

WATERSHED PLANNING PARTY  
SOIL CONSERVATION SERVICE

# WORK PLAN

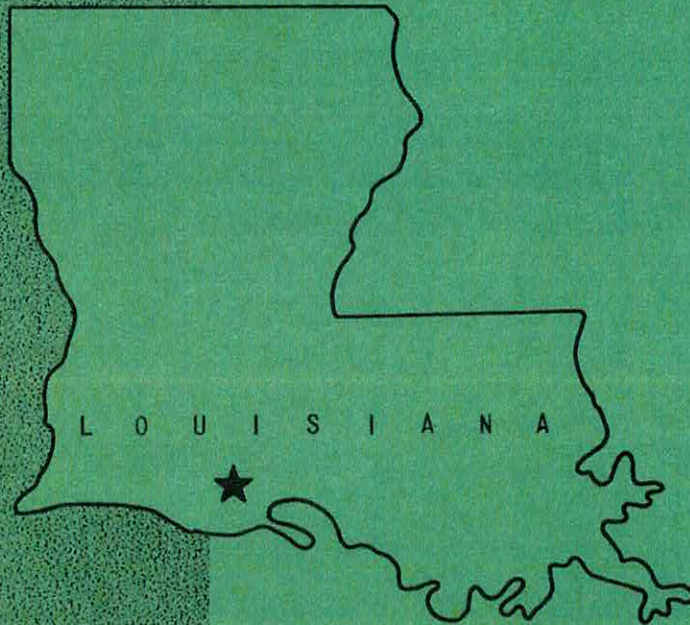
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FOR

WATERSHED PROTECTION,  
FLOOD PREVENTION,  
AND AGRICULTURAL WATER MANAGEMENT

# SEVENTH WARD CANAL WATERSHED

VERMILION PARISH, LOUISIANA



FILE COPY

March 1964

WATERSHED WORK PLAN AGREEMENT

between the

IBERIA-VERMILION SOIL CONSERVATION DISTRICT  
(Local Organization)

SEVENTH WARD CANAL GRAVITY DRAINAGE DISTRICT  
(Local Organization)

VERMILION PARISH POLICE JURY  
(Local Organization)

In the State of Louisiana  
(hereinafter referred to as the Sponsoring Local Organizations)

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 Organizations for assistance in preparing a plan for works of improvement for the Seventh Ward Canal Watershed, State of Louisiana, 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 Organizations and the Service a mutually satisfactory plan for works of improvement for the Seventh Ward Canal Watershed, State of Louisiana, 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 Organizations 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 five 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 Seventh Ward Canal Gravity Drainage District will acquire without cost to the Federal Government such land, easements, or rights-of-way as will be needed in connection with the works of improvement.  
(Estimated cost \$80,370)
2. The Sponsoring Local Organizations will acquire or provide assurance that landowners or water users have acquired such water rights pursuant to State law as may be needed in the installation and operation of the works of improvement.
3. The percentages of construction costs of structural measures to be paid by the Seventh Ward Canal Gravity Drainage District 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)
Mains and Laterals	28.7	71.3	180,782
Levees	0	100	38,962
Water Control Structures	28.7	71.3	104,190

4. The percentages of the cost for installation services to be borne by the Sponsoring Local Organizations and the Service are as follows:

<u>Works of Improvement</u>	<u>Sponsoring Local Organization</u> (percent)	<u>Service</u> (percent)	<u>Estimated Installation Service Cost</u> (dollars)
All Structural Measures	0	100	99,076

5. The Seventh Ward Canal Gravity Drainage District will bear the costs of administering contracts. (Estimated cost \$6,000)
6. The Sponsoring Local Organizations will provide assistance to landowners and operators to assure the installation of the land treatment measures shown in the watershed work plan.
7. The Sponsoring Local Organizations will encourage landowners and operators to operate and maintain the land treatment measures for the protection and improvement of the watershed.
8. The Seventh Ward Canal Gravity Drainage District 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.
9. The costs shown in this agreement represent preliminary estimates. In finally determining the costs to be borne by the parties hereto, the actual costs incurred in the installation of works of improvement will be used.
10. This agreement does not constitute a financial document to serve as a basis for the obligation of Federal funds, and financial and other assistance to be furnished by the Service in carrying out the watershed work plan is contingent on the appropriation of funds for this purpose.

Where there is a Federal contribution to the construction cost of works of improvement, a separate agreement in connection with each construction contract will be entered into between the Service and the Seventh Ward Canal Gravity Drainage District prior to the issuance of the invitation to bid. Such agreement will set forth in detail

the financial and working arrangements and other conditions that are applicable to the specific works of improvement.

11. 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.
12. No member of 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.

IBERIA-VERMILION SOIL CONSERVATION DISTRICT

By Medina Hernandez, Sr.

Title Chairman

Date June 4, 1964

The signing of this agreement was authorized by a resolution of the governing body of the Iberia-Vermilion Soil Conservation District adopted at a meeting Local Organization

held on June 4, 1964

J. F. Noel  
Secretary, Iberia-Vermilion Soil  
Conservation District

Date June 4, 1964

Seventh Ward Canal Gravity Drainage District  
Local Organization

By *Samuel Niles*

Title President

Date June 4, 1964

The signing of this agreement was authorized by a resolution of the governing body of the Seventh Ward Canal Gravity Drainage District adopted at a meeting  
Local Organization

held on June 4, 1964

*Francis D. Stray*  
Secretary, Seventh Ward Canal Gravity Drainage District

Date June 4, 1964

Vermilion Parish Police Jury  
Local Organization

By *Goldman & Victor*

Title President

Date June 4, 1964

The signing of this agreement was authorized by a resolution of the governing body of the Vermilion Parish Police Jury adopted at a meeting held on  
Local Organization

June 2, 1964

*[Signature]*  
Secretary, Vermilion Parish Police Jury

Date June 2, 1964

Soil Conservation Service  
United States Department of Agriculture

By *H B Martin*

Date June 5, 1964

WORK PLAN  
FOR  
WATERSHED PROTECTION, FLOOD PREVENTION  
AND AGRICULTURAL WATER MANAGEMENT

SEVENTH WARD CANAL WATERSHED  
Vermilion Parish, Louisiana

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

Prepared By:

Iberia-Vermilion Soil Conservation District  
(Sponsor)

Seventh Ward Canal Gravity Drainage District  
(Sponsor)

Vermilion Parish Police Jury  
(Sponsor)

With Assistance By:

United States Department of Agriculture  
Soil Conservation Service  
March 1964

## WATERSHED WORK PLAN

SEVENTH WARD CANAL WATERSHED  
Vermilion Parish, Louisiana  
March 1964

### SUMMARY OF PLAN

This plan provides for watershed protection, flood prevention, drainage irrigation, and prevention of salt water intrusion in the Seventh Ward Canal watershed. It was prepared by the Iberia-Vermilion Soil Conservation District, the Vermilion Parish Police Jury, and the Seventh Ward Canal Gravity Drainage District. Technical assistance was provided by the Soil Conservation Service of the United States Department of Agriculture.

The watershed contains 32,000 acres, or 50 square miles, in Vermilion Parish. Approximately 53 percent of the watershed is in cropland; 15 percent in pasture; 25 percent in woodland and swamp; and 7 percent in miscellaneous uses such as roads, railroads, ditches and canals, oil and gas production and transmission facilities, farmsteads, idle areas, etc. All land is privately owned.

The primary objectives of the project are to reduce flooding, provide adequate drainage outlets for all farm land, provide a more dependable supply of irrigation water, and protect the area from damage caused by salt water intrusion of abnormally high tides. The proposed plan will meet these objectives.

The work plan proposes installing, in a 3-year period for structural measures and a 5-year period for land treatment measures, a project for protection and development of the watershed at a total installation cost of \$862,380. Public Law 566 will bear \$387,666 of this total, and the remaining \$474,714 will be borne by other funds. Local interests will bear the entire cost of operation and maintenance.

#### Land Treatment Measures

Approximately 90 percent of all needed land treatment measures for watershed protection and improvement will be installed within the 5-year installation period. The cost of these measures is estimated to be \$353,000, of which \$296,100 is for the cost of installing the practices and includes expected reimbursement from the Agricultural Stabilization and Conservation Service. The remaining \$56,900 is for technical assistance and includes \$10,400 presently being provided by the going program, and \$46,500 needed to accelerate the installation of the needed measures within the 5-year project installation period.

Land treatment needed for watershed protection, flood prevention and agricultural water management which is expected to be installed during the project period is shown in table 1.



### Structural Measures

Structural measures to be installed are 3.3 miles of levees, 4 water control structures, and 39.6 miles of multiple-purpose mains and laterals. The total cost of structural measures is estimated to be \$509,380, of which the Public Law 566 share is \$341,166. Of the remaining \$168,214, which is to be borne by local interests, 49 percent (\$81,844) is for construction; 48 percent (\$80,370) is for land, easements, and rights-of-way; and 3 percent (\$6,000) is for administration of contracts.

### Benefits

The reduction of flooding, improvement of drainage outlets, and a more dependable supply of water for irrigation will directly benefit 190 farm units in the project area. The average annual primary benefits accruing to structural measures are \$114,561, and the average annual cost of these measures is \$33,016. The ratio of benefits to cost is 3.5 to 1.

