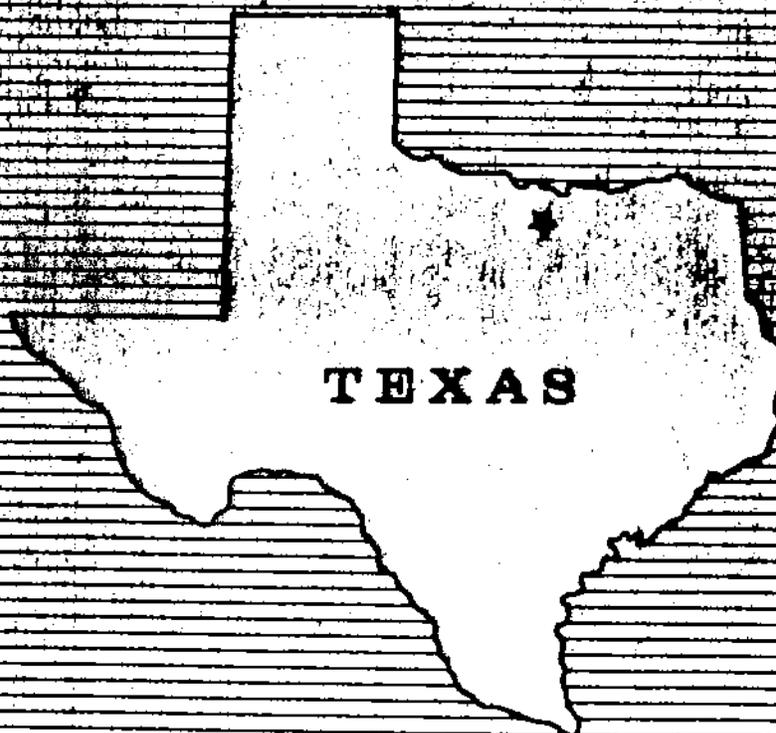


**SUPPLEMENTAL WATERSHED PLAN NO. II  
FOR WATERSHED PROTECTION AND FLOOD PREVENTION**

**ELM FORK WATERSHED  
OF THE TRINITY RIVER WATERSHED**

**MONTAGUE, COOKE, AND DENTON COUNTIES, TEXAS**



FINAL SUPPLEMENTAL WATERSHED PLAN NO. II  
FOR  
ELM FORK WATERSHED  
(of the Trinity River Watershed)  
Montague, Cooke, and Denton Counties, Texas

October 1979

FINAL SUPPLEMENTAL WATERSHED PLAN NO. II

ELM FORK WATERSHED  
of the  
Trinity River Watershed  
Montague, Cooke, and Denton Counties, Texas

Plan Prepared and Works of Improvement  
To Be Installed Under the Authority  
of the Flood Control Act of 1944,  
as Amended and Supplemented

Prepared By:

Upper Elm-Red Soil and Water Conservation District

Denton Soil and Water Conservation District

Montague County Commissioners Court

Cooke County Commissioners Court

City of Muenster

Muenster Water District

With Assistance By:

U. S. Department of Agriculture  
Soil Conservation Service

October 1979

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SUPPLEMENTAL WATERSHED PLAN AGREEMENT NO. II

Between the

Upper Elm-Red Soil and Water Conservation District

Denton Soil and Water Conservation District

Montague County Commissioners Court

Cooke County Commissioners Court

City of Muenster

Muenster Water District

(hereinafter referred to as the sponsors)

State of Texas

and the

Soil Conservation Service

United States Department of Agriculture

(hereinafter referred to as the SCS)

Whereas, the Watershed Work Plan Agreement for Elm Fork Watershed, State of Texas, executed by the sponsors named therein and the SCS, became effective on the 21st day of June 1956; and

Whereas, the Supplemental Watershed Work Plan Agreement No. I, executed by the sponsors named therein and the SCS, became effective on the 10th day of July 1978; and

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

Whereas, it has been found necessary to modify the watershed plan, as supplemented, by deleting floodwater retarding structures Nos. 6A, 11A, 11A-1, 11C, 14, 15, 16C, 61N, 61O, 61P, and adding multiple-purpose structure No. 19 and its basic recreational facilities; and

Whereas, the Montague County Commissioners Court and the Cooke County Commissioners Court have previously signed an operation and maintenance agreement with the soil and water conservation districts and the SCS, and therefore are added as sponsors of said watershed project; and

Whereas, the City of Muenster, Texas, will benefit from the installation of multiple-purpose structure No. 19 and its basic recreational facilities, and now therefore agrees to become a sponsor of said watershed project; and

Whereas, the Muenster Water District, created by special legislation passed by the Texas Legislature and enacted into law in 1974, will benefit from the installation of multiple-purpose structure No. 19 and its basic recreational facilities, and now therefore agrees to become a sponsor of said watershed project; and

Whereas, it has been found necessary to modify the watershed plan, as supplemented, to reflect current policy and terminology relative to engineering and project administration costs; and

Whereas, a Supplemental Watershed Plan No. II, which modifies the Watershed Plan dated June 1956, as supplemented, for said watershed has been developed through the cooperative efforts of the sponsors and the SCS, which plan is annexed to and made a part of this agreement;

Now, therefore, the sponsors and the SCS agree upon the following modifications of the terms, conditions, and stipulations of said Watershed Work Plan Agreement, as supplemented:

1. Paragraph numbered 10 is added as follows:

The sponsors will acquire all land, easements, and rights-of-way needed for the installation of structural works of improvement in connection with multiple-purpose structure No. 19 (estimated cost \$562,270). The percentages of this cost to be borne by the sponsors and the SCS for land acquisition and modification of existing improvements are as follows:

<u>Works of Improvement</u>	<u>Sponsors (percent)</u>	<u>SCS (percent)</u>	<u>Estimated Land Rights Costs (dollars)</u>
<u>Multiple-Purpose Structure No. 19</u>			
Fee Simple Title for for About 597.0 Acres and Cost of Modification of Improvements	65.830	34.170	513,430
Survey and Legal Fees	100.000	0.000	25,000
Flowage Easements on 53.2 Acres	100.000	0.000	10,640
<u>Basic Recreational Facilities</u>			
Fee Simple Title for About 22.0 Acres	50.000	50.000	13,200

The sponsors agree that all land acquired or improved with PL 534 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 11 is added as follows:

The sponsors will acquire or will provide assurance that land-owners or water users have acquired such water rights pursuant to state law as may be needed in the installation and operation of the works of improvement.

3. Paragraph numbered 12 is added as follows:

The percentages of construction costs of structural measures to be paid by the sponsors and by the SCS are as follows:

<u>Works of Improvement</u>	<u>Sponsors (percent)</u>	<u>SCS (percent)</u>	<u>Estimated Construction Costs (dollars)</u>
Multiple-Purpose Structure No. 19	36.005	63.995	1,607,050
Basic Recreational Facilities	50.000	50.000	193,360
Municipal Outlet Structure	100.000	0.000	26,600

4. Paragraph numbered 13 is added as follows:

The percentages of the engineering services cost to be borne by the sponsors and the SCS are as follows:

<u>Works of Improvement</u>	<u>Sponsors (percent)</u>	<u>SCS (percent)</u>	<u>Estimated Engineering Costs (dollars)</u>
Multiple-Purpose Structure No. 19	33.980	66.020	96,420
Basic Recreational Facilities	50.000	50.000	14,900
Municipal Outlet Structure	100.000	0.000	3,720

5. Paragraph numbered 14 is added as follows:

The sponsors and the SCS will each bear the cost of project administration which it incurs, estimated to be \$52,500 and \$535,400, respectively, for the total project installation.

The sponsors and the SCS further agree to all other terms, conditions, and stipulations of said watershed plan, as supplemented, not modified herein.

