Project Benefits

The estimated average annual monetary damage (revised table 5) within the watershed will be reduced from \$299,503 to \$54,593, or 82 percent. Crop and pasture damages will be reduced from \$105,932 to \$27,369, or 74 percent. Other agricultural damage, such as loss of fences, farming equipment, livestock, and other property, will be reduced from \$36,819 to \$9,336, or 75 percent. Road and bridge damage will be reduced from \$29,130 to \$2,076, or 93 percent. Urban damage in the city of Sherman will be reduced from \$74,600 to \$4,300, or 94 percent. The overbank deposition of damaging sediment upon flood plain soils, now occurring at the rate of \$2,262 annually, will be reduced to \$817, or 64 percent. Channel deposition damage will be reduced from \$2,110 to \$717, or 66 percent. Flood plain scour damages will be reduced from \$20,247 to \$4,177, or 79 percent. Valley trenching damage will be reduced from \$1,175 to \$838, or 29 percent.

Incidental recreation benefits will be \$4,236 annually.

Benefits of \$2,800 annually can be expected to accrue as a result of installing the drainage system for the 260 acres of wet land.

The multiple-purpose structures with associated recreation facilities will produce approximately \$157,757 in annual benefits to residents of the area.

Benefits accruing as a result of developing municipal water storage for the cities of Sherman and Bells are expected to be \$60,115 annually.

The average annual floodwater, sediment and erosion damage reduction in the benefited area for each evaluation reach is shown in the following tabulation:

Evaluation Reach	Without Project (dollars) ^{1/}	With Project (dollars) ^{1/}	Reduction (percent)
1	149,688	31,477	79
2	25,288	7,663	70
3	17,636	3,477	80
4	10,195	3,260	68
5	82,060	4,730	94
6	10,828	1,965	82
7	3,808	2,021	47
Total	299,503	54,593	82

^{1/} Adjusted normalized prices.

Although not considered pertinent from a national viewpoint, secondary benefits will amount to \$40,658 annually in the immediate locale. This amount, which excludes indirect benefits in any form, results from \$37,759 in secondary benefits stemming from the project and \$2,899 induced by the project.

Comparison of Benefits and Costs

The total average annual cost of structural measures and basic recreational facilities (amortized total installation cost and project administration, plus operation, maintenance, and replacement) is \$336,440. These measures are expected to produce average annual primary benefits of \$458,980. The benefit-cost ratio without secondary benefits is 1.4 to 1.0. The ratio of total annual project benefits accruing to structural measures, \$499,638, to the average annual cost of structural measures, \$336,440, is 1.5 to 1.0 (revised table 6).

Project Installation

The Choctaw Watershed Water Improvement District and the Grayson County Commissioners Court will assume the same responsibilities for floodwater retarding structures Nos. 13A and 34A as they have for the other single-purpose floodwater retarding structures except No. 11. The City of Howe will no longer have any responsibilities for the installation of any part of the project.

Financing Project Installation

The Choctaw Watershed Water Improvement District and the Grayson County Commissioners Court will assume the same responsibilities for floodwater retarding structures Nos. 13A and 34A as they have for the other single-purpose floodwater retarding structures except No. 11. The City of Howe will no longer be responsible for financing any part of the project.

Provisions for Operation and Maintenance

The Choctaw Watershed Water Improvement District and Grayson County will assume the responsibilities for operation and maintenance of floodwater retarding structures No. 13A and No. 34A. The City of Howe will no longer have any operation and maintenance responsibilities for any works of improvement included in the work plan.

The average annual cost of operation and maintenance of all structural measures is estimated to be \$28,582.