### Operation and Maintenance

Land treatment measures will be maintained by the landowners and operators of the farms on which the measures are installed. The Iberia-Vermilion Soil Conservation District will furnish technical assistance.

Structural measures will be operated and maintained by the Seventh Ward Canal Gravity Drainage District. This district is legally formed and has the power of taxation. The estimated average annual cost of operation and maintenance of the structural measures is \$9,310, based on long-term prices.

### Provisions for Financing Construction

The Seventh Ward Canal Gravity Drainage District will provide the local share of construction costs through a bonded indebtedness. A tax sufficient to repay bonded indebtedness and to provide funds necessary for operation and maintenance will be assessed the residents of the drainage district.

A project agreement will be entered into between the Seventh Ward Canal Gravity Drainage District and the Soil Conservation Service to include the commitments by both parties.

## DESCRIPTION OF WATERSHED

### Physical Data

The Seventh Ward Canal watershed, comprising 32,000 acres, is located in Vermilion Parish and is roughly triangular in shape. The eastern side is formed by the Vermilion River; and the western side is formed by a road and irrigation supply canal which meanders north and south approximately on the section

line one mile west of the range line, separating Range 2 East and Range 3 East. The southern boundary follows the Forked Island, Ester, Intracoastal City road. The apex of the triangle is about 3 miles east of Kaplan.

The land is very flat with the predominant slope being less than one foot per mile. The elevations range from sea level to 20 feet above sea level. Due to the extreme low elevation and flat slope of the southern portion of the area, man-made obstructions such as roads, levees, or dikes form drainage boundaries.

The watershed lies partly within two physiographic areas, the Gulf Coast Prairies in the northern portion and the Gulf Coast Marsh in the extreme southern portion. The soils have developed from Recent alluvium which extends to a considerable depth. Deltaic plain deposits underlie the marshes, swamps, bays, and lakes.

The Patoutville, Crowley, Beaumont, and Midland soils represent most of the soils that are in cultivation. These soils are very slowly permeable, fine textured in the subsoil, and generally in need of drainage. The fresh water marshland consists of intermingled silts and peats overlying soft clays. These soils are very slowly permeable and are poorly drained.

The drainage pattern is generally from north to south. Natural coulees, or bayous, provide drainage for the area. These have been enlarged over a period of years. The topography is so flat that a true flood plain cannot be identified, and many miles of on-farm ditches are required to deliver rainfall runoff to the main and lateral ditches. Three bayous, or coulees, discharge water from the watershed into the Vermilion River.

Due to the extremely low elevation in the lower part of the watershed, the bottom elevation of most ditches is below sea level. Normal water level in the Vermilion River is such that water stands in most drainage ditches at all times. The local farmers pump water from these ditches to irrigate their rice fields.

The over-all land use of the watershed is as follows:

<u>Land Use</u>	<u>Acres</u>	<u>Percent</u>
Cropland	17,100	53
Pasture	4,650	15
Woodland and Swamp	7,900	25
Miscellaneous <u>1/</u>	2,350	7
<hr/>	<hr/>	<hr/>
Total	32,000	100

1/ Includes roads, railroads, farmsteads, ditches and canals, oil and gas production areas, etc.

The average annual rainfall of about 58 inches is usually well distributed throughout the year. However, heavy rainfall causing serious crop damage may occur in any season. Hurricane-produced storms which strike the area occasionally are accompanied by heavy rainfall. Normally, the two driest months are March and November with 3.5 and 3.7 inches, respectively. The two wettest months are June and July with 5.3 and 7.3 inches. The mean monthly temperatures range from 54 degrees Fahrenheit in January to 82 degrees in July. The maximum recorded temperature is 105 degrees and the minimum is 5 degrees. The average frost-free period of 264 days extends from March 2 to November 20.

Water for domestic use is obtained mainly from deep wells; however, a few cisterns are used. Livestock water is obtained from shallow wells and from irrigation canals and drainage ditches.

The Corps of Engineers has constructed locks on the Intracoastal Waterway west of the Vermilion River and east of the Calcasieu River. They also have constructed water control structures on Schooner Bayou and at Catfish Point, thereby forming the Mermentau River Fresh Water Basin which is southwest of and in close proximity of the watershed. Rice farmers obtain water from this basin for irrigation by pumping from multiple-purpose drainage and irrigation ditches which connect the farming areas with the basin.

Fresh water for irrigation of rice is also obtained from the Vermilion River by pumping from multiple-purpose drainage and irrigation ditches which connect the farmland with the river.

Approximately three-fourths of the riceland in the watershed is irrigated from the above two sources.

The Acadia-Vermilion Rice Irrigation Company pumps water from the Vermilion River and delivers it commercially to farmers growing rice on the remaining one-fourth of the riceland representing about 1,400 acres.

A number of farmers have deep wells from which irrigation water is pumped. These wells normally are used during drought periods to supplement available water from the other sources. In recent years water pumped from this aquifer has been found to contain chlorides in sufficient quantity to discourage its use except as an emergency supply.

#### Economic Data

The economy of the watershed is based on farming; however, a considerable amount of income is realized from other sources. Approximately 53 percent of the watershed area is in rice or pasture in rotation with rice, and most of the residents are farmers. There are a number of producing oil and gas wells in the area, and considerable income is obtained from these and related sources. Some watershed residents are employed in the shipping industry along the Intracoastal Waterway. Production of oil from the off-shore

fields in the Gulf of Mexico also offers opportunity for employment. Trapping of muskrat and nutria provides seasonal income for some residents.

The principal agricultural enterprises are rice farming and beef cattle production. A rotation of 1-year rice and 2-year pasture is most common.

The Bureau of Sport Fisheries and Wildlife and the Louisiana Wildlife and Fisheries Commission have made a survey of the watershed. Their report states that sport fishing in the area is minor; however, the waterways and marshes adjacent to the lower end of the watershed constitute a part of the coastal nursery area for marine species. This segment of the watershed is, therefore, important to the Gulf fishery.

Multiflora-rose grows along many miles of fence and is used for wildlife habitat. Rabbits, rails, and bob-white quail are found throughout the area. Squirrels and deer are confined to the two large wooded areas in the watershed, which are referred to locally as Big Woods and Palmetto Island.

There are no towns, urban areas, or public lands in the watershed.

Abbeville, population 10,414, the parish seat of Vermilion Parish, and Kaplan, population 5,267, are near the watershed and serve as the principal commercial centers for its inhabitants. The population of the watershed is estimated to be 700.

A very extensive system of roads serves the area. Approximately 16 miles are hard surfaced and include State Route Nos. 14 and 82. There are about 50 miles of secondary roads which are maintained by the parish, about half of which are graveled. Most of these roads are generally passable and there are no transportation or accessibility difficulties encountered. The Southern Pacific Railroad crosses the upper part of the watershed, and shipping facilities are available at Abbeville and Kaplan.

Census data listed for Vermilion Parish is considered average for the watershed. The following data was obtained from the census reports.

<u>Item (average per farm)</u>	<u>1949</u>	<u>1954</u>	<u>1959</u>
1. Size (acres)	127	145	168
2. Value of sales of farm products	\$3,562	\$7,207	\$7,881
3. Value of land, buildings, and improvement (per acre)	\$ 108	\$ 166	\$ 229

#### Land Treatment Data

The watershed is served by the Iberia-Vermilion Soil Conservation District. The district has entered into a cooperative agreement with the owners or operators of 80 farms with a total area of 13,400 acres, or about 42 percent

of the watershed. Basic farm plans have been developed on 74 of the 80 farms under district agreement; however, changes in farming methods have produced a need for the revision of 57 conservation plans involving 9,600 acres. There are approximately 190 farms in the watershed. The Abbeville Work Unit of the Soil Conservation Service provides technical assistance to the farmers through the Soil Conservation District.

The farmers in the watershed recognize the need for, and advantage of, applying sound soil conservation practices for the treatment of the land according to its needs for protection and improvement. In the last 10 years farmers have applied sound soil conservation practices costing \$219,175 (table 1A). Sound conservation practices have been followed by some farmers for more than 10 years; however, the pace for establishment of these measures has been increased considerably in the last decade.

### WATERSHED PROBLEMS

#### Floodwater Problems

Proper drainage and removal of floodwater is required for the efficient production of rice and other crops in the area. Moderate rainfall often causes flooding and ponding, which reduces rice and pasture yields and delays planting and harvesting of rice, the major cash crop. Flooding in the low-lying areas reduces the efficiency of farm and group drains and results in crops and pasture being damaged almost every year and frequently more than once a year. The larger, less frequent storms producing rainfall of 6 inches or more within a 24-hour period often result in total loss of crops.

Abnormally high tides with a probable recurrence interval of about 5 years reach a stage of 4.7 feet m.s.l. at the lower end of the watershed. The gravity flow of rainfall runoff from the higher land is often retarded by the simultaneous occurrence of these high tides. Land below this high tide elevation cannot be adequately drained by gravity. When these abnormally high wind or lunar tides occur, the lowland within the lower portions of the watershed is flooded by tidewater, and many days are required for this to drain. This low-lying land normally provides storage of fresh water for irrigation of riceland. When the area is flooded by salt tide water, the available fresh water is contaminated and is no longer usable for irrigation.

The amount of land flooded by a given event will vary depending upon the length of time the tide is at or above a given elevation. However, there are approximately 3,700 acres of land subject to inundation by an event of about 5-year frequency. The majority of this area is low-lying wooded land.