Upper Elm-Red Soil and Water  
Conservation District  
Local Organization

P. O. Box 340  
Gainesville, Texas                      76240  
Address                                      Zip Code

By [Signature]  
Title Chairman  
Date 7/21/80

The signing of this agreement was authorized by a resolution of the governing body of the Upper Elm-Red Soil and Water Conservation District

adopted at a meeting held on 7/21/80

[Signature]  
Secretary, Local Organization

Sherman, Texas                      75090  
Address                                      Zip Code

Date 7-21-80

Denton-Wise Soil and Water  
Conservation District

Local Organization

P.O. Box 40  
Denton, Tx. 76201  
Address Zip Code

By

Title

Date

James Struthmont  
Chairman  
7-10-80

The signing of this agreement was authorized by a resolution of the governing  
body of the Denton-Wise Soil and Water Conservation District

adopted at a meeting held on

July 10, 1980

~~Address~~  
Secretary, Local Organization

Address

Zip Code

Date

R-1, Box 474  
Denton, Tx 76201  
7-10-80

Montague County Commissioners Court

Local Organization

Box 122  
Montague, Texas 76251  
Address Zip Code

By

Title

Date

Charles W. Coffield  
CHARLES W. COFFIELD  
County Judge  
7-21-80

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

adopted at a meeting held on

7-21-80

Christine Cook, County Clerk

By Juanita Parker, Deputy  
Secretary, Local Organization

Address

Zip Code

Date

Montague, Texas  
76251  
July 21, 1980

Cooke County Commissioners Court  
Local Organization

Cooke County Courthouse  
Gainesville, Texas 76240  
Address Zip Code

By 

Title GREG L. UNDERWOOD  
County Judge

Date 7/14/80

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

adopted at a meeting held on July 14, 1980

  
~~Secretary~~, Local Organization  
COUNTY CLERK  
Date 7/14/80

Cooke County Courthouse  
Gainesville, Texas 76240  
Address Zip Code

City of Muenster  
Local Organization

Box 208, Muenster, Tex. 76252  
Address Zip Code

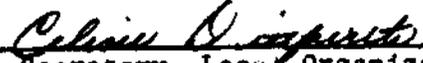
By 

Title Mayor

Date June 30, 1980

The signing of this agreement was authorized by a resolution of the governing body of the City of Muenster

adopted at a meeting held on June 30, 1980

  
Secretary, Local Organization

Date June 30, 1980

Box 208, Muenster, Tex. 76252  
Address Zip Code



## PREFACE

The supplemental watershed plan has been briefed to avoid excessive duplication with similar information presented in the "Trinity River Watershed Environmental Impact Statement." The "Trinity River Watershed Environmental Impact Statement" should be reviewed for pertinent information regarding the planned project, environmental setting, water and related land resource problems, environmental impacts, project alternatives, and the irreversible and irretrievable commitment of resources.

FINAL SUPPLEMENTAL WATERSHED PLAN NO. II

ELM FORK WATERSHED  
(of the Trinity River Watershed)  
Montague, Cooke, and Denton Counties, Texas

October 1979

PURPOSE OF THE SUPPLEMENTAL WATERSHED PLAN

It has become necessary to modify the watershed plan, as supplemented, for Elm Fork watershed in order to: delete floodwater retarding structures Nos. 6A, 11A, 11A-1, 11C, 14, 15, 16C, 61N, 61O, and 61P, and add multiple-purpose structure No. 19 and its basic recreational facilities. Multiple-purpose structure No. 19 will provide storage of municipal and recreational water for the city of Muenster, Texas. The deletion of the 10 floodwater retarding structures has become necessary due to insurmountable obstacles not anticipated during formulation of the watershed plan. The loss of flood reduction created by this deletion will be partially compensated for by the addition of multiple-purpose structure No. 19.

The addition of multiple-purpose structure No. 19 and the deletion of the 10 floodwater retarding structures will result in a decrease in the reduction of acres flooded by the 25-year frequency storm event from 5,864 acres to 5,479 acres. The reduction in average annual acres flooded on the evaluated flood plain will be decreased from 9,196 acres to 8,772 acres.

The 10 deleted floodwater retarding structures required 141 acres for sediment pools, 497 more acres for the detention pools, and additional areas would also have been required for the construction and maintenance of the dams and spillways. The multiple-purpose structure's recreational pool has a surface area of 120 acres; in addition, 189 surface acres will be required for the storage of municipal water, 224 surface acres for detention storage, and 50 acres for construction and maintenance of the dams and spillways. The total area to be purchased by fee simple title for the dam site, basic recreational development area, and within the reservoir area is 619 acres.

The multiple-purpose structure's recreational storage and basic recreational development will satisfy a need for a public water-oriented park in the immediate vicinity of the city of Muenster. Research compiled by the Comprehensive Planning Staff of the Texas Parks and Wildlife Department indicates there is a deficit of outdoor water-based recreation facilities to serve the needs of the people residing in Region 12, which includes the city of Muenster. Region 12 is one of the more heavily populated regions of the state and has a projected population increase through the year 2000. The user-days participation occurring in this region is expected to increase 352 percent during the period 1968-1980. Activities in the top ranking consist of fishing, boating, picnicking, swimming, and camping.

The City of Muenster has created by a special act of the Texas legislature a public entity entitled the "Muenster Water District." This special legislation was enacted into law in 1974. The purpose of the Muenster Water District is for financing only. The Muenster Water District and the City of Muenster are coterminous in their boundaries. The directors of the district are appointed by the mayor and the city council of the City of Muenster. Hereinafter, the City of Muenster in conjunction with the Muenster Water District are referred to as the City.

Federal funds will not bear any of the costs allocated to municipal water for the multiple-purpose structure. The \$1,028,430 construction cost for the multiple-purpose structure to be borne by federal funds consists of the construction cost allocated to flood prevention (\$995,890) and 50 percent of the construction cost allocated to recreation (\$32,540). Federal funds will also bear 50 percent of the construction cost for the basic recreational facilities (\$96,680). All the engineering cost for the multiple-purpose structure allocated to flood prevention and recreation (\$63,660), and 50 percent of the engineering cost for the basic recreational facilities (\$7,450) will be borne by federal funds. Land rights cost to be borne by federal funds are 50 percent of the eligible land rights cost allocated to recreation for the multiple-purpose structure (\$175,440) and the basic recreational facilities (\$6,600)(revised table 2).

The \$578,620 construction cost for the multiple-purpose structure to be borne by the City consists of the construction cost allocated to municipal water (\$546,080) and 50 percent of the construction cost allocated to recreation (\$32,540). The City will also bear all the construction cost for the municipal outlet structure (\$26,600) and 50 percent of the construction cost for the basic recreational facilities (\$96,680). All the engineering cost for the multiple-purpose structure allocated to municipal water (\$32,760), all of the engineering cost for the municipal outlet structure (\$3,720) and 50 percent of the engineering cost for the basic recreational facilities (\$7,450) will be borne by the City. The \$373,630 land rights cost for the multiple-purpose structure to be borne by the City consists of the land rights cost allocated to municipal water (\$187,550), 50 percent of the eligible land rights cost allocated to recreation (\$175,440) and the cost of the flowage easements (\$10,640), which are allocated to flood prevention. The City will also bear 50 percent of the land rights cost for the basic recreational facilities (\$6,600) and all the water rights cost (\$1,500)(revised table 2).

The operation and maintenance of multiple-purpose structure No. 19 and its basic recreational facilities are the responsibility of the City of Muenster and has an estimated annual cost of \$8,378.

The total estimated average annual benefits accruing to structural measures as supplemented are \$593,170 and their total average annual cost is \$214,986. This gives a benefit-cost ratio of 2.8 to 1.0 (revised table 6).

In order to simplify the cost sharing for installation of structural measures, it is necessary to modify the watershed plan, as supplemented, to reflect current policy and terminology relative to engineering and project administration costs.

The following are changes and modifications made in appropriate parts of the watershed plan, as supplemented.

### PLANNED PROJECT

#### Land Treatment

The sponsors of the project recognize an effective conservation program is essential to a sound continuing program of flood prevention and watershed protection. Planned land treatment has been completed with the exception of critical area stabilization which has an estimated cost of \$45,000 for installation and \$10,000 for technical assistance. Continued emphasis will be placed on establishing and maintaining land treatment measures. (revised table 1)

#### Structural Measures

Multiple-purpose structure No. 19 and its related recreational facilities are the remaining structural measures to be installed.

Classification of a structure is based on the potential damages that would occur downstream if the structure should fail. Where failure may cause loss of life or serious damage to homes, industrial and commercial buildings, important public utilities, main highways, or railroads, the structure is considered high hazard or a class "C" structure. Based on a breach analysis, multiple-purpose structure No. 19 is a class "C" structure.

The class "C" criteria used in the design of multiple-purpose structure No. 19 uses the greatest rainfall rate for a 6-hour duration theoretically possible (probable maximum precipitation) in the structural routing to establish the required top of dam. These rainfall rates were determined by National Oceanic and Atmospheric Administration, National Weather Service, and are published in Hydrometeorological Report No. 51.

The total drainage area of the multiple-purpose structure is 14.33 square miles. The uncontrolled drainage area used in this structure design is 10.98 square miles. Floodwater retarding structures Nos. 6A1, 6E, and 61CC control 3.84 square miles of this area; however the installation of multiple-purpose structure No. 19 reduces the effectiveness of floodwater retarding structure No. 61CC (0.49 square miles).

Water quality determination for multiple-purpose structure No. 19 was made by laboratory analysis of water samples from the sediment pools of

existing floodwater retarding structures Nos. 6A1, 6E, and 61CC. The results of these tests indicate that a safe water supply can be developed.