REVISED TABLE 1 - ESTIMATED PROJECT INSTALLATION COST
Choctaw Creek Watershed, Texas

Installation Cost Item	: Unit	: Number : To Be : Applied	Estimated Cost (Dollars) 1/		
			: Public Law : 566 Funds	: Other : Funds	: Total
LAND TREATMENT					
Soil Conservation Service					
Cropland	Acre	40,138	-	362,586	362,586
Grassland	Acre	92,902	-	1,700,178	1,700,178
Technical Assistance			25,267	170,924	196,191
SCS Subtotal			25,267	2,233,688	2,258,955
TOTAL LAND TREATMENT			25,267	2,233,688	2,258,955
STRUCTURAL MEASURES					
CONSTRUCTION					
Soil Conservation Service					
Floodwater Retarding Structures	No.	35	2,103,914	-	2,103,914
Stream Channel Improvement	Foot	110,180	391,600	-	391,600
Grade Stabilization Structures	No.	7	20,130	-	20,130
Drainage Main and Laterals	Foot	21,600	5,775	1,925	7,700
Multiple-Purpose Structures	No.	6	981,639	1,111,521	2,093,160
Basic Recreational Facilities	No.	2	212,905	212,905	425,810
Diversion Works	No.	1	-	75,000	75,000
Subtotal - Construction			3,715,963	1,401,351	5,117,314
Engineering Services					
Soil Conservation Service			249,841	60,768	310,609
Subtotal - Engineering Services			249,841	60,768	310,609
Relocation Payments					
Soil Conservation Service			40,192	51,008	91,200
Subtotal - Relocation Payments			40,192	51,008	91,200
Project Administration					
Soil Conservation Service					
Relocation Advisory Assistance Services			-	4,000	4,000
Construction Inspection			292,575	77,125	369,700
Other			391,931	143,698	535,629
Subtotal - Project Administration			624,506	224,823	849,329
Other Costs					
Land Rights			245,090	1,918,726	2,163,816
Water Rights			-	6,100	6,100
Subtotal - Other Costs			245,090	1,924,826	2,169,916
TOTAL STRUCTURAL MEASURES			4,875,592	3,662,776	8,538,368
TOTAL PROJECT			4,900,859	5,896,464	10,797,323

1/ Price Base: 1971 for all structural measures except floodwater retarding structures Nos. 12, 16, 17, 20, 21, 23, 27, 33, 39 and 40 and grade stabilization structures 101 and 102, which are at actual construction cost.

March 1972

REVISED TABLE 2 - ESTIMATED STRUCTURAL COST DISTRIBUTION

Choctaw Creek Watershed, Texas
(Dollars) 1/

Item	Installation Cost - Public Law 566 Funds				Installation Cost - Other Funds				Total Installation Cost
	Construction	Engineering	Land Rights	Relocation	Construction	Engineering	Land Rights	Relocation	
Floodwater Retarding Structures									
(Constructed)									
Nos. 12, 16, 17, 20, 21, 23, 27, 33, 39, and 40	3/ 506,375	61,991	-	-	548,566	-	-	76,575	625,141
Floodwater Retarding Structures									
13A	67,940	4,756	-	-	72,696	-	-	19,400	92,096
34A	32,370	3,237	-	-	35,607	-	-	5,950	41,557
Subtotal	100,310	7,993	-	-	108,303	-	-	25,350	133,653
Floodwater Retarding Structures									
23 Structures	1,497,029	112,236	-	-	1,609,265	-	-	23,938	1,633,203
Subtotal - Floodwater Retarding Structures	2,103,914	162,220	-	-	2,266,134	-	-	808,141	3,117,075
Multiple-Purpose Structures									
1	336,164	15,127	-	4,980	356,271	382,136	17,196	251,500	645,103
4	166,320	7,484	-	-	173,804	295,680	13,306	181,500	465,790
10A	73,029	5,113	-	-	78,142	9,331	653	26,800	115,426
30	73,960	4,445	-	-	78,405	55,840	3,356	34,000	172,601
Subtotal	649,473	32,169	-	4,980	686,622	643,087	24,005	345,800	1,075,514
35	244,116	13,706	172,590	11,679	442,091	353,184	14,051	367,160	809,251
Basic Recreation Facilities									
Sites 35	140,800	6,336	42,500	-	189,636	140,800	6,336	44,500	381,272
38	386,916	20,042	215,090	11,679	633,727	493,984	20,387	411,660	1,045,711
Subtotal	88,030	7,145	19,250	4,627	129,072	15,350	-	31,450	181,845
Basic Recreation Facilities									
Sites 38	22,105	3,245	750	-	26,100	72,105	3,245	850	102,300
Multiple-Purpose Structures	160,155	10,390	30,000	4,627	205,172	87,455	3,245	32,300	292,627
Subtotal - Multiple-Purpose Structures	1,194,544	62,601	245,090	21,286	1,523,521	1,399,426	60,768	937,760	2,461,287
Stream Channel Improvement Grade Stabilization Structures									
(Constructed)									
101 and 102	3/ 16,200	2,268	-	-	18,468	-	-	600	19,068
103 through 107	3,930	658	-	-	4,588	-	-	125	4,713
Subtotal - Grade Stabilization Structures	20,130	2,926	-	-	23,056	-	-	725	23,781