The major flood damage to cropland and pasture occurs when there is a simultaneous occurrence of heavy rainfall and high tide. This high tide restricts the drainage capacity of the channels and prevents efficient runoff on higher lands.

### Sediment and Erosion Damage

Sediment and erosion damages generally are low in this flatland watershed. The major source of sediment is from flushing operations used in rice production. This practice moves silts and clays from the fields into drainage ditches and requires a greater amount of maintenance to keep them open and functioning.

### Problems Relating to Water Management

The entire area in cropland and pasture (21,780 acres) is in need of improved drainage. Group ditches are presently of insufficient capacity to effectively remove excess runoff from cropland and pasture. The Vermilion River serves as an adequate outlet for any system which may have developed in the watershed. Because of the flat topography, floodwater and drainage problems caused by the runoff of rainfall within the watershed are inseparable.

A more dependable supply of fresh water is needed for the irrigation of riceland. Drainage canals connect the watershed with the Vermilion River, and these canals, due to the extremely low elevation, maintain a normal depth of water ranging from 2 to 8 feet. The farmers pump water from these canals into their rice fields, thereby utilizing the ditch for the multiple purpose of flood prevention, drainage, and irrigation.

The water surface elevation in the Vermilion River is low during dry periods. Since the area is subject to tidal action, the water often becomes salty due to the influx of sea water. This contaminates the available fresh water needed for irrigation of rice.

The Chicot ground water reservoir is the primary source of water from wells. According to Geologic Bulletin No. 30, published in January 1954 by the Department of Conservation of the Louisiana Geological Survey, entitled "Geology and Ground-Water Resources of Southwestern Louisiana", this reservoir is recharged by the Vermilion River. Since the lower portion of the Vermilion River is affected by tidal influx, the recharge water is salty at times. This salty water moves westward and northwestward along the lower portion of the reservoir. When, due to a high water table and a low river stage, the reservoir drains into the Vermilion River, the effluent is non-salty. This differential discharge and recharge to and from the Vermilion River results in an increasing amount of salt content in the water within the underground reservoir. This prohibits use of this water for irrigation purposes except as an emergency supply.

Riceland normally is drained for about 10 days during the hottest months to control root maggots. This usually is the period when the availability of fresh water is the lowest. The need to re-use the released water is greatest at this period. However, its re-use presently is prohibited either because of its loss through flow or its contamination by sea water.

### PROJECTS OF OTHER AGENCIES

A portion of the Intracoastal Waterway, which extends from Florida to Brownsville, Texas, is near the southern boundary of the watershed. This waterway was constructed by the Corps of Engineers. Hydrologic investigations show that the works of improvement included in this work plan will have no significant effects on the waterway.

The Mermentau Fresh Water Basin is a project constructed by the Corps. This basin is formed by the locks on the Intracoastal Waterway west of the Vermilion River and east of the Calcasieu River and by water control structures on Schooner Bayou and at Catfish Point on the Mermentau River. This basin is operated and the water stages regulated for (a) the conservation of fresh water by maintenance of normal lake stages and prevention of uncontrolled tidal inflow during the rice irrigating season, April through August; (b) the prompt and efficient release of flood waters during abnormal stages; (c) the limitation of minimum stages to zero mean low Gulf in view of navigation requirements; and (d) the periodical operation of gates in the interest of fish and wildlife when not detrimental to other major interests. The works of improvement included in this plan will have no detrimental effects on the Mermentau Fresh Water Basin.

### BASIS FOR PROJECT FORMULATION

Determination was made, first, of the land treatment measures which contribute directly to flood prevention and agricultural water management and which remain to be done in the watershed, based on land capability classes determined from soil surveys.

Although significant beneficial effects would result from installation of land treatment measures, it was apparent that structural measures would be required to attain the degree of watershed protection, flood damage reduction, and agricultural water management desired.

Physical characteristics of the watershed are not suited to the use of floodwater retarding structures as a means of controlling floodwater from watershed lands. Based on completed field investigations and surveys, it was determined that improved channels and group laterals would provide the most effective and economical means for removal of flood runoff and excess water from on-farm drainage systems.

The sponsors requested that consideration be given to all measures needed for adequate watershed protection, flood prevention and water management on agricultural land. They requested that a 2-year level of protection be provided those agricultural lands served by drainage mains and laterals and that a 5-year level of protection be provided against flooding which results from abnormally high tides. In addition, they requested that measures be incorporated which would insure a more dependable use of existing fresh water.

Existing fresh water may be obtained from the Mermentau Fresh Water Basin, the Vermilion River, or the re-use of irrigation water drained from farmland. A dependable supply of fresh water is predicated upon its availability since these are the only three sources from which water can be economically obtained. However, the local people believe a plan can be developed which will make an adequate supply of water available during a 2-week irrigation period 4 years out of 5. There is no supply problem on riceland which presently obtains water commercially.

It was agreed that the channels, levees and necessary appurtenant structures would be designed to provide the level of protection requested by the sponsors and land treatment measures necessary to assure the attaining of project objectives would be installed during the installation period. It was agreed further that channels constructed as part of the plan would have a drainage area at the upper end of 320 acres or more and 2 or more landowners would be served.

#### WORKS OF IMPROVEMENT TO BE INSTALLED

##### Land Treatment Measures

The Soil Conservation District has been conducting a basic conservation program on the farms of the watershed for several years. This program, based on the use of each acre of agricultural land within its capabilities and its treatment in accordance with its needs, is an essential part of watershed protection, flood prevention, and water management. The extent of needed land treatment measures which have been applied to date within the watershed represents an expenditure by landowners and operators of approximately \$219,175. Table 1A shows the measures which have been installed during the last 10 years.

Table 1 includes estimates of the acreage in each major land use which should receive accelerated land treatment during the 5-year project installation period. Land treatment measures will be established and maintained by the landowners and operators in cooperation with the going district program. Land treatment measures associated with the conservation, development, utilization, and disposal of water are especially important to maintain the productivity of the soil. The agricultural water management benefits used to justify the project are based on the installation of adequate on-farm drainage and irrigation systems.

The land treatment measures needed to facilitate maximum utilization of structural measures for watershed protection, flood prevention, and agricultural water management which are expected to be installed during the 5-year project installation period are structures for water control (250), drainage main or lateral (79,200 feet), land smoothing (5,000 acres) and irrigation water management (2,000 acres), and irrigation field ditches (31,700 feet). In addition, other needed land treatment measures include conservation cropping



systems (15,000 acres), cover and green manure crops (15,000 acres), crop residue use (15,000 acres), grasses and legumes in rotation (5,000 acres), pasture and hayland renovation (2,000 acres), proper pasture use (2,000 acres), and rotation grazing (2,000 acres). These measures are required to produce the benefits that will accrue from structural measures which will be installed.

By accelerating the present rate of technical assistance, it is expected that, during the 5-year installation period, the following accomplishments will be made.

1. Fifty-seven of the plans involving the whole farm will be revised.
2. Eighty-six farm plans will be made for farm units presently in the progressive planning state or farm units not presently having a district agreement.
3. The land treatment measures listed above are expected to be installed.
4. Standard soil surveys will be made for the entire watershed. Existing surveys will be utilized by converting them to standard surveys.

#### Structural Measures

Planned structural measures to be installed are shown on the Project Map and include:

1. Improvement of 39.6 miles of multiple-purpose mains and laterals.
2. Construction of 3 two-way, semi-automatic water control structures, and 1 manually controlled water control structure.
3. Construction of 3.3 miles of levees.

The multiple-purpose mains and laterals will provide adequate outlets for on-farm drainage systems and will have sufficient capacity to provide flood protection from the runoff of about a 2-year frequency storm.

Landowners or operators will also pump water from these ditches to irrigate riceland during the irrigation period. In some instances the channels have been planned deeper than is necessary for proper removal of floodwater and drainage. This additional depth is for the purpose of insuring a more dependable supply of water for irrigation of riceland. Some ditches are adequate in their present condition for drainage and flood prevention but need to be deepened to provide a more dependable supply of irrigation water.

The water control gates are to be constructed across the improved channel on which each is located. The gates will be constructed in such manner that drainage and floodwater from within the watershed may flow out, but outside floodwater will be excluded from the watershed. Outside water may be introduced into the watershed by mechanically opening the gates to allow its admittance for beneficial purposes. The gates may also function, when mechanically set to do so, to hold released irrigation water in the project ditches for re-use and to trap rainfall runoff when needed for irrigation. Figure 1 and figure 2 show typical structures of this type.

The top of the gates on the downstream side of all structures will be set at elevation 4.7 feet m.s.l. The downstream (or outside) gate will operate to allow drainage, but will prevent tide water from backing into the protected area. This gate may also be manually locked into an open position to allow irrigation water to enter the area. The top of the manual gates on the upstream side will be 1.2 feet m.s.l. This gate may be held in an open position to facilitate drainage when irrigation water is not needed.

The levees will be constructed to a grade elevation which provides flood protection for a storm or tide event of about 5-year occurrence frequency. The elevation which will provide this degree of protection is 4.7 feet m.s.l. An additional one-foot freeboard allowance will be added to protect against wave action.

The purpose for which the channel improvement and water control structures are to be installed is to provide benefits from flood prevention, drainage, and irrigation. The levees will serve as a flood prevention measure.

The estimated cost of installing these measures is \$509,380.