The multiple-purpose structure has a total storage capacity of 10,550 acre-feet, of which 6,538 acre-feet are for floodwater detention and sediment storage, 3,585 acre-feet are for municipal water supply, and 427 acre-feet are for recreation. The surface area of the recreation pool is 120 acres. An additional 189 surface acres will be available for recreational use at the maximum elevation of the municipal water supply pool.

The area above the maximum flow line for multiple-purpose structure No. 19 (during passage of the emergency spillway hydrograph) to be purchased for the development and use of the basic recreational facilities is 22 acres. An additional area of 288 acres between the water supply pool and the fee simple title taking line will also be used for public recreation activities as water levels permit.

The embankment of the multiple-purpose structure will be protected from wave action by the placement of rock riprap on the upstream embankment slope from mean sea level elevation 1019.0 to 1028.0.

#### Basic Recreational Facilities

Basic recreational facilities will be installed in association with multiple-purpose structure No. 19 on a 22-acre area on the west side of the reservoir (Figure 1). A reservoir operation study shows the reservoir will furnish a year-round water supply for recreation. The basic recreational development is in accord with the Texas Outdoor Recreation Plan. Revised table 2B lists the basic facilities and the proposed number or amount which will be installed as part of this plan. All state and local requirements related to public health and maintenance of reservoir water quality will be complied with in the design, construction, operation, and maintenance of the basic recreational facilities.

The soils complex in the majority of the 22 acres is a Bolar-Malotierre complex. This soil is a very shallow, gravelly clay resting on limestone bedrock and is not conducive to a septic tank filter drain system. A sewage lagoon system will be used for this reason and it will consist of a 4,200-gallon septic tank with a gravity outlet to an aerobic lagoon with a 135-foot square bottom and a design depth of 5 feet. This lagoon will have to be plated with a highly impervious clay (Houston Black series) which is located within 200 feet. The dimensions of this lagoon are such that the net evaporation on the surface of the effluent will equal or exceed the total effluent volume. A reservoir operation study shows the lagoon will contain the effluent from year to year without any spillage.

The water supply for the basic recreational development will consist of a well drilled to the Antlers formation, which is located approximately 150 feet below the surface. Information from other wells drilled to this formation indicate it will furnish an adequate and potable supply.

The City is planning to stock the reservoir with a combination of fish species to enhance the quality of the basic recreational facilities. The City will be responsible for the cost of the stockings and the SCS will furnish technical assistance.

The "Trinity River Watershed Environmental Impact Statement" should be reviewed to obtain information regarding the planned project.

#### INSTALLATION COSTS - MONETARY

The total estimated installation cost of the structural measures, as supplemented, is \$5,183,950, of which federal costs will be \$3,875,660 and the local share will be \$1,308,290 (revised table 2).

Federal costs include \$2,670,470 for construction, of which \$96,680 is for recreational facilities; \$487,750 is for engineering services; \$182,040 is for land rights; and \$535,400 is for project administration (revised table 2).

The local costs consist of \$701,900 for construction, \$43,930 for engineering, \$508,460 for land rights, \$1,500 for water rights, and \$52,500 for project administration.

Of the remaining structural measures to be installed, the total cost allocated to recreation is \$641,780; to water supply, \$797,760; and to flood prevention, \$1,066,280; for a total of \$2,505,820 (revised table 2A).

The Use of Facilities Method is the method used to allocate the construction and engineering costs of multiple-purpose structure No. 19 to flood prevention, recreation, and municipal uses. By this method, the joint costs are distributed in proportion to capacity. The capacity of flood prevention storage is 6,538 acre-feet, recreation storage is 427 acre-feet, and municipal storage is 3,585 acre-feet; these capacities are 61.97 percent, 4.05 percent, and 33.98 percent, respectively, of the total capacity of 10,550 acre-feet.

The specific cost of the municipal water outlet structure is allocated to municipal water supply.

Federal funds will not bear any of the costs allocated to municipal water supply, or any legal fees or engineering services necessary to obtain land rights.

The \$1,703,470 joint (construction and engineering) costs for multiple-purpose structure No. 19 are allocated \$68,990 to recreation, \$1,055,640 to flood prevention, and \$578,840 to water supply. The \$30,320 specific cost for the municipal outlet structure is allocated to water supply. The \$208,260 for basic recreational facilities is allocated to recreation.

Engineering costs for the basic recreational facilities of \$14,900 are for professional architectural and engineering (A&E) services. The City and the SCS will enter into an agreement for the procurement of A&E services with a qualified private firm for preparation of construction plans and specifications for recreation facilities. Such agreement will provide for the SCS to award and administer such contract which will be negotiated by the SCS in accordance with Federal Procurement Regulations. The SCS will consult with the City on the price, if it exceeds the estimated cost provided for in the project agreement. The A&E contract for basic facilities will be cost-shared 50-50 by the City and SCS. The SCS will participate with the City in review of all construction plans and specifications.

All costs of land purchased by fee simple title and modification of improvements required for multiple-purpose structure No. 19 are allocated between municipal water supply and recreation. The portion of the costs allocated to recreation, 68.34 percent, is determined on the basis of the total purchase area required for the dam, spillway, and reservoir (597.0 acres) minus the reservoir area for the municipal water supply (189 acres) divided by the total purchase area. The remainder, 31.66 percent, is allocated to municipal water supply. The cost of land to be purchased for the basic recreational development (22 acres) is all allocated to recreation.

The estimated costs of land, easements, rights-of-way, legal fees, and alteration, modification, or replacement of existing improvements for multiple-purpose structure No. 19 and its basic recreational facilities (\$562,270) are allocated \$364,080 to recreation, \$187,550 to water supply, and \$10,640 to flood prevention. The cost for water rights (\$1,500) is allocated \$450 to recreation and \$1,050 to water supply.

The federal share of land purchased by fee simple title will be based on the actual payments made by the sponsors or the fair market value as jointly agreed to by the sponsors and the Service, whichever is the lesser amount. All costs for surveys and legal fees (\$25,000) will be borne by the City.

Engineering costs consist of, but are not limited to, detailed surveys, geologic investigations, laboratory analyses, reports, designs, and cartographic services.

Federal project administration costs consist of construction inspection, contract administration, and maintenance of SCS state office records and accounts. The local costs for project administration include sponsors' costs relative to contract administration, overhead and organizational costs, and whatever construction inspection the sponsors desire to make at their own expense.

Under present conditions, there will be no apparent displacements or relocations of persons, businesses, or farm operations as a result of installation of structural measures. If relocations or displacements become necessary, they will be carried out in accordance with Public

Law 91-646, Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970. The installation of multiple-purpose structure No. 19 will require alteration, modification, permits, or replacement of the following existing improvements:

1. Two Cooke County roads
2. One Matador Pipeline Co. pipeline
3. Three Arco Pipeline Co. pipelines and one pump station complex
4. Muenster Telephone Co. underground cables and overhead lines
5. Cooke County Electric Coop. powerlines
6. One Texas Power & Light Co. powerline

No part of the cost will be borne by the federal government for water resource improvements or basic recreational facilities which have been constructed or acquired by the sponsors prior to the execution of appropriate project agreements.

#### ECONOMIC BENEFITS

The estimated average annual monetary damages (table 5) after installation of the project, as supplemented, will be reduced from \$639,826 to \$114,296, a reduction of 82 percent. Crop and pasture damages will be reduced from \$261,773 to \$39,583, or 85 percent. Other agricultural damages, such as loss of fences, farm equipment, livestock, and other property, will be reduced from \$93,638 to \$14,408, or 85 percent. Nonagricultural damage to roads and bridges will be reduced from \$96,680 to \$12,000, or 88 percent. Flood plain scour damages, averaging \$91,296 annually, will be reduced to \$19,260, or 79 percent. Damages from overbank deposition of bottomland soils will be reduced from \$26,612 to \$12,764, or 52 percent. Damages from sediment accumulation in Garza-Little Elm Reservoir will be reduced from \$11,661 to \$5,890, or 49 percent.

The installation of the basic recreational facilities included in this plan in connection with the recreation water provided by multiple-purpose structure No. 19 will provide a needed water-oriented recreation area for the residents in and near Muenster. It is estimated that 11,000 recreation user-days annually will result from the development of the proposed public park. The peak daily design capacity of the park is estimated to be 500 visitors. An analysis of available data from this general area indicates that the recreation facilities herein provided should be valued at about \$3.15 per user day. It is estimated that the installation of all planned recreational facilities will produce \$34,650 in average annual benefits.

The estimated average annual monetary benefits, including recreation and municipal water supply, will amount to \$593,170 (revised table 6) while the total annual costs amount to \$214,986, giving a benefit-cost ratio of 2.8:1.0.

INSTALLATION AND FINANCING

Planning and application of land treatment and structural measures will be carried out in accordance with provisions of the watershed plan, as supplemented.