(See footnotes at end of table 2)

REVISED TABLE 2 - ESTIMATED STRUCTURAL COST DISTRIBUTION - Continued
 Choptaw Creek Watershed, Texas
 (Dollars) 1/

Item	Installation Cost - Public Law 566 Funds			Installation Cost - Other Funds			Total				
	Construction	Relocation	Other	Construction	Relocation	Other	Construction	Relocation	Other		
Drainage Main I and Laterals IA, IB, and IC	5,775	1,194	-	1,925	-	-	3,350	-	-	5,275	12,244
Subtotal - All Structural Bases	3,715,963	249,841	245,090	1,401,351	60,766	1,918,726	51,008	6,100	3,437,953	7,689,039	
Project Administration	xxx	xxx	xxx	624,506	xxx	xxx	xxx	xxx	xxx	224,823	849,329
GRAND TOTAL	3,715,963	249,841	245,090	1,401,351	60,766	1,918,726	51,008	6,100	3,662,776	8,538,368	

1/ Price Base: 1971

2/ Relocation payments for displacements prior to July 1, 1972, will be shared as provided in Pl. 91-646 and in paragraph numbered 1 of Supplemental Watershed Work Plan Agreement No. II

3/ Actual construction cost

March 1972

REVISED TABLE 2A - COST ALLOCATION AND COST SHARING SUMMARY
 Choctaw Creek Watershed, Texas
 (Dollars)

Item	COST ALLOCATION					Total
	Flood Prevention	Municipal	Water Supply	Drainage	Recreation	
Single-Purpose						
35 Floodwater Retarding Structures						
110,180 feet of Stream Channel Improvement, and 7 Grade Stabilization Structures	3,722,206	-	-	-	-	3,722,206
Multiple-Purpose						
Structure No. 1	474,281	540,642	-	-	-	1,014,923
Structure No. 4	239,144	426,646	-	-	-	665,790
Structure No. 10A	102,384	-	-	-	13,042	115,426
Structure No. 30	97,778	74,823	-	-	-	172,601
Diversion Works	-	77,625	-	-	-	77,625
Structure No. 35	202,268	509,440	-	-	481,099	1,192,807
Basic Recreation Facilities	-	-	-	-	381,272	381,272
Structure No. 38	77,725	-	-	-	104,120	181,845
Basic Recreation Facilities	-	-	-	-	152,300	152,300
Drainage Main and Laterals	6,122	-	-	6,122	-	12,244
TOTAL	4,921,908	1,629,176	6,122	1,131,833	7,689,039	

(See footnotes at end of table 2A)

REVISED TABLE 2A - COST ALLOCATION AND COST SHARING SUMMARY - Continued
 Choctaw Creek Watershed, Texas
 (Dollars) 1/