The details of the quantities, costs, and design features of all measures are shown in tables 1, 2, 3, 3A, and 3B.

#### EXPLANATION OF INSTALLATION COSTS

##### Land Treatment Measures

The cost of land treatment measures for watershed protection, flood prevention, and agricultural water management totaling \$353,000 is shown in table 1. The major share of the cost of land treatment will be borne by other than Public Law 566 funds. This includes services and labor by landowners and operators, cost-sharing by the Agricultural Conservation Program, and help from other programs, totaling \$296,100.

It is expected that the Soil Conservation Service will provide technical assistance to the going Soil Conservation District program valued at \$10,400 during the 5-year installation period. This is insufficient to accomplish the job needed. Public Law 566 will provide \$46,500 of which \$5,600 is for standard soil surveys and the remainder is for the acceleration of technical

assistance in order that the needed land treatment may be applied during the installation period.

### Structural Measures

The mains and laterals are multiple-purpose channels serving flood prevention, drainage and irrigation. The additional cost of deepening channels over that required for adequate drainage and flood prevention (\$47,454) is allocated to irrigation. The cost of constructing the channels of sufficient capacity for flood prevention and drainage is allocated between these two purposes in accordance with procedures outlined in Part 1, Chapter 1, Paragraph 1132.2 of the Watershed Protection Handbook. Alternative 2 of these procedures was used. This resulted in 50 percent of these costs (\$135,496) being allocated to flood prevention and a like amount to drainage.

The water control structures are multiple-purpose measures serving flood prevention, drainage, and irrigation. The cost of the structures is allocated to these three purposes in the same proportion that the cost of the multiple-purpose mains and laterals is allocated to these purposes. This results in \$58,883 of the costs being allocated to flood prevention, \$58,883 to drainage and \$20,620 to irrigation.

The levees are single-purpose measures and all their cost (\$52,548) is allocated to flood prevention.

The cost of structural measures (\$509,380) is allocated 48.5 percent (\$246,927) to flood prevention; 38.2 percent (\$194,379) to drainage, and 13.3 percent (\$68,074) to irrigation (table 2A).

The total estimated cost of all structural measures is \$509,380, of which \$341,166, or 67 percent, will be borne by Public Law 566 and \$168,214, or 33 percent, will be borne by the local sponsors. The local share includes 50 percent of all construction costs allocated to drainage and irrigation, \$81,844; all costs associated with land, easements and rights-of-way, \$80,370; and the entire cost of contract administration, \$6,000. The Public Law 566 share includes all construction costs allocated to flood prevention, \$160,248; 50 percent of all construction costs allocated to drainage and irrigation, \$81,842; and all installation services costs, \$99,076. Construction costs of all structural measures include an allowance of 15 percent for unpredictable construction costs.

All quantities and unit costs have been estimated by Soil Conservation Service engineers and have been discussed with the local sponsors for their concurrence. Installation services costs are based on Soil Conservation Service experience.

The estimated schedule of obligations for the 5-year installation period covering installation of both land treatment and structural measures is as follows:

## Schedule of Obligations

Fiscal Year	Measures	Public Law :566 Funds	Other : Funds	Total
1st	Land Treatment	-	50,000	50,000
	Technical Assistance	13,780	2,080	15,860
	Structural Measures	96,086	38,677	134,763
	Installation Services	40,000	-	40,000
	Land, Easements, and Rights-of-Way	-	22,117	22,117
	Contract Administration	-	2,000	2,000
2nd	Land Treatment	-	50,000	50,000
	Technical Assistance	8,180	2,080	10,260
	Structural Measures	71,365	13,043	84,408
	Installation Services	40,000	-	40,000
	Land, Easements, and Rights-of-Way	-	10,863	10,863
	Contract Administration	-	2,000	2,000
3rd	Land Treatment	-	96,100	96,100
	Technical Assistance	8,180	2,080	10,260
	Structural Measures	74,639	30,124	104,763
	Installation Services	19,076	-	19,076
	Land, Easements, and Rights-of-Way	-	47,390	47,390
	Contract Administration	-	2,000	2,000
4th	Land Treatment	-	50,000	50,000
	Technical Assistance	8,180	2,080	10,260
5th	Land Treatment	-	50,000	50,000
	Technical Assistance	8,180	2,080	10,260
Total		387,666	474,714	862,380

This schedule may be adjusted from year to year on the basis of any significant changes in the plan found to be mutually desirable in light of appropriations and accomplishments actually made.

EFFECTS OF WORKS OF IMPROVEMENT

Benefits from the installed measures will depend upon installation of needed group drainage facilities, on-farm laterals, and adequate maintenance of existing drainage systems. Establishment of the land treatment program will reduce the cost of removing sediment from ditches, thereby reducing annual maintenance costs.

The levees will prevent flooding of about 3,700 acres during the occurrence of a tide event of about 5-year recurrence frequency. The area which will be protected from flooding is used primarily for sump storage of fresh water for irrigation. The levees will prevent the contamination of this supply of fresh water.

By preventing the flooding of the low, swampy areas from tide water, they will serve as a sump for storing rainfall runoff until the high tide recedes. Rainfall runoff will be stored as long as the tide elevation exceeds the water level inside the levees. The higher land which is not presently flooded from the tide action will benefit from a faster removal of rainfall runoff.

The mains and laterals will provide improved drainage and reduce floodwater damage, resulting in increased yields of rice, hay, pasture, and other crops in the area. A total of 22,212 acres of cropland and pasture will be benefited by measures proposed in this plan.

Secondary benefits will accrue as a result of the project. They will result from the increased production and flow of agricultural products for processing, transportation, and consumption. The increased production and sale of products will increase the purchasing power of farm operators and will raise the economic level of the community.

Population of the benefited area is about 700. There are approximately 190 farm units which will be benefited.

About 320 acres of woodland will be cleared and converted to pastureland.

A new source of irrigation water will not be provided.

The planned system of levees, water control structures, and channels will, however, allow the replenishment of stored water when the Vermilion River and the Mermentau Fresh Water Basin are free of salt and will prevent the contamination of this supply from salt water intrusion. A more dependable supply of fresh water for irrigation will, thereby, be provided for 6,300 acres of riceland. The water control structures may be closed to retain, for re-use, water drained from rice fields for management purposes and to allow recharge of the sump storage basin by runoff.

#### PROJECT BENEFITS

Average annual benefits are expected to be \$114,561. Of this amount \$12,029 is expected to accrue from increased production on riceland due to a more dependable source of fresh water that may be provided by the project. The remaining \$102,532 will accrue from increased production due to flood protection and better drainage. These benefits are inseparable and have been allocated 50 percent to flood prevention and 50 percent to drainage. Agricultural benefits are based on improved crop yields, reduced costs of planting and harvesting, and increased management efficiency due to project installation.

The project will provide other benefits that were not included for project justification. Those include the increased economic activity in the watershed and neighboring towns and the greater sense of economic security by people living in the area. Secondary benefits were not used in the justification of any part of the project.

#### COMPARISON OF BENEFITS AND COSTS

Average annual benefits from structural measures are estimated to be \$114,561. Average annual costs are estimated at \$33,016. The ratio of benefits to cost is 3.5:1 (table 5).

#### PROJECT INSTALLATION

The project is to be installed within a 5-year period. It is expected that 3 years will be needed to install the structural measures. Land treatment measures necessary for watershed protection, flood prevention, and agricultural water management will be installed over the entire installation period.

The water control structures will be installed as soon as possible. The installation of the levees and the channel improvement may proceed simultaneously with the water control structures, but the proper functioning of all of the measures is contingent upon the completion of these water control structures.

The project sponsors are the Seventh Ward Canal Drainage District, the Iberia-Vermilion Soil Conservation District, and the Vermilion Parish Police Jury.

Most of the land treatment will consist of the installation of farm drainage and irrigation systems and vegetative measures after channels are constructed. Cover conditions will be improved on a small amount of overgrazed woodland and native pasture. Installation and maintenance of these measures will be outlined in farm conservation plans made by the farmers and jointly agreed to by the farmer and the Iberia-Vermilion Soil Conservation District.

The Seventh Ward Canal Gravity Drainage District will be responsible for securing all land, easements, and rights-of-way; all road, bridges, utility, and improvement changes; the local share of the installation costs; will advertise for bids; and award and administer contracts for the construction of all structural measures. The Drainage District has the power, through the right of eminent domain, to secure needed land, easements, and rights-of-way. The directors have agreed to exercise these rights in the execution of this plan. This Drainage District will enter into a project agreement with the Soil Conservation Service prior to contracting for the installation of any works of improvement.

Construction of the planned structural measures will be started as soon as: (1) the project is approved, (2) the local people are prepared to discharge their responsibilities, (3) local and Federal funds are available, (4) the necessary easements and rights-of-way have been obtained, and (5) maintenance agreements have been executed.

It will not be necessary for all land, easements, and rights-of-way to be obtained before starting any portion of the work; however, all land, easements, and rights-of-way necessary for construction of works of improvement covered by each project agreement should be obtained prior to beginning work on that particular unit. The water control structures, the levees, and each main ditch and its associated laterals should be considered a unit. Several mains and their associated laterals may be grouped into a single unit for convenience of contract administration; however, care will be exercised to assure the construction of all mains simultaneously with or prior to construction of the associated laterals.