The installation period for the remainder of the project is estimated to be 4 years. The following is the estimated schedule of obligations for the 4-year installation period:

Schedule of Obligations				
Fiscal:		: Flood	: Other	:
Year :	Measures	: Funds	: Funds	: Total
		(dollars)	(dollars)	(dollars)
First	Land Treatment	11,500	2,250	13,750
Second	Land Treatment	11,500	2,250	13,750
	Structure No. 19 and Municipal Outlet	1,374,590	1,032,830	2,407,420
Third	Land Treatment	11,500	2,250	13,750
	Basic Recreational Facilities	217,790	126,730	344,520
Fourth	Land Treatment	11,500	2,250	13,750

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

All land rights necessary for the installation of multiple-purpose structure No. 19 and its basic recreational facilities will be acquired by the City. Payments for about 597 acres of land for the installation of multiple-purpose structure No. 19 to be acquired in fee simple title and modification of improvements will be shared 34.17 percent by the federal government and 65.83 percent by the City. Payments for about 22 acres of land for the installation of the basic recreational facilities to be acquired in fee simple title will be shared 50 percent by the federal government and 50 percent by the City. All costs for legal fees, survey costs, and flowage easements will be borne by the City.

The SCS will advertise, award, and administer contracts and supervise construction of multiple-purpose structure No. 19 and its basic recreational facilities.

Technical assistance will be provided by the SCS for the review of plans and specifications for multiple-purpose structure No. 19 and its basic

recreational facilities, and for the inspection of construction, preparation of contract payment estimates, final inspection, execution of certification of completion, and other related tasks necessary to install the structure. The City will make whatever inspections they desire at their own expense.

Funds for the local share of the cost of installing multiple-purpose structure No. 19 and its basic recreational facilities will be provided by the City.

Multiple-purpose structure No. 19 and its basic recreational facilities will be installed pursuant to the following conditions:

1. All land rights have been obtained.
2. Water rights have been obtained.
3. Reimbursable agreement between the SCS and the City has been executed relative to the share of construction and engineering services costs to be borne by local interests.
4. Federal funds are available.
5. Project operation and maintenance agreements have been executed.
6. The requirements for land treatment in the drainage area above multiple-purpose structure No. 19 have been satisfied.

The SCS will keep the Secretary of the Interior informed through the Director, Southwest Region, Heritage Conservation and Recreation Service, of the construction schedule, as required by Public Law 86-523. The Secretary will be similarly notified if any archeological materials are found during construction in accordance with Section 3 of Public Law 93-291.

#### OPERATION, MAINTENANCE, AND REPLACEMENT

##### Land Treatment Measures

Land treatment measures will be maintained in accordance with the provisions of the watershed plan, as supplemented.

##### Structural Measures

The estimated average annual cost for operation and maintenance of multiple-purpose structure No. 19 is \$458. The estimated average annual operation, maintenance, and replacement cost for the basic recreational facilities is estimated to be \$7,920, of which \$2,200 is for replacement of facilities during the evaluation period.

Specific operation and maintenance agreements will be executed by the City and the SCS prior to the issuance of any invitation to bid on construction of multiple-purpose structure No. 19 and its basic recreational facilities.

With consideration of allocation of evaporation by purpose, the lower operating limit of the municipal water supply is elevation 1002.5. The City will notify the SCS, through the state conservationist, whenever the reservoir is operated below this elevation. The City will participate with the state conservationist in determining whether there is a continuing need to so operate the reservoir. If it is found that there is a continuing need for the use of recreation storage for municipal or industrial purposes, the City agrees to reimburse the federal government for all federal funds used for public recreation associated with the reservoir (construction, engineering services, land, and basic facilities).

The City will be responsible for operation and maintenance of the multiple-purpose structure and its basic recreational facilities in accordance with the provisions specified in the operation and maintenance agreement.

Funds for operation and maintenance will come from the City's general funds, which may include revenues from fees charged in conjunction with use of the recreational development. Admission fees charged by the City will be limited to those necessary to amortize the initial investment and provide adequate operation and maintenance.

The City will be responsible for and promptly perform, or have performed, without cost to the SCS, all maintenance of multiple-purpose structure No. 19 and its basic recreational facilities as determined to be needed by either the City or the SCS immediately following completion of the structure by the contractor.

The SCS, the City, and the Upper Elm-Red Soil and Water Conservation District will make a joint inspection of the multiple-purpose structure at least annually or after unusually severe floods or in the event of any other unusual conditions that may adversely affect the structure for 3 years following installation. Inspection after the third year will be made at least annually by the City and the soil and water conservation district. The SCS will participate in annual inspections as often as it elects to do so after the third year. Inspections of the basic recreational facilities will be conducted on the same schedule except the facilities will also be inspected by the City during the season of heavy usage as often as necessary to prevent deterioration of the facilities.

Provisions will be made for free access of representatives of the sponsors and the federal representatives to inspect and provide maintenance for structural measures and their appurtenances at any time.

REVISED TABLE 1 - ESTIMATED INSTALLATION COST

Site Work Estimated, Taxes  
(of the Trinity River Watershed)

Installation Cost Item	Federal		Nonfederal		Total		Estimated Cost (Dollars)	
	Land	Other	Land	Other	Land	Other	Land	Other
<b>LAND TREATMENT</b>								
Cropland	37,962				37,962		372,300	
Pastureland	25,604				25,604		594,518	
Rangeland	24,874				24,874		171,230	
Critical Area Stabilization	300				300		9,000	
Technical Assistance								
<b>TOTAL LAND TREATMENT</b>								
							1,147,068	1,324,043
<b>STRUCTURAL MEASURES</b>								
Construction								
Floodwater Retarding								
Structures	41		1,545,360		1,545,360			1,545,360
Multiple-Purpose								
Structure No. 19	1		1,068,430		1,068,430		578,620	1,607,050
Municipal Outlet Structure	1						26,000	26,000
Basic Recreational Facilities	1		96,600		96,600		96,600	193,360
Subtotal - Construction			2,670,420		2,670,420		701,240	3,371,370
Engineering Services			687,750		687,750		63,830	531,600
Project Administration								
Construction Inspection			294,700		294,700		18,150	314,850
Other			230,900		230,900		24,350	273,050
Subtotal - Administration			536,600		536,600		52,500	507,900
Other Costs								
Land Rights			302,000		302,000		500,400	800,500
Water Rights							1,500	1,500
Subtotal - Other			302,000		302,000		501,900	692,000
<b>TOTAL STRUCTURAL MEASURES</b>			3,515,770		3,515,770		1,308,290	5,183,950
<b>TOTAL PROJECT</b>			4,082,837		4,082,837		2,455,358	6,503,995

1/ Price based actual costs for constructed structural measures; 1979 prices for unconstructed structural measures.  
2/ As planned land treatment completed with the exception of critical area stabilization.

1975-1976  
 The City of  
 and the  
 (District)

Item	Installation Cost - Direct Funds				Total Installation Cost
	Equipment	Land	Buildings	Other	
<b>STRUCTURAL REPAIRS - CONTINUING</b>					
Pleasanton Retarding Structures Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	1,200,000	400,000	1,000,000	100,000	2,700,000
<b>STRUCTURAL REPAIRS - NEW CONSTRUCTION</b>					
Multiple-Purpose Structure No. 1	1,000,000	175,000	1,000,000	50,000	2,225,000
Municipal Order Structure	50,000	2,000	2,000	2,000	56,000
Basic Structural Facilities	1,200,000	100,000	1,000,000	200,000	2,500,000
<b>Project Administration</b>					
					50,000
<b>GRAND TOTAL</b>	<b>2,400,000</b>	<b>575,000</b>	<b>2,000,000</b>	<b>250,000</b>	<b>5,100,000</b>

1/ Price Basis: Actual electric structure construction and 1975 prices for structural concrete uncontracted.  
 2/ Includes \$53,000 for also structure, modification, permits, or replacement of existing improvements.  
 3/ Includes \$102,000 for the structure, modification, permits, or replacement of existing improvements; \$25,000 for survey and legal fees; and \$10,000 for design contracts.  
 4/ Engineering services contract.

**ESTIMATE NUMBER 11 - CIVIL ENGINEERING AND SURVEYING WORK**  
**FOR THE**  
**CONSTRUCTION OF THE**  
**TRINITY DAM AND DAM**  
**ON THE TRINITY RIVER, TEXAS**  
**(Dallas)**

Item	ESTIMATE NUMBER 11 - CIVIL ENGINEERING AND SURVEYING WORK				CONTRACT BIDDING				Total	
	ESTIMATE NUMBER 11 - CIVIL ENGINEERING AND SURVEYING WORK		CONTRACT BIDDING		ESTIMATE NUMBER 11 - CIVIL ENGINEERING AND SURVEYING WORK		CONTRACT BIDDING			
	Quantity	Unit Price	Quantity	Unit Price	Quantity	Unit Price	Quantity	Unit Price		
<b>SUBTOTAL - PROPOSED:</b>										
All Foundation Reinforcing Structures	1,000,000		1,000,000		1,000,000		1,000,000		1,000,000	1,000,000
Basic Rectangular Panel Facilities	221,000		221,000		221,000		221,000		221,000	221,000
Municipal Outlet Structures	30,000		30,000		30,000		30,000		30,000	30,000
<b>SUBTOTAL - PROPOSED:</b>	1,251,000		1,251,000		1,251,000		1,251,000		1,251,000	1,251,000
<b>Site No. 19</b>										
<b>TOTAL</b>	1,251,000		1,251,000		1,251,000		1,251,000		1,251,000	1,251,000

Price Basis: Actual cost for structural materials, equipment and labor, plus overhead and profit.