Item	COST SHARING										Total	Other		
	Flood Prevention	Municipal Supply	Water Supply	Recreation	Drainage	PL 566	Flood Prevention	Municipal Water	Supply	Drainage			Recreation	
Single-Purpose														
35 Floodwater Retarding Structures, 110,180 feet of Stream Channel Improvement, and 7 Grade Stabilization Structures	2,720,596	-	-	-	-	2,720,596	1,001,610	-	-	-	-	-	-	1,001,610
Multiple-Purpose														
Structure No. 1	353,622	-	-	-	-	353,622	120,659	-	-	-	-	-	-	658,652
Structure No. 4	173,804	2/2,649	-	-	-	173,804	65,340	-	-	-	-	-	-	491,986
Structure No. 10A	78,142	-	-	-	-	78,142	26,242	-	-	-	-	-	-	37,284
Structure No. 30	78,405	-	-	-	-	78,405	19,373	-	-	-	-	-	-	94,196
Diversion Works	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Structure No. 35	202,268	2/3,971	-	-	-	442,091	-	-	-	-	-	-	-	77,625
Basic Recreation Facilities	-	-	-	-	-	189,636	-	-	-	-	-	-	-	750,716
Structure No. 38	77,725	-	-	-	-	129,072	-	-	-	-	-	-	-	191,636
Basic Recreation Facilities	-	-	-	-	-	51,347	-	-	-	-	-	-	-	52,773
Drainage Main and Laterals	4,447	-	-	-	-	76,100	1,675	-	-	-	-	-	-	76,200
		2,522	-	-	-	6,969	-	-	-	-	-	-	-	5,275
TOTAL	3,689,009	6,620	2,522	522,935	4,251,086	1,232,899	1,622,556	3,600	578,898	3,437,953				

1/ Price Base: 1971 for structural measures to be constructed and actual costs for structural measures constructed.
 2/ Relocation payments.

TABLE 3 - STRUCTURAL DATA - STRUCTURES WITH PLANNED STORAGE CAPACITY

Choctaw Creek Watershed, Texas

Item	Unit	Structure Number		Total
		13A	34A	
Class of Structure		A	B	XXX
Drainage Area	Sq. Mi.	2.82	0.68	112.28
Curve No. (1-Day)(AMC II)		81	77	XXX
Tc	Hrs.	1.02	0.65	XXX
Elevation Top of Dam	Ft.	732.5	602.1	XXX
Elevation Crest Emergency Spillway	Ft.	728.0	597.0	XXX
Elevation Crest Principal Spillway	Ft.	715.2	587.6	XXX
Elevation Crest Lowest Ungated Outlet	Ft.	709.3	587.6	XXX
Maximum Height of Dam	Ft.	50	29	XXX
Volume of Fill	Cu. Yds.	105,900	48,000	7,073,200
Total Capacity	Ac. Ft.	1,177	226	77,879
Sediment Pool (Lowest Ungated Outlet)	Ac. Ft.	200	54	4,098
Sediment Submerged 1st 50 Years	Ac. Ft.	185	28	5,979
Sediment Submerged 2nd 50 Years	Ac. Ft.	179	26	XXX
Sediment Agraded	Ac. Ft.	26	9	XXX
Water Supply	Ac. Ft.	-	-	21,195
Recreation	Ac. Ft.	-	-	3,073
Retarding	Ac. Ft.	787	163	41,769
Surface Area				
Sediment Pool (Lowest Ungated Outlet)	Acres	21	14	703
Sediment Pool (Principal Spillway Crest)	Acres	39	14	756
Water Supply Pool	Acres	-	-	1,145
Recreation Pool	Acres	-	-	XXX
Retarding Pool	Acres	90	27	5,095
Principal Spillway				
Rainfall Volume (Areal)(1-Day)	In.	7.80	8.61	XXX
Rainfall Volume (Areal)(10-Day)	In.	13.20	14.50	XXX
Runoff Volume (10-Day)	In.	8.38	8.91	XXX
Capacity (Maximum)	C.F.S.	74	19	XXX
Frequency Operation - Emer. Spillway	% Chance	3.0	1.7	XXX
Size of Conduit	In.	24	24	XXX
Emergency Spillway				
Rainfall Volume (ESH)(Areal)	In.	6.80	9.60	XXX
Runoff Volume (ESH)	In.	4.61	6.76	XXX
Type	Veg.	Veg.	Veg.	XXX
Bottom Width	Ft.	100	50	XXX
Velocity of Flow (V _s)	Ft./Sec.	-	5.7	XXX
Slope of Exit Channel	Ft./Ft.	.050	.070	XXX
Maximum Water Surface Elevation	Ft.	-	598.3	XXX
Freeboard				
Rainfall Volume (FH)(Areal)	In.	14.00	20.70	XXX
Runoff Volume (FH)	In.	11.52	17.50	XXX
Maximum Water Surface Elevation	Ft.	732.5	602.1	XXX
Capacity Equivalents				
Sediment Volume	In.	2.59	1.94	XXX
Retarding Volume	In.	5.23	5.08	XXX