Technical assistance will be provided by the Soil Conservation Service to assist in design, preparation of specifications, supervision of construction, preparation of contract payment estimates, final inspection, execution of certificates of completion, and related tasks for the establishment of planned works.

#### FINANCING PROJECT INSTALLATION

The Seventh Ward Canal Gravity Drainage District is a legally constituted organization under the laws of the State of Louisiana. It has full authority to incur bonded indebtedness for construction of works of improvement and to levy taxes to repay the bonded indebtedness, and to operate and maintain the measures. The assessed value of all taxable assets within the district is \$1,223,000. This is considered adequate to provide the basis for a bond issue for the local share of the cost of project installation. The district directors have called for a referendum for a bond issue.

The Parish Agricultural Stabilization and Conservation Service committee will cooperate with the governing body of the Soil Conservation District in selecting practices and providing financial assistance for those Agricultural Conservation Program practices which will accomplish the conservation objectives in the shortest possible time.

The Federal government will finance its share of the costs of this project under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress, 68 Stat. 666), as amended. Financial and other assistance to be furnished by the Service in carrying out the project is contingent on the appropriation of funds for this purpose.

#### PROVISIONS FOR OPERATION AND MAINTENANCE

Operation and maintenance of all phases of the completed project will be the responsibility of non-Federal groups, agencies, and individuals.

Landowners will be responsible for operation and maintenance of land treatment measures. The Iberia-Vermilion Soil Conservation District will assume the responsibility for coordinating this work with the aid of the Soil Conservation Service and other agencies giving assistance to the Soil Conservation District. The objective will be to maintain adequate vegetative cover or

other conservation practices on areas that may yield a high rate of rainfall runoff, to maintain the effectiveness of farm drainage and irrigation systems, and to establish and maintain such additional vegetative and mechanical conservation and treatment measures as may be needed so that the full benefits of the project may be realized.

The Seventh Ward Canal Gravity Drainage District will be responsible for the operation and maintenance of the structural works of improvement.

The levee will be inspected at regular intervals to insure the maintenance of vegetative cover. Woody growth will be removed annually to prevent root penetration into the levee; and weeds and briars will be controlled either mechanically or chemically, or both.

A small part of the existing levee system which is adequate in its present conditions is maintained by a private individual, and another part is maintained by a corporation. The Drainage District has agreed to accept maintenance responsibility for this portion in the event the private and corporate concerns fail to exercise proper maintenance of these measures. Sufficient maintenance funds are included to allow for this eventuality.

The district will assign individual responsibility of closing the water control structures for the conservation of fresh water during the periods of low water or when salt water intrusion is a problem, and for flood protection during periods of abnormally high tide events. These persons will reopen the gates when the closure is no longer desired. The Soil Conservation Service will assist the district in preparing a plan for the operation of the gates. Maintenance will consist of, but not be limited to, the regular care of the structure by painting to preserve metal and wood, replacement of worn or damaged parts, clearing accumulations of debris, and removal of sediment deposits.

Vegetative growth in the channels, berms and spoils will be controlled chemically or mechanically. Heavy accumulations of debris will be removed following each abnormally heavy rainfall. Heavy sediment accumulations will be removed annually or when they occur to the extent that the overall efficiency of the channel is impaired. A continuing maintenance program will be placed into effect which will provide for the regular removal of sediment deposits in all ditches. This continuing program will be of sufficient intensity to insure that all ditches are cleaned of sediment deposition at least each ten years.

The Drainage District fully understands its obligations for maintenance and will execute a specific maintenance agreement with the Soil Conservation Service prior to the execution of the project agreement for the installation of works of improvement.

Representatives of the Vermilion Police Jury, the Iberia-Vermilion Soil Conservation District, the Seventh Ward Canal Gravity Drainage District, and



the Soil Conservation Service will make a joint maintenance inspection of all works of improvement at least annually. Items of inspection will include, but not be limited to, condition of vegetative cover, need for removal of sediment bars and debris accumulations, rilling or sloughing of levees, care of water control structures, and brush control.

Provisions will be made for free access to inspect structural works of improvement at any reasonable time by representatives of the cooperating parties or agencies.

A tax will be assessed for the purpose of providing funds necessary for operating and maintaining structural works of improvement. The average annual maintenance cost is estimated to be \$9,310. The Drainage District will keep a record of all inspections and maintenance work done. This record will be available to other parties or agencies cooperating in the project.

TABLE 1 - FINAL PROJECT INSTALLATION COST  
Seventh Ward Canal Watershed, Louisiana

Installation Cost Item	Unit	Number	Estimated Cost (Dollars)		TOTAL
			P. L. 566 Funds SCS3/	Other SCS3/	
<b>LAND TREATMENT</b>					
Land Areas <sup>2/</sup>					
Cropland	Acres	15,000	-	234,900	234,900
Pastureland	Treated	2,000	-	61,200	61,200
Technical Assistance			32,000	10,400	42,400
TOTAL LAND TREATMENT			32,000	306,500	338,500
<b>STRUCTURAL MEASURES</b>					
<b>Construction</b>					
Multiple Purpose Structures <sup>4/</sup>	No.	4	105,792	33,116	138,908
Channel Modification	Miles	43	222,696	84,914	307,610
Subtotal - Construction			328,488	118,030	446,518
Engineering Services			135,855	-	135,855
<b>Project Administration</b>					
Construction Inspection			164,120	-	164,120
Other			43,295	6,000	49,295
Subtotal - Administration			207,415	6,000	213,415
<b>Other Costs</b>					
Land Rights			-	80,370	80,370
Subtotal - Other			-	80,370	80,370
TOTAL STRUCTURAL MEASURES			671,758	204,400	876,158
TOTAL PROJECT			703,758	510,900	1,214,658

1/ Price base 1971.  
 2/ Includes only areas estimated to be adequately treated during the project installation period. Treatment will be accelerated throughout the watershed, and dollar amounts apply to total land areas, not just to adequately treated areas.  
 3/ Federal agency responsible for assisting in installation of works of improvement.

TABLE 1 - ESTIMATED PROJECT INSTALLATION COST

Seventh Ward Canal Watershed, Louisiana

Installation Cost Item	:	Unit	:	Number	: Estimated Cost (Dollars) <sup>1/</sup>		:
					Public Law 566 Funds	Other Funds	
<u>LAND TREATMENT</u>							
Soil Conservation Service							
Conservation Treatment							
Cropland	:	Acre	:	15,000	-	234,900	234,900
Grassland	:	Acre	:	2,000	-	61,200	61,200
Technical Assistance	:		:		46,500	10,400	56,900
Soil Surveys	:	Acre	:	32,000	-	-	-
Farms Planned	:	No.	:	86	-	-	-
Farm Plans Revised	:	No.	:	57	-	-	-
<u>TOTAL LAND TREATMENT</u>					46,500	306,500	353,000
<u>STRUCTURAL MEASURES</u>							
Soil Conservation Service							
Mains and Laterals	:	Mile	:	39.6	128,867	51,915	180,782
Water Control Structures	:	No.	:	4	74,261	29,929	104,190
Levees	:	Mile	:	3.3	38,962	-	38,962
Subtotal - Construction					242,090	81,844	323,934
<u>Installation Services</u>							
Engineering Services	:		:		72,886	-	72,886
Other	:		:		26,190	-	26,190
Subtotal - Installation Services					99,076	-	99,076
<u>Other Costs</u>							
Land, Easements, and Rights-of-Way	:		:		-	80,370	80,370
Administration of Contracts	:		:		-	6,000	6,000
Subtotal - Other Costs					-	86,370	86,370
<u>TOTAL STRUCTURAL MEASURES</u>					341,166	168,214	509,380
<u>TOTAL PROJECT</u>					387,666	474,714	862,380

<sup>1/</sup> Price Base: 1963

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TABLE 1A - STATUS OF WATERSHED WORKS OF IMPROVEMENT

Seventh Ward Canal Watershed, Louisiana

Measures	Unit	Number Applied To Date	Total Cost (Dollars) <sup>1/</sup>
<u>LAND TREATMENT</u>			
Conservation Cropping System	Acre	15,000	3,750
Cover and Green Manure	Acre	3,000	21,000
Crop Residue Use	Acre	6,500	1,625
Irrigation Water Management	Acre	2,200	2,200
Pasture and Hayland Renovation	Acre	2,200	66,000
Grass and Legumes in Rotation	Acre	3,000	30,000
Proper Pasture Use	Acre	2,200	1,100
Rotation Grazing	Acre	2,200	1,100
<u>STRUCTURAL MEASURES</u>			
Drainage - Mains and Laterals	Mile	14	14,000
Irrigation Field Ditches	Mile	6	9,000
Land Smoothing	Acre	9,000	63,000
Structures for Water Control	Number	128	6,400
<hr/>			
TOTAL	xxx	xxx	219,175
<hr/>			

<sup>1/</sup> Price Base: 1963.