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**REVISED TABLE 2B - RECREATIONAL FACILITIES - ESTIMATED CONSTRUCTION COSTS**

Elm Fork Watershed, Texas  
(of the Trinity River Watershed)

(Dollars)<sup>1/</sup>

Item	Number <sup>2/</sup>	Estimated Unit Cost	Total Construction Cost
Boat Ramp (2 lanes reinforced concrete)	2,000 sq. ft.	6	12,000
Fishing Piers (2 - wood construction)	1,080 sq. ft.	25	27,000
Picnic Tables (w/concrete pad)	25 each	350	8,750
BBQ Grills	10 each	75	750
Comfort Station (w/concrete sidewalk)	380 sq. ft.	40	12,800
Septic Tank (4,200 gallons)	1 each	2,500	2,500
Sewage Lagoon (3 ft. depth, 135 ft. x 135 ft. bottom)	3,400 cu. yd.	2	6,800
Water System (well, treatment unit, and waterline)	1 each	6,000	6,000
Water Fountain	1 each	30	30
Backstop	1 each	600	600
Trash Containers	20 each	75	1,500
Traffic Control	4,800 ft.	1	4,800
Electrical System	Lump Sum		4,300
Pole Mounted Lights	6 each	250	1,500
Access Trail	200 ft.	3	600
Roads (asphalt surfaced)	4,800 ft.	15	72,000
Auto Parking (asphalt surfaced)	70 each	125	8,750
Auto w/Trailer Parking (asphalt surfaced)	20 each	150	3,000
Grading, Shaping, and Vegetating	6 ac.	500	3,000
Landscaping (area above pool)	23 ac.	130	2,960
Entrance Sign	1 each	500	500
Fencing (woven wire)	3,400 ft.	3	10,200
<b>TOTAL</b>			<b>193,360</b>

<sup>1/</sup> Price Base: 1979

<sup>2/</sup> Estimated quantity subject to minor variation at time of detailed planning.

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**REVISED TABLE 4 - ANNUAL COST**

Elm Fork Watershed, Texas  
(of the Trinity River Watershed)

(Dollars) <sup>1/</sup>

Evaluation Unit	Amortization of Installation Cost <sup>2/</sup>	Operation, Maintenance, and Replacement Cost <sup>3/</sup>	Total
Constructed Floodwater Retarding Structures Nos. 1, 2, 3, 4, 5, 24, 25, 6A1, 6B, 6C, 6D, 6E, 6F, 6G, 6H, 6I, 6J, 6K, 6L, 6M, 6N, 6O, 7A, 7B, 7C, 7D, 7E, 7F, 8, 11A, 12, 15A, 15, 610C, 61D, 61F, 61G, 61K, 61L, 61O, 61W, 61H, 61V, 61P, and 61X	15,097	4,776	19,873
Multiple Purpose Structure No. 10, Municipal Outlet Structure, and Basic Recreational Facilities	102,063	8,378	110,441
Project Administration	22,074	-	22,074
<b>TOTAL</b>	<b>127,234</b>	<b>13,154</b>	<b>140,388</b>

- 1/ Price Base: Actual cost for structural measures constructed; 1978 prices for structural measures unconstructed.
- 2/ Constructed floodwater retarding structures amortized at 2.5 percent interest rate for 30 years. Structural measures added by this supplement amortized at 3.25 percent interest rate for 30 years.
- 3/ Includes \$7,920 for operation, maintenance, and replacement of recreational facilities.

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**REVISED TABLE 5 - ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE REDUCTION BENEFITS**

Elm Fork Watershed, Texas  
(of the Trinity River Watershed)

(Dollars)<sup>1/</sup>

Item	Estimated Average Annual Damage		Damage Reduction <sup>2/</sup>
	Without Project	With Project	
<b>Floodwater</b>			
Crop and Pasture	261,773	39,583	222,190
Other Agricultural	93,638	14,408	79,230
Nonagricultural	96,680	12,000	84,680
<b>Subtotal</b>	<b>452,091</b>	<b>65,991</b>	<b>386,100</b>
<b>Sediment</b>			
Overbank Deposition	26,612	12,764	13,848
Reservoirs	11,651	4,890	5,771
<b>Subtotal</b>	<b>38,273</b>	<b>18,654</b>	<b>19,619</b>
<b>Erosion</b>			
Flood Plain Scour	91,296	19,260	72,036
<b>Indirect</b>	<b>58,166</b>	<b>10,391</b>	<b>47,775</b>
<b>TOTAL</b>	<b>639,826</b>	<b>114,296</b>	<b>525,530</b>

<sup>1/</sup> Price Base: Current normalized price levels (October 1978).

<sup>2/</sup> Excludes effects of accelerated land treatment measures.

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**APPENDIX TABLE 5 - OPERATING COSTS, REVENUES AND COSTS**

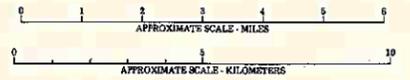
The First Washington Triennial  
for the Triennial Water Resources  
(Dollars)