March 1972

REVISED TABLE 4 - ANNUAL COST

Choctaw Creek Watershed, Texas

(Dollars)^{1/}

Evaluation Unit	:Amortization of:Operation and:		: Total
	: Installation : Maintenance :	: Cost : Cost :	
35 Floodwater Retarding Structures; 110,180 feet of Stream Channel Improvement; Multiple-Purpose Structures 1, 4, 10A, 30, 35, and 38, including Basic Recreational Facilities; and Grade Stabiliza- tion Structures 101, 102, 103, 104, 106, and 107	279,499	31,174	310,673
21,600 feet of Drainage Main and Laterals and Grade Stabilization Structure 105	535	452	987
Project Administration	27,824	xxx	27,824
GRAND TOTAL	2/307,858	3/31,626	339,484

- 1/ Price Base: 1971 for all structural measures except floodwater retarding structures Nos. 12, 16, 17, 20, 21, 23, 27, 33, 39, and 40, and grade stabilization structures Nos. 101 and 102, which are at actual construction cost.
- 2/ Amortized for 100 years at 3.125 percent, except for multiple-purpose structure No. 10A, and floodwater retarding structures 13A and 34A, which are amortized at 3.250 percent.
- 3/ Includes replacement costs of \$5,150 for basic recreational facilities and for any structure or appurtenance requiring replacement before end of 100-year evaluation period.

March 1972

REVISED
TABLE 5 - ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE REDUCTION BENEFITS

Choctaw Creek Watershed, Texas

(Dollars) ^{1/}

Item	: Estimated Average Annual Damage :		: Damage Reduction Benefit :
	: Without Project :	: With Project :	
Floodwater			
Crop and Pasture	105,932	27,369	78,563
Other Agricultural	36,819	9,336	27,483
Non-Agricultural			
Road and Bridge	29,130	2,076	27,054
Urban	74,600	4,300	70,300
Subtotal	246,481	43,081	203,400
Sediment			
Overbank Deposition	2,262	817	1,445
Channel Deposition	2,110	717	1,393
Subtotal	4,372	1,534	2,838
Erosion			
Flood Plain Scour	20,247	4,177	16,070
Valley Trenching	1,175	838	337
Subtotal	21,422	5,015	16,407
Indirect	27,288	4,963	22,265
TOTAL	299,503	54,593	244,910

^{1/} Price Base: Adjusted normalized prices

March 1972

REVISED TABLE 6 - COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

Choctaw Creek Watershed, Texas
(Dollars)

Evaluation Unit	AVERAGE ANNUAL BENEFITS ^{1/}										Average Annual Cost ^{2/}	Benefit-Cost Ratio		
	Flood Prevention	Water	Non-Agricultural	Water Management	Damage Reduction	Incidental	Water Management	Municipal	Water	Supply			Recreation	Secondary
35 Floodwater Retarding Structures; 110,180 feet of Strada Channel Improvement; Multiple-Purpose Structures 1, 4, 10A, 30, 35, and 38, including Basic Recreational Facilities; and Grade Stabilization Structures 101, 102, 103, 104, 106, and 107 ^{3/}	-	4,236	-	60,115	157,757	40,013	-	-	-	-	-	496,193	310,673	1.6:1.0
21,600 feet of Drainage Main and Laterals and Grade Stabilization Structure 105	1,400	-	-	-	-	-	-	1,400	-	-	645	3,445	987	3.5:1.0
Project Administration	-	-	-	-	-	-	-	-	-	-	-	-	27,824	XXX
GRAND TOTAL ^{4/}	1,400	4,236	1,400	60,115	157,757	40,013	645	1,400	499,638	339,484	1.5:1.0			

^{1/} Price Base: Adjusted normalized prices
^{2/} From table 4
^{3/} Interrelated measures
^{4/} In addition, it is estimated that land treatment measures will provide flood damage reduction benefits of \$10,838 annually