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TABLE 2 - ESTIMATED STRUCTURAL COST DISTRIBUTION

Seventh Ward Canal Watershed, Louisiana

(Dollars) 1/

Structure Type	Installation Cost - Public Law 566 Funds			Installation Cost - Other Funds					
	Construction	Engineering	Other	Construction	Engineering	Other			
Mains and Laterals	128,867	40,678	14,616	184,161	51,915	3,350	79,020	134,285	318,446
Water Control Structures	74,261	23,442	8,424	106,127	29,929	1,930	400	32,259	138,386
Levees	38,962	8,766	3,150	50,878	-	720	950	1,670	52,548
<b>GRAND TOTAL</b>	<b>242,090</b>	<b>72,886</b>	<b>26,190</b>	<b>341,166</b>	<b>81,844</b>	<b>6,000</b>	<b>80,370</b>	<b>168,214</b>	<b>509,380</b>

1/ Price Base: 1963

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TABLE 2A - COST ALLOCATION AND COST SHARING SUMMARY

Seventh Ward Canal Watershed, Louisiana

(Dollars) 1/

Item	Purpose				Total
	Flood Prevention	Drainage	Irrigation		
<u>COST ALLOCATION</u>					
Single Purpose					
Levees	52,548	-	-		52,548
Multiple Purpose					
Mains and Laterals	135,496	135,496	47,454		318,446
Water Control Structures	58,883	58,883	20,620		138,386
<b>TOTAL</b>	<b>246,927</b>	<b>194,379</b>	<b>68,074</b>		<b>509,380</b>
<u>COST SHARING</u>					
Public Law 566	209,260	97,738	34,168		341,166
Other	37,667	96,641	33,906		168,214
<b>TOTAL</b>	<b>246,927</b>	<b>194,379</b>	<b>68,074</b>		<b>509,380</b>

1/ Price Base: 1963.

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TABLE 3 - STRUCTURE DATA - CHANNELS  
Seventh Ward Canal Watershed, Louisiana

Channel Designation	Station From : To	Station Numbering	Drainage Area (acres)	Drainage Curve	Gradient		Bottom		Slopes		Depth		Velocity		Required		Estimated		Elevation of Hydraulic Gradient Outlet (ft.m.s.l.)
					at Outlet	at Inlet	at Outlet	at Inlet	at Outlet	at Inlet	at Outlet	at Inlet	at Outlet	at Inlet	at Outlet	at Inlet	at Outlet	at Inlet	
M-6	0+00	23+00	10,737	Improved pasture	.00002	26.0	1.5:1	9.7	.885	320	321	125,557	133,417	1.9					
	177+00	453+80																	
L-6A	0+00	72+00	1,335	Improved pasture	.00005	6.0	1.5:1	7.0	.590	55.0	57.2	3,625	4,169	2.9					
L-6A1	0+00	27+00	434	Improved pasture	.0001	4.0	1.5:1	4.8	.550	22.0	52.1 <u>1/</u>	5,727	5,927	3.2					
L-6B	0+00	69+60	543	Improved pasture	.00003	20.0	1.5:1	6.2	.400	26.0	34.5 <u>1/</u>	10,774	12,759	3.2					
L-6C	0+00	52+00	503	Improved pasture	.0004	4.0	1.5:1	3.7	.970	24.5	26.0	6,521	6,906	2.6					
L-6D <u>2/</u>	0+00	40+00	560	Improved pasture	-	-	-	-	-	-	-	-	5,000	-					
M-7	0+00	372+00	11,992	Improved pasture	.00002	28.0	1.5:1	10.0	.909	355	361	278,917	294,259	2.3					
L-7A	0+00	138+00	2,412	Improved pasture	.00005	10.0	1.5:1	7.3	.760	101	110	28,877	29,916	2.8					
L-7A2	0+00	83+00	937	Improved pasture	.00003	5.0	1.5:1	6.8	.454	42	43	27,191	27,959	2.8					
L-3B	0+00	189+00	5,729	Improved pasture	.00003	12.0	1.5:1	9.4	.81	190	191	62,121	65,998	3.2					
L-3B1	0+00	120+00	1,932	Improved pasture	.0002	9.0	1.5:1	6.2	1.19	75	122.6 <u>1/</u>	22,238	23,815	3.3					
L-3B2	0+00	122+20	1,217	Improved pasture	.0001	19.0	1.5:1	6.3	.83	51	135 <u>1/</u>	21,740	24,456	3.4					
L-3C	0+00	70+00	674	Improved pasture	.00005	8.0	1.5:1	6.2	.590	31	60.8 <u>1/</u>	7,152	8,215	3.1					
L-3D	0+00	29+00	613	Improved pasture	.0004	4.0	1.5:1	6.1	1.180	29.0	104.2 <u>1/</u>	4,736	5,058	3.1					
M-8	0+00	326+00	4,719	Coastal	.0001	8.0	1.5:1	9.6	1.220	243	245	151,088	155,569	3.5					
L-8A	0+00	44+50	1,300	Improved pasture	.0002	7.0	1.5:1	4.5	.980	55	57	11,169	11,665	6.6					

1/ Deepened for irrigation.

2/ Ditch not designed. Quantities estimated.

TABLE 3A - STRUCTURE DATAWATER CONTROL STRUCTURES

Seventh Ward Canal Watershed, Louisiana

Structure Number	Drainage Area (acres)	Designed Capacity (c.f.s.)	Type of Structure	Elevation Top of Inside Gate (ft. m.s.l.)	Elevation Top of Outside Gate (ft. m.s.l.)
1	11,992	398	Two-way Semi-automatic	1.2	4.7
2	10,737	345	Two-way Semi-automatic	1.2	4.7
3	998	85	Two-way Semi-automatic	1.2	4.7
4	6,955	236	Manual	None	4.7

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TABLE 3B - STRUCTURE DATA - LEVEES

## Seventh Ward Canal Watershed, Louisiana

Station		:	:	:	:	:	:	Volume
Numbering		:	Top	Maximum	Berm	Side	:	of
From	To	:	Width	Height	:	Slope	:	Fill
			(Ft.)	(Ft.)	(Ft.)			(Cu. Yds.)
0+00	31+50		8.0	3.0	15	2.5:1		3,250
82+00	85+00		8.0	2.5	15	2.5:1		125
160+00	165+00		8.0	1.5	15	2.5:1		290
173+50	191+00		8.0	1.5	15	2.5:1		1,200
197+50	235+00		8.0	4.5	15	2.5:1		8,180
235+00	277+00		12.0	4.7 <u>1/</u>	30	3.0:1		32,707
298+00	329+50		8.0	2.5	15	2.5:1		3,650
333+00	338+50		8.0	3.5	15	2.5:1		665

1/ Excluding stream channel.

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TABLE 4 - ANNUAL COST

## Seventh Ward Canal Watershed, Louisiana

(Dollars)

Evaluation Unit	: Amortization : of : Installation : Cost <u>1/</u>	: Operation : and : Maintenance : Cost <u>2/</u>	: Total
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## Multiple-Purpose

Mains and Laterals,  
Water Control Structures

and

Levees

23,706

9,310

33,016

TOTAL

23,706

9,310

33,016

1/ Price Base: 1963. Installation costs amortized for 35 years at 3 percent interest.

2/ Long-term prices as projected by ARS, September 1957.

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TABLE 5 - COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

Seventh Ward Canal Watershed, Louisiana

(Dollars) 1/

Evaluation Unit	AVERAGE ANNUAL BENEFITS					Average Annual Cost <u>2/</u>	Benefit Cost Ratio
	Flood Prevention	Agricultural Water Management	Drainage	Irrigation	Total		
Multiple-Purpose Mains and Laterals, Water Control Structures and Levees	56,657	761	45,114	12,029	114,561	33,016	3.5:1
GRAND TOTAL	56,657	761	45,114	12,029	114,561	33,016	3.5:1

1/ Price Base: Long-term prices as projected by ARS, September 1957.

2/ From table 4.

## INVESTIGATIONS AND ANALYSES

### Land Use and Treatment

#### Soil Conditions

The watershed was sampled, using soil maps and field surveys, to determine soil conditions. Soil maps were available for most of the watershed. Information on soils was analyzed by Soil Conservation Service personnel working with the Iberia-Vermillion Soil Conservation District. Soils of the Beaumont-Midland and Patoutville-Crowley series are almost equally distributed over the watershed area. Drainage in these soils is generally poor.

#### Land Use and Treatment Needs

Records of accomplishments, tabulations of conservation needs, and information from the work unit of the Soil Conservation Service and other agricultural offices were used to determine the probable land uses and treatment to be expected under going programs. Rice allotments prohibit increases in rice acreages and affect the acreages of other crops. Such items were considered in evaluating land use and treatment needs. A small amount of woodland will be cleared and established in pasture after the project is installed.

#### Engineering Investigations

The following study was made to determine the structural measures for flood prevention and agricultural water management which would be feasible to install:

1. A base map was prepared showing the watershed boundary, drainage pattern, system of roads and other pertinent information. A map of the watershed was prepared on which land use, soil types and other pertinent data were shown. Quadrangle map, aerial photographs, parish road maps, and other maps showing physical features were assembled and used to determine the best approach to locating needed measures.
2. A determination concerning the possibility of installing floodwater retarding structures was made. The topography is not suitable for this type of measure because of insufficient relief.
3. Profiles and cross sections of proposed levees, mains and laterals were surveyed (figures 3 and 4).
4. In the project area it has been determined that drainage curves will be used for design of mains and laterals serving both flood prevention and drainage. Flood routing

is not feasible due to broad, flat areas to be protected. Ample experience is available to determine that the agreed-upon level of protection for the project will be obtained by the use of drainage curves. The drainage curves are based on the formula  $Q = CM^{5/6}$  where "Q" is the required discharge in cubic feet per second, "M" is the drainage area in square miles, and "C" is a coefficient based upon land use, topography, soils, etc. Drainage coefficients have been developed over a period of years by measuring the flow in drainage systems which provide adequate protection, and by observation of the influence of ditch capacity on crops. They have been firmed up by testing for some 20 years through a complete life cycle of drainage systems. Primarily, drainage coefficients are selected to provide economical protection for crops to be grown. In this case the channels have been designed using  $Q = 30M^{5/6}$  for the land which is normally in rice-pasture rotation, and  $Q = 15M^{5/6}$  for swampland and marsh. Runoff from areas of cropland for which a pumping system is in effect has been computed on the basis of a 2-inch removal in 24 hours. This criteria will provide about a 2-year level of protection against flood damage to crops from rainfall runoff.