Evaluation Unit	AVERAGE ANNUAL REVENUE			Total	Average Cost	Benefit-Cost Ratio
	Damage Reduction	Recreation	Small			
Constructed Floodwater Retarding Structures (Nos. 1, 2, 3, 4, 5, 6, 7)						
6A1, 6B, 6C, 6D, 6E, 6F, 6G, 6H, 6I, 6J, 6K, 6L, 6M, 6N, 6O, 6P, 6Q, 6R, 6S, 6T, 6U, 6V, 6W, 6X, 6Y, 6Z	585,330	34,650	12,990	633,070	192,912	5.1:1.0
7B, 7C, 7D, 7E, 7F, 7G, 7H, 7I, 7J, 7K, 7L, 7M, 7N, 7O, 7P, 7Q, 7R, 7S, 7T, 7U, 7V, 7W, 7X, 7Y, 7Z						
8A, 8B, 8C, 8D, 8E, 8F, 8G, 8H, 8I, 8J, 8K, 8L, 8M, 8N, 8O, 8P, 8Q, 8R, 8S, 8T, 8U, 8V, 8W, 8X, 8Y, 8Z						
9A, 9B, 9C, 9D, 9E, 9F, 9G, 9H, 9I, 9J, 9K, 9L, 9M, 9N, 9O, 9P, 9Q, 9R, 9S, 9T, 9U, 9V, 9W, 9X, 9Y, 9Z						
10A, 10B, 10C, 10D, 10E, 10F, 10G, 10H, 10I, 10J, 10K, 10L, 10M, 10N, 10O, 10P, 10Q, 10R, 10S, 10T, 10U, 10V, 10W, 10X, 10Y, 10Z						
11A, 11B, 11C, 11D, 11E, 11F, 11G, 11H, 11I, 11J, 11K, 11L, 11M, 11N, 11O, 11P, 11Q, 11R, 11S, 11T, 11U, 11V, 11W, 11X, 11Y, 11Z						
12A, 12B, 12C, 12D, 12E, 12F, 12G, 12H, 12I, 12J, 12K, 12L, 12M, 12N, 12O, 12P, 12Q, 12R, 12S, 12T, 12U, 12V, 12W, 12X, 12Y, 12Z						
13A, 13B, 13C, 13D, 13E, 13F, 13G, 13H, 13I, 13J, 13K, 13L, 13M, 13N, 13O, 13P, 13Q, 13R, 13S, 13T, 13U, 13V, 13W, 13X, 13Y, 13Z						
14A, 14B, 14C, 14D, 14E, 14F, 14G, 14H, 14I, 14J, 14K, 14L, 14M, 14N, 14O, 14P, 14Q, 14R, 14S, 14T, 14U, 14V, 14W, 14X, 14Y, 14Z						
15A, 15B, 15C, 15D, 15E, 15F, 15G, 15H, 15I, 15J, 15K, 15L, 15M, 15N, 15O, 15P, 15Q, 15R, 15S, 15T, 15U, 15V, 15W, 15X, 15Y, 15Z						
16A, 16B, 16C, 16D, 16E, 16F, 16G, 16H, 16I, 16J, 16K, 16L, 16M, 16N, 16O, 16P, 16Q, 16R, 16S, 16T, 16U, 16V, 16W, 16X, 16Y, 16Z						
17A, 17B, 17C, 17D, 17E, 17F, 17G, 17H, 17I, 17J, 17K, 17L, 17M, 17N, 17O, 17P, 17Q, 17R, 17S, 17T, 17U, 17V, 17W, 17X, 17Y, 17Z						
18A, 18B, 18C, 18D, 18E, 18F, 18G, 18H, 18I, 18J, 18K, 18L, 18M, 18N, 18O, 18P, 18Q, 18R, 18S, 18T, 18U, 18V, 18W, 18X, 18Y, 18Z						
19A, 19B, 19C, 19D, 19E, 19F, 19G, 19H, 19I, 19J, 19K, 19L, 19M, 19N, 19O, 19P, 19Q, 19R, 19S, 19T, 19U, 19V, 19W, 19X, 19Y, 19Z						
20A, 20B, 20C, 20D, 20E, 20F, 20G, 20H, 20I, 20J, 20K, 20L, 20M, 20N, 20O, 20P, 20Q, 20R, 20S, 20T, 20U, 20V, 20W, 20X, 20Y, 20Z						
21A, 21B, 21C, 21D, 21E, 21F, 21G, 21H, 21I, 21J, 21K, 21L, 21M, 21N, 21O, 21P, 21Q, 21R, 21S, 21T, 21U, 21V, 21W, 21X, 21Y, 21Z						
22A, 22B, 22C, 22D, 22E, 22F, 22G, 22H, 22I, 22J, 22K, 22L, 22M, 22N, 22O, 22P, 22Q, 22R, 22S, 22T, 22U, 22V, 22W, 22X, 22Y, 22Z						
23A, 23B, 23C, 23D, 23E, 23F, 23G, 23H, 23I, 23J, 23K, 23L, 23M, 23N, 23O, 23P, 23Q, 23R, 23S, 23T, 23U, 23V, 23W, 23X, 23Y, 23Z						
24A, 24B, 24C, 24D, 24E, 24F, 24G, 24H, 24I, 24J, 24K, 24L, 24M, 24N, 24O, 24P, 24Q, 24R, 24S, 24T, 24U, 24V, 24W, 24X, 24Y, 24Z						
25A, 25B, 25C, 25D, 25E, 25F, 25G, 25H, 25I, 25J, 25K, 25L, 25M, 25N, 25O, 25P, 25Q, 25R, 25S, 25T, 25U, 25V, 25W, 25X, 25Y, 25Z						
26A, 26B, 26C, 26D, 26E, 26F, 26G, 26H, 26I, 26J, 26K, 26L, 26M, 26N, 26O, 26P, 26Q, 26R, 26S, 26T, 26U, 26V, 26W, 26X, 26Y, 26Z						
27A, 27B, 27C, 27D, 27E, 27F, 27G, 27H, 27I, 27J, 27K, 27L, 27M, 27N, 27O, 27P, 27Q, 27R, 27S, 27T, 27U, 27V, 27W, 27X, 27Y, 27Z						
28A, 28B, 28C, 28D, 28E, 28F, 28G, 28H, 28I, 28J, 28K, 28L, 28M, 28N, 28O, 28P, 28Q, 28R, 28S, 28T, 28U, 28V, 28W, 28X, 28Y, 28Z						
29A, 29B, 29C, 29D, 29E, 29F, 29G, 29H, 29I, 29J, 29K, 29L, 29M, 29N, 29O, 29P, 29Q, 29R, 29S, 29T, 29U, 29V, 29W, 29X, 29Y, 29Z						
30A, 30B, 30C, 30D, 30E, 30F, 30G, 30H, 30I, 30J, 30K, 30L, 30M, 30N, 30O, 30P, 30Q, 30R, 30S, 30T, 30U, 30V, 30W, 30X, 30Y, 30Z						
31A, 31B, 31C, 31D, 31E, 31F, 31G, 31H, 31I, 31J, 31K, 31L, 31M, 31N, 31O, 31P, 31Q, 31R, 31S, 31T, 31U, 31V, 31W, 31X, 31Y, 31Z						
32A, 32B, 32C, 32D, 32E, 32F, 32G, 32H, 32I, 32J, 32K, 32L, 32M, 32N, 32O, 32P, 32Q, 32R, 32S, 32T, 32U, 32V, 32W, 32X, 32Y, 32Z						
33A, 33B, 33C, 33D, 33E, 33F, 33G, 33H, 33I, 33J, 33K, 33L, 33M, 33N, 33O, 33P, 33Q, 33R, 33S, 33T, 33U, 33V, 33W, 33X, 33Y, 33Z						
34A, 34B, 34C, 34D, 34E, 34F, 34G, 34H, 34I, 34J, 34K, 34L, 34M, 34N, 34O, 34P, 34Q, 34R, 34S, 34T, 34U, 34V, 34W, 34X, 34Y, 34Z						
35A, 35B, 35C, 35D, 35E, 35F, 35G, 35H, 35I, 35J, 35K, 35L, 35M, 35N, 35O, 35P, 35Q, 35R, 35S, 35T, 35U, 35V, 35W, 35X, 35Y, 35Z						
36A, 36B, 36C, 36D, 36E, 36F, 36G, 36H, 36I, 36J, 36K, 36L, 36M, 36N, 36O, 36P, 36Q, 36R, 36S, 36T, 36U, 36V, 36W, 36X, 36Y, 36Z						
37A, 37B, 37C, 37D, 37E, 37F, 37G, 37H, 37I, 37J, 37K, 37L, 37M, 37N, 37O, 37P, 37Q, 37R, 37S, 37T, 37U, 37V, 37W, 37X, 37Y, 37Z						
38A, 38B, 38C, 38D, 38E, 38F, 38G, 38H, 38I, 38J, 38K, 38L, 38M, 38N, 38O, 38P, 38Q, 38R, 38S, 38T, 38U, 38V, 38W, 38X, 38Y, 38Z						
39A, 39B, 39C, 39D, 39E, 39F, 39G, 39H, 39I, 39J, 39K, 39L, 39M, 39N, 39O, 39P, 39Q, 39R, 39S, 39T, 39U, 39V, 39W, 39X, 39Y, 39Z						
40A, 40B, 40C, 40D, 40E, 40F, 40G, 40H, 40I, 40J, 40K, 40L, 40M, 40N, 40O, 40P, 40Q, 40R, 40S, 40T, 40U, 40V, 40W, 40X, 40Y, 40Z						
41A, 41B, 41C, 41D, 41E, 41F, 41G, 41H, 41I, 41J, 41K, 41L, 41M, 41N, 41O, 41P, 41Q, 41R, 41S, 41T, 41U, 41V, 41W, 41X, 41Y, 41Z						
42A, 42B, 42C, 42D, 42E, 42F, 42G, 42H, 42I, 42J, 42K, 42L, 42M, 42N, 42O, 42P, 42Q, 42R, 42S, 42T, 42U, 42V, 42W, 42X, 42Y, 42Z						
43A, 43B, 43C, 43D, 43E, 43F, 43G, 43H, 43I, 43J, 43K, 43L, 43M, 43N, 43O, 43P, 43Q, 43R, 43S, 43T, 43U, 43V, 43W, 43X, 43Y, 43Z						
44A, 44B, 44C, 44D, 44E, 44F, 44G, 44H, 44I, 44J, 44K, 44L, 44M, 44N, 44O, 44P, 44Q, 44R, 44S, 44T, 44U, 44V, 44W, 44X, 44Y, 44Z						
45A, 45B, 45C, 45D, 45E, 45F, 45G, 45H, 45I, 45J, 45K, 45L, 45M, 45N, 45O, 45P, 45Q, 45R, 45S, 45T, 45U, 45V, 45W, 45X, 45Y, 45Z						
46A, 46B, 46C, 46D, 46E, 46F, 46G, 46H, 46I, 46J, 46K, 46L, 46M, 46N, 46O, 46P, 46Q, 46R, 46S, 46T, 46U, 46V, 46W, 46X, 46Y, 46Z						
47A, 47B, 47C, 47D, 47E, 47F, 47G, 47H, 47I, 47J, 47K, 47L, 47M, 47N, 47O, 47P, 47Q, 47R, 47S, 47T, 47U, 47V, 47W, 47X, 47Y, 47Z						
48A, 48B, 48C, 48D, 48E, 48F, 48G, 48H, 48I, 48J, 48K, 48L, 48M, 48N, 48O, 48P, 48Q, 48R, 48S, 48T, 48U, 48V, 48W, 48X, 48Y, 48Z						
49A, 49B, 49C, 49D, 49E, 49F, 49G, 49H, 49I, 49J, 49K, 49L, 49M, 49N, 49O, 49P, 49Q, 49R, 49S, 49T, 49U, 49V, 49W, 49X, 49Y, 49Z						
50A, 50B, 50C, 50D, 50E, 50F, 50G, 50H, 50I, 50J, 50K, 50L, 50M, 50N, 50O, 50P, 50Q, 50R, 50S, 50T, 50U, 50V, 50W, 50X, 50Y, 50Z						
51A, 51B, 51C, 51D, 51E, 51F, 51G, 51H, 51I, 51J, 51K, 51L, 51M, 51N, 51O, 51P, 51Q, 51R, 51S, 51T, 51U, 51V, 51W, 51X, 51Y, 51Z						
52A, 52B, 52C, 52D, 52E, 52F, 52G, 52H, 52I, 52J, 52K, 52L, 52M, 52N, 52O, 52P, 52Q, 52R, 52S, 52T, 52U, 52V, 52W, 52X, 52Y, 52Z						
53A, 53B, 53C, 53D, 53E, 53F, 53G, 53H, 53I, 53J, 53K, 53L, 53M, 53N, 53O, 53P, 53Q, 53R, 53S, 53T, 53U, 53V, 53W, 53X, 53Y, 53Z						
54A, 54B, 54C, 54D, 54E, 54F, 54G, 54H, 54I, 54J, 54K, 54L, 54M, 54N, 54O, 54P, 54Q, 54R, 54S, 54T, 54U, 54V, 54W, 54X, 54Y, 54Z						
55A, 55B, 55C, 55D, 55E, 55F, 55G, 55H, 55I, 55J, 55K, 55L, 55M, 55N, 55O, 55P, 55Q, 55R, 55S, 55T, 55U, 55V, 55W, 55X, 55Y, 55Z						
56A, 56B, 56C, 56D, 56E, 56F, 56G, 56H, 56I, 56J, 56K, 56L, 56M, 56N, 56O, 56P, 56Q, 56R, 56S, 56T, 56U, 56V, 56W, 56X, 56Y, 56Z						
57A, 57B, 57C, 57D, 57E, 57F, 57G, 57H, 57I, 57J, 57K, 57L, 57M, 57N, 57O, 57P, 57Q, 57R, 57S, 57T, 57U, 57V, 57W, 57X, 57Y, 57Z						
58A, 58B, 58C, 58D, 58E, 58F, 58G, 58H, 58I, 58J, 58K, 58L, 58M, 58N, 58O, 58P, 58Q, 58R, 58S, 58T, 58U, 58V, 58W, 58X, 58Y, 58Z						
59A, 59B, 59C, 59D, 59E, 59F, 59G, 59H, 59I, 59J, 59K, 59L, 59M, 59N, 59O, 59P, 59Q, 59R, 59S, 59T, 59U, 59V, 59W, 59X, 59Y, 59Z						
60A, 60B, 60C, 60D, 60E, 60F, 60G, 60H, 60I, 60J, 60K, 60L, 60M, 60N, 60O, 60P, 60Q, 60R, 60S, 60T, 60U, 60V, 60W, 60X, 60Y, 60Z						
61A, 61B, 61C, 61D, 61E, 61F, 61G, 61H, 61I, 61J, 61K, 61L, 61M, 61N, 61O, 61P, 61Q, 61R, 61S, 61T, 61U, 61V, 61W, 61X, 61Y, 61Z						
62A, 62B, 62C, 62D, 62E, 62F, 62G, 62H, 62I, 62J, 62K, 62L, 62M, 62N, 62O, 62P, 62Q, 62R, 62S, 62T, 62U, 62V, 62W, 62X, 62Y, 62Z						
63A, 63B, 63C, 63D, 63E, 63F, 63G, 63H, 63I, 63J, 63K, 63L, 63M, 63N, 63O, 63P, 63Q, 63R, 63S, 63T, 63U, 63V, 63W, 63X, 63Y, 63Z						
64A, 64B, 64C, 64D, 64E, 64F, 64G, 64H, 64I, 64J, 64K, 64L, 64M, 64N, 64O, 64P, 64Q, 64R, 64S, 64T, 64U, 64V, 64W, 64X, 64Y, 64Z						
65A, 65B, 65C, 65D, 65E, 65F, 65G, 65H, 65I, 65J, 65K, 65L, 65M, 65N, 65O, 65P, 65Q, 65R, 65S, 65T, 65U, 65V, 65W, 65X, 65Y, 65Z						
66A, 66B, 66C, 66D, 66E, 66F, 66G, 66H, 66I, 66J, 66K, 66L, 66M, 66N, 66O, 66P, 66Q, 66R, 66S, 66T, 66U, 66V, 66W, 66X, 66Y, 66Z						
67A, 67B, 67C, 67D, 67E, 67F, 67G, 67H, 67I, 67J, 67K, 67L, 67M, 67N, 67O, 67P, 67Q, 67R, 67S, 67T, 67U, 67V, 67W, 67X, 67Y, 67Z						
68A, 68B, 68C, 68D, 68E, 68F, 68G, 68H, 68I, 68J, 68K, 68L, 68M, 68N, 68O, 68P, 68Q, 68R, 68S, 68T, 68U, 68V, 68W, 68X, 68Y, 68Z						
69A, 69B, 69C, 69D, 69E, 69F, 69G, 69H, 69I, 69J, 69K, 69L, 69M, 69N, 69O, 69P, 69Q, 69R, 69S, 69T, 69U, 69V, 69W, 69X, 69Y, 69Z						
70A, 70B, 70C, 70D, 70E, 70F, 70G, 70H, 70I, 70J, 70K, 70L, 70M, 70N, 70O, 70P, 70Q, 70R, 70S, 70T, 70U, 70V, 70W, 70X, 70Y, 70Z						
71A, 71B, 71C, 71D, 71E, 71F, 71G, 71H, 71I, 71J, 71K, 71L, 71M, 71N, 71O, 71P, 71Q, 71R, 71S, 71T, 71U, 71V, 71W, 71X, 71Y, 71Z						
72A, 72B, 72C, 72D, 72E, 72F, 72G, 72H, 72I, 72J, 72K, 72L, 72M, 72N, 72O, 72P, 72Q, 72R, 72S, 72T, 72U, 72V, 72W, 72X, 72Y, 72Z						
73A, 73B, 73C, 73D, 73E, 73F, 73G, 73H, 73I, 73J, 73K, 73L, 73M, 73N, 73O, 73P, 73Q, 73R, 73S, 73T, 73U, 73V, 73W, 73X, 73Y, 73Z						
74A, 74B, 74C, 74D, 74E, 74F, 74G, 74H, 74I, 74J, 74K, 74L, 74M, 74N, 74O, 74P, 74Q, 74R, 74S, 74T, 74U, 74V, 74W, 74X, 74Y, 74Z						
75A, 75B, 75C, 75D, 75E, 75F, 75G, 75H, 75I, 75J, 75K, 75L, 75M, 75N, 75O, 75P, 75Q, 75R, 75S, 75T, 75U, 75V, 75W, 75X, 75Y, 75Z						
76A, 76B, 76C, 76D, 76E, 76F, 76G, 76H, 76I, 76J, 76K, 76L, 76M, 76N, 76O, 76P, 76Q, 76R, 76S, 76T, 76U, 76V, 76W, 76X, 76Y, 76Z						