5. The criteria used for the design of the levees was that the area would be protected from floods which are expected to occur no more frequently than once in about 5 years. A frequency versus stage curve was used as a basis for establishing tidewater elevations used in determining the level of protection being provided. Sufficient gaging stations are located near the area and the data from these stations was used to prepare this curve. A long-time record of tidal fluctuations is kept at the Vermilion Lock on the Intracoastal Waterway. This gaging station is near the area and was weighed heavily in determining stage and frequency of events. Other gages in the vicinity were used to firm up hydrologic data. It was determined that protection from a tide event of stage 4.7 feet m.s.l. would provide the desired level of protection.
6. Unit costs of structural measures were estimated based on the going rate of similar work in the general area. These costs were adjusted to meet special conditions that exist in the watershed.

When the land treatment measures and those structural measures for flood prevention and agricultural water management had been determined, a table was developed which gave the total cost of each type of measure. The summation of the total costs for all the needed measures represented the

estimated installation cost of the project (table 1). A second table was developed to show the annual costs of installation and operation and maintenance of the structural measures (table 4). Pertinent physical data for individual structural measures was summarized in tables 3, 3A, and 3B.

#### Fish and Wildlife Investigations

A reconnaissance of the watershed was made by representatives of the U. S. Fish and Wildlife Service and a report of their finding was made to the Soil Conservation Service on September 24, 1962 and on December 4, 1962. The Louisiana Wildlife and Fisheries Commission concurred in the report.

The reconnaissance survey conducted by the Fish and Wildlife Service revealed that the fish and wildlife resources of the area are of moderate importance. Sport fishing is minor; however, the waterways and marshes adjacent to the lower end of the watershed constitute a part of the coastal nursery area for marine species. This segment of the watershed is, therefore, important to the Gulf fishery. Resident game species include deer, squirrels, rabbits, and rails. Deer and squirrels are confined to the major woodlands of Big Woods and Palmetto Island. The survey report recommended that (1) spoil from channel excavation across swamp or marsh areas be placed in such a manner as not to block or interfere with intersecting drains and waterways, (2) any outflow structures installed in canals be located upstream from these wetlands, and (3) plans for spoil placement and location of structures be coordinated with the Louisiana Wildlife and Fisheries Commission and with the Fish and Wildlife Service.

The above report and recommendations have been considered and no part of the planned works of improvement is in conflict with any of these recommendations.

#### Hydraulic and Hydrologic Investigations

Aerial photographs and topographic maps were available during preparation of the plan. These aids, together with soil surveys, field survey data, and field inspection of existing drainage systems, were used to determine drainage areas.

The channels, levees, and water control structures, were designed using previously described criteria. In order that fuller protection against wind and wave action be provided the leveed areas, it was determined that a one-foot freeboard allowance should be provided on all newly constructed levees. This freeboard also will provide additional protection from extreme damage anticipated from storm or tide events greater than those for which the plan is designed.

#### Geologic Investigations

The Prairie formation, the youngest of the Pleistocene Terrace deposits, is the principal formation cropping out in the area. This formation was

deposited as either a fluvial or a littoral deposit, with a strong possibility that both of these depositional conditions were present at some time.

The Prairie formation consists of a yellowish silty clay containing ferrous nodules overlying a firm silty blue clay which in turn overlies a fine to medium grained sand. Recent alluvial silts and organic deposits are found in the vicinity of the marsh areas.

Studies of previously constructed ditches located in the area were made to determine the adequacy of sediment allowance and the stability of side slopes. It was found that where a sound maintenance and management program had been followed, the ditches were functioning as planned. No excessive sedimentation or sloughing was noticed where the side slopes had been constructed according to design.

It was decided to use side slopes of  $1\frac{1}{2}$  to 1 for the planned channels which are commonly used in this area. Sediment allowances were planned in accordance with previous experience and consisted of 10 to 20 percent of design depth plus 0.5 foot.

Hand borings were made at the location of the proposed water control structures to determine foundation conditions. These conditions were found to be suitable for the proposed structure.

Prior to final design, a detailed geologic investigation will need to be made of the water control structure locations. Representative borings should be made along the deeper cuts in the channels to insure adequate design.

#### Economic Investigations

Information was obtained from landowners and operators, agricultural workers, and processors relative to average yields and production losses resulting from floodwater, poor drainage, and contamination of existing fresh water from salt intrusion. Landowners and operators were contacted to determine the extent and rate of which any changes in land use and crop distribution would take place after installation of the project. Damage schedules were taken on approximately 40 percent of the farmland in the watershed. Published data from the Mississippi River and Tributaries study were also used. This information was used in determining average production losses resulting from inundation, inadequate outlets, lack of surface water disposal systems, and shortages of fresh water for irrigation.

Damages resulting from reduced yields are caused by runoff of excessive rainfall. This rainfall causes flooding or prolonged wet conditions on much of the farmland, especially in the planting and early growing season. These conditions result in reduced yields caused by late planting, lack of cultivation, or increases in weed infestation - especially to rice.

Practically all of the crop and pasture land in the watershed sustains damages to yields from floodwater and inadequate drainage. Total damage from those two sources amounts to \$102,532 annually. In addition, rice in approximately the lower three-fourths of the watershed sustains damage from salt water intrusion. Louisiana State University Experiment Station personnel estimate that this type of damage causes 20 percent reduction in rice yields every three or four years. This amounts to approximately one barrel per acre loss in rice production annually in the area affected. However, due to expected project effectiveness, only 0.53 barrel per acre increase was claimed. The value of this annual benefit is \$12,029.

There will be only minor land use changes after the project is installed. The large majority of the benefits will be derived from improved drainage and elimination of floodwater and salt water intrusion damage.

Landowners have stated they are ready to install farm drainage systems on their land as soon as adequate outlets become available.

The following data have been developed for the watershed:

1. Yields and production costs for various crops grown.
2. Land use and production under future conditions without project.
3. Land use and production under future conditions with project.
4. Associated development costs.

Benefits claimed are net benefits after all production and associated costs have been deducted. The structure costs were reduced to average annual equivalent costs and compared to the average annual benefits. In this manner it was determined that structural works of improvements could be economically justified. Incomplete participation and lag in installation of on-farm systems were considered in appraising the expected damage reduction. Investigations showed that an amortization period of 35 years would be appropriate for the planned structural measures. This amortization period is comparable to that used for similar projects.

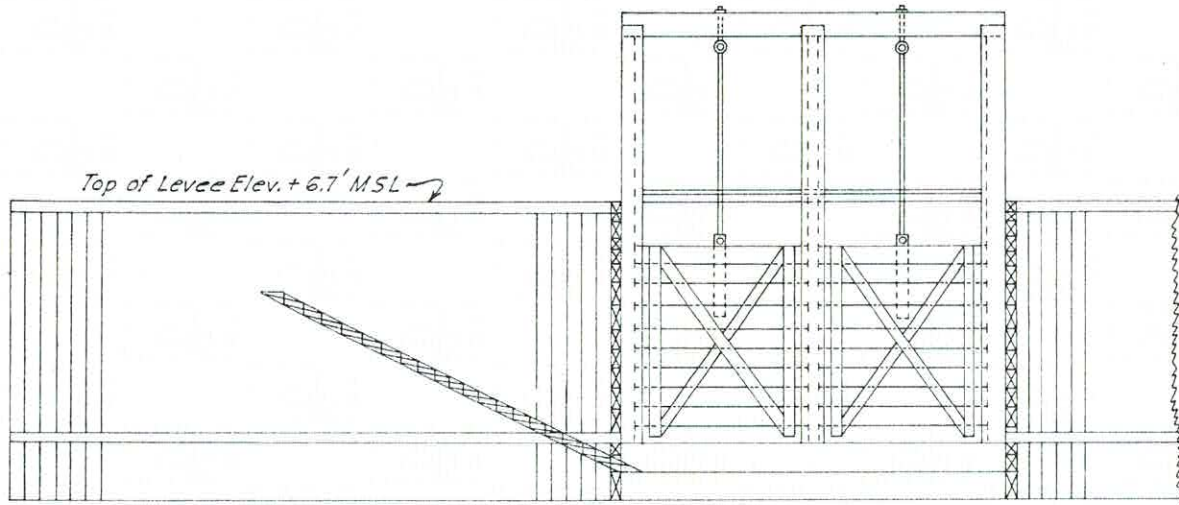
The increase in net returns after deducting associated costs, was used as a base for determination of benefits. None of the benefits will be derived from increased acreages of rice, the controlled crop in the benefit area.