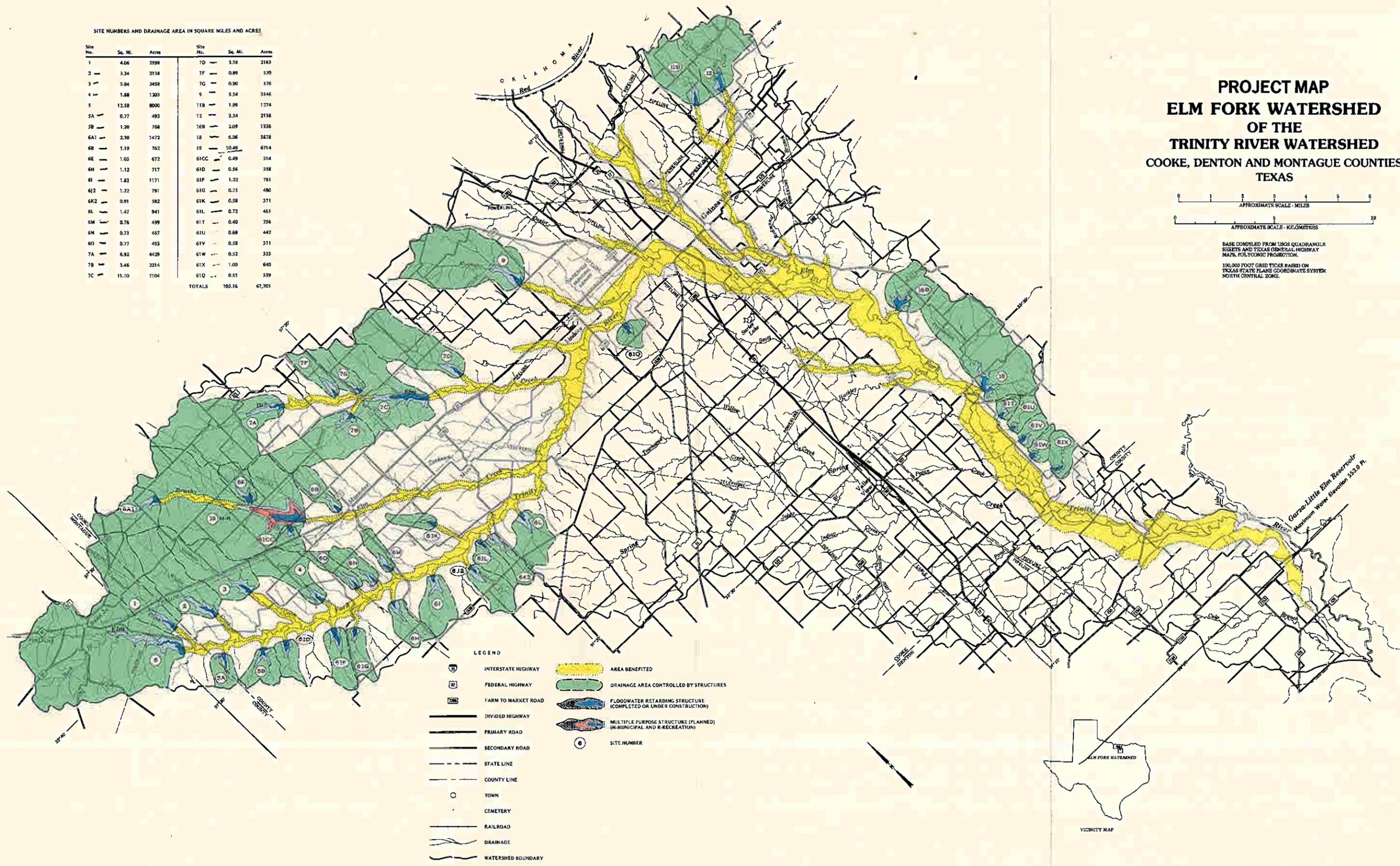
SITE NUMBERS AND DRAINAGE AREA IN SQUARE MILES AND ACRES

Site No.	Sq. Mi.	Acres	Site No.	Sq. Mi.	Acres
1	4.06	2598	7D	3.38	2163
2	3.34	2138	7F	0.89	570
3	5.84	2458	7G	0.90	576
4	1.88	1203	9	5.54	3546
5	12.50	8000	11B	1.99	1274
5A	0.77	493	12	3.34	2138
5B	1.20	768	16R	2.09	1338
6A1	2.30	1472	18	6.06	3878
6B	1.19	762	19	10.49	6714
6E	1.05	672	61CC	0.48	314
6H	1.12	717	61D	0.56	358
6I	1.82	1171	61F	1.22	781
6J2	1.22	781	61G	0.75	480
6K2	0.91	582	61K	0.58	371
6L	1.47	941	61L	0.72	461
6M	0.78	499	61T	0.40	256
6N	0.73	467	61U	0.69	442
6O	0.77	493	61V	0.58	371
7A	6.82	4420	61W	0.52	333
7B	3.46	2214	61X	1.00	640
7C	11.10	7104	61Q	0.51	339
TOTALS	105.16	67,305			

**PROJECT MAP  
ELM FORK WATERSHED  
OF THE  
TRINITY RIVER WATERSHED  
COOKE, DENTON AND MONTAGUE COUNTIES  
TEXAS**



BASE COMPILED FROM USGS QUADRANGLE SHEETS AND TEXAS GENERAL HIGHWAY MAPS. POLYCONIC PROJECTION.  
15,000 FOOT GRID TICS BASED ON TEXAS STATE PLANS COORDINATE SYSTEM NORTH CENTRAL ZONE.



- LEGEND**
- INTERSTATE HIGHWAY
  - FEDERAL HIGHWAY
  - FARM TO MARKET ROAD
  - DIVIDED HIGHWAY
  - PRIMARY ROAD
  - SECONDARY ROAD
  - STATE LINE
  - COUNTY LINE
  - TOWN
  - CEMETERY
  - RAILROAD
  - DRAINAGE
  - WATERSHED BOUNDARY
  - AREA BENEFITED
  - DRAINAGE AREA CONTROLLED BY STRUCTURES
  - FLOODWATER RETARDING STRUCTURE (COMPLETED OR UNDER CONSTRUCTION)
  - MULTIPLE PURPOSE STRUCTURE (PLANNED) (M-MUNICIPAL AND R-RECREATION)
  - SITE NUMBER



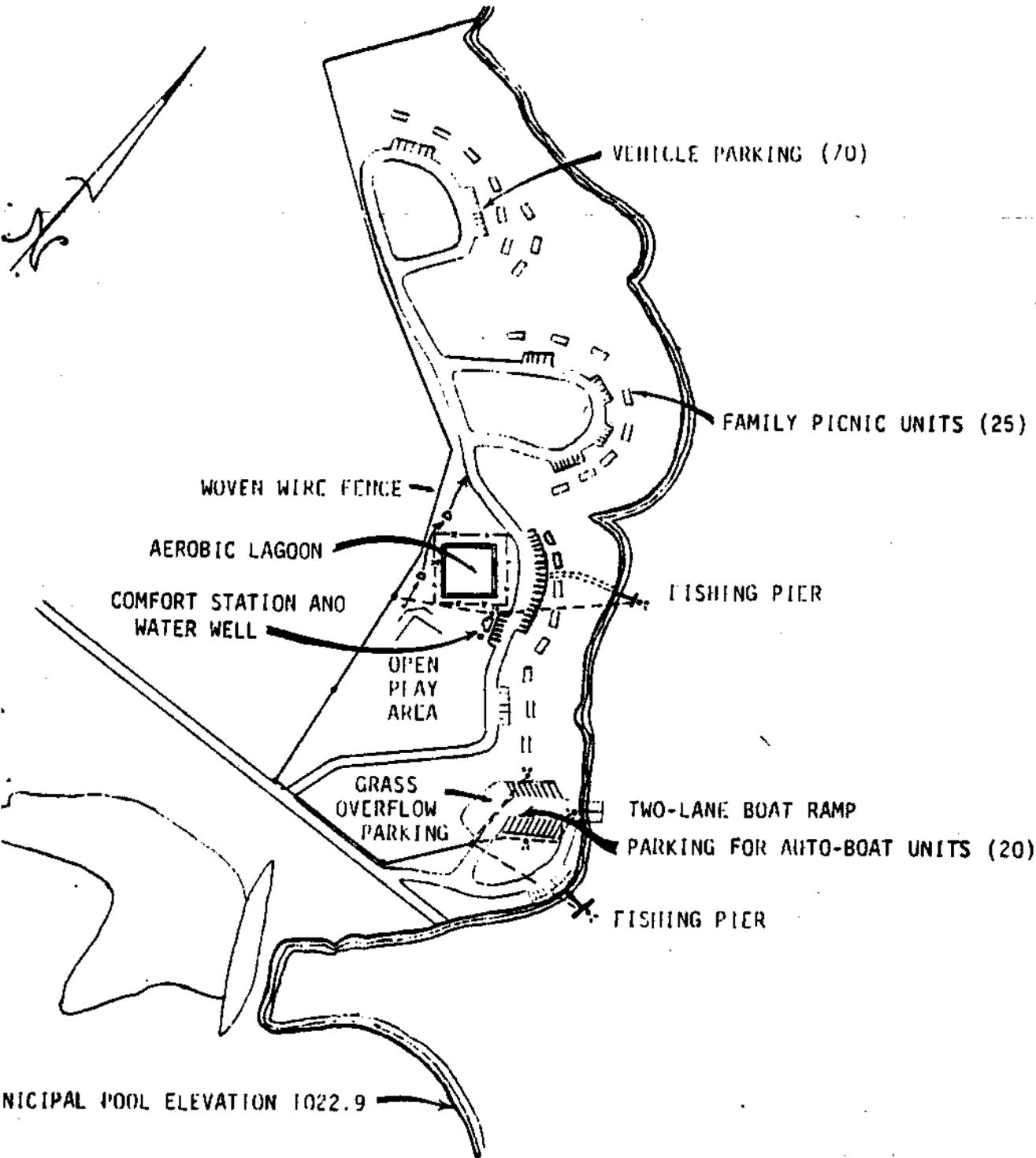


FIGURE 1A  
 BASIC RECREATION DEVELOPMENT  
 SITE 19

ELM FORK CREEK WATERSHED  
 (TRINITY RIVER WATERSHED)  
 COOKE COUNTY, TEXAS

October 1979