Five years are allowed after the main ditches and laterals are installed for the buildup of farm drainage to an estimated 90 percent participation. Benefits were discounted in accordance with established procedures, taking into consideration the following factors: lag in installation, increased overhead expense, and associated farm drainage costs. Data on land use,

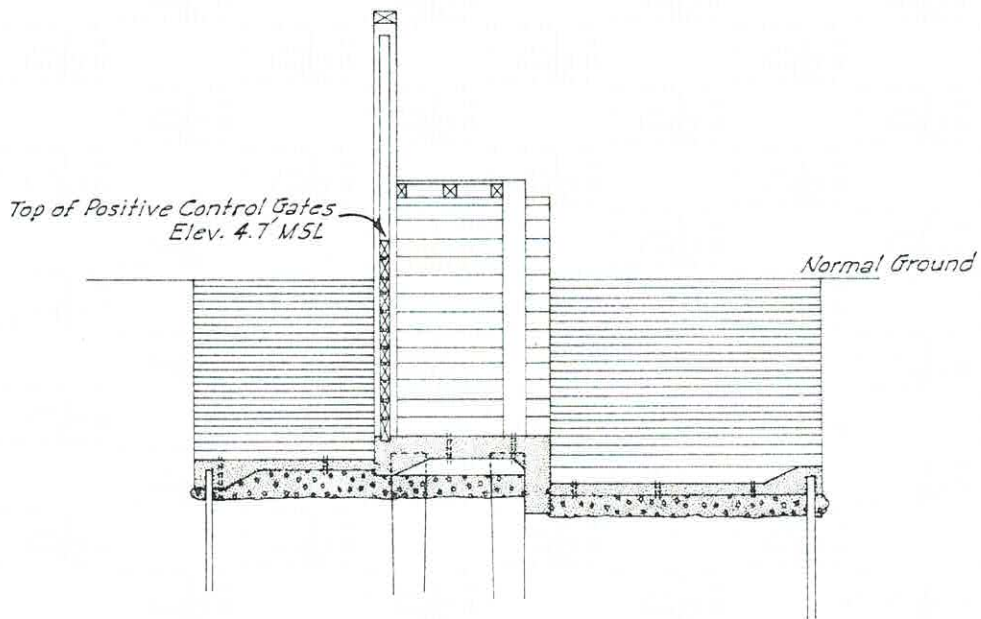


crop distribution, yields, and benefits to project are summarized in Table A. The average annual net primary project benefits are distributed as follows:

<u>Type Benefit</u>	<u>Dollars</u>
1. Drainage	45,114
2. Floodwater	57,418
3. Protection of fresh water	12,029
Total	<u>114,561</u>

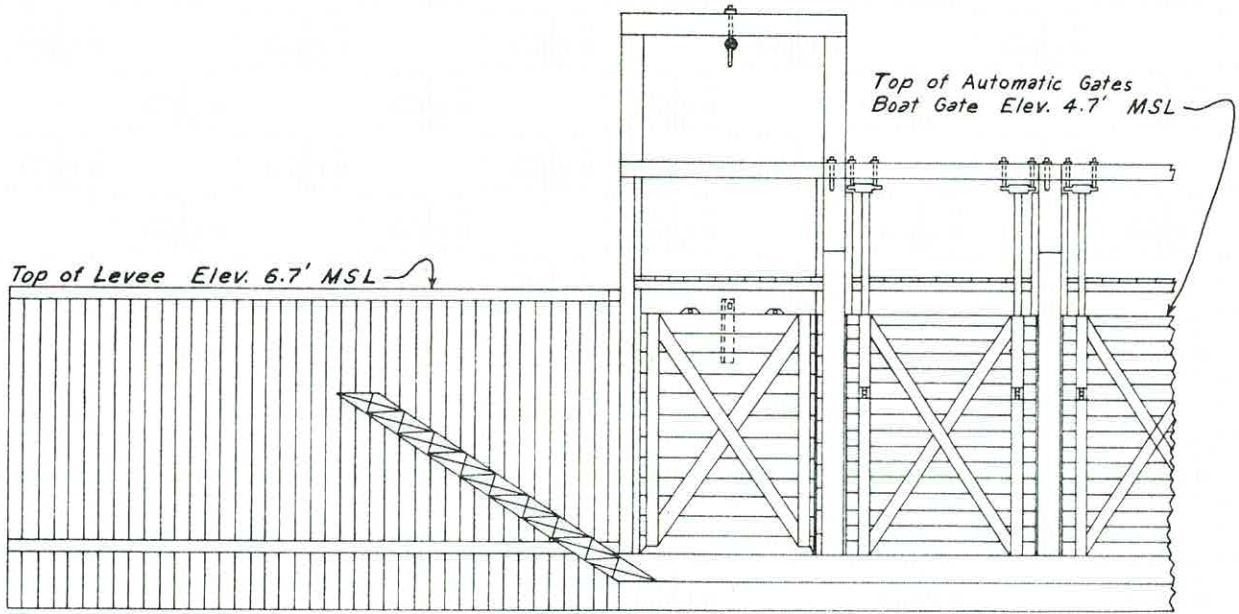


ELEVATION

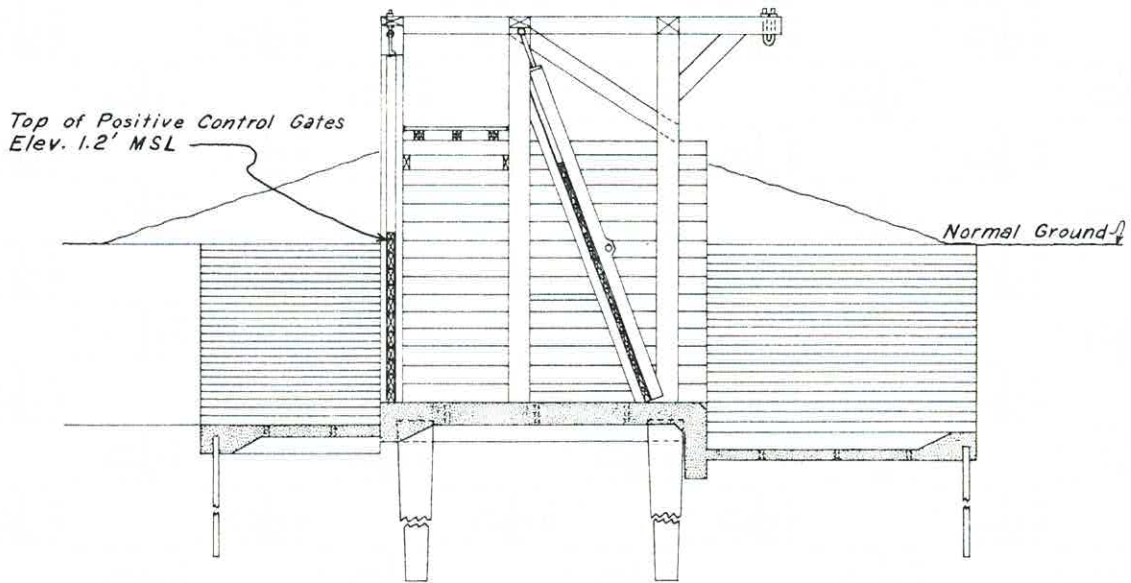


SECTION

Figure 2  
**TYPICAL PLAN**  
WATER CONTROL STRUCTURE NO. 4  
SEVENTH WARD CANAL WATERSHED  
VERMILION PARISH, LOUISIANA  
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
ALEXANDRIA, LOUISIANA

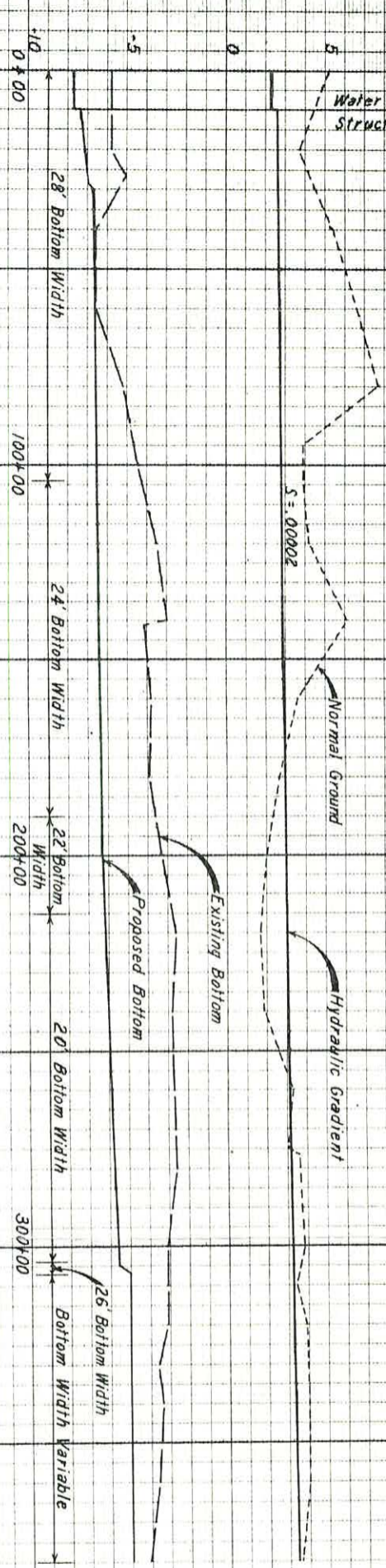


ELEVATION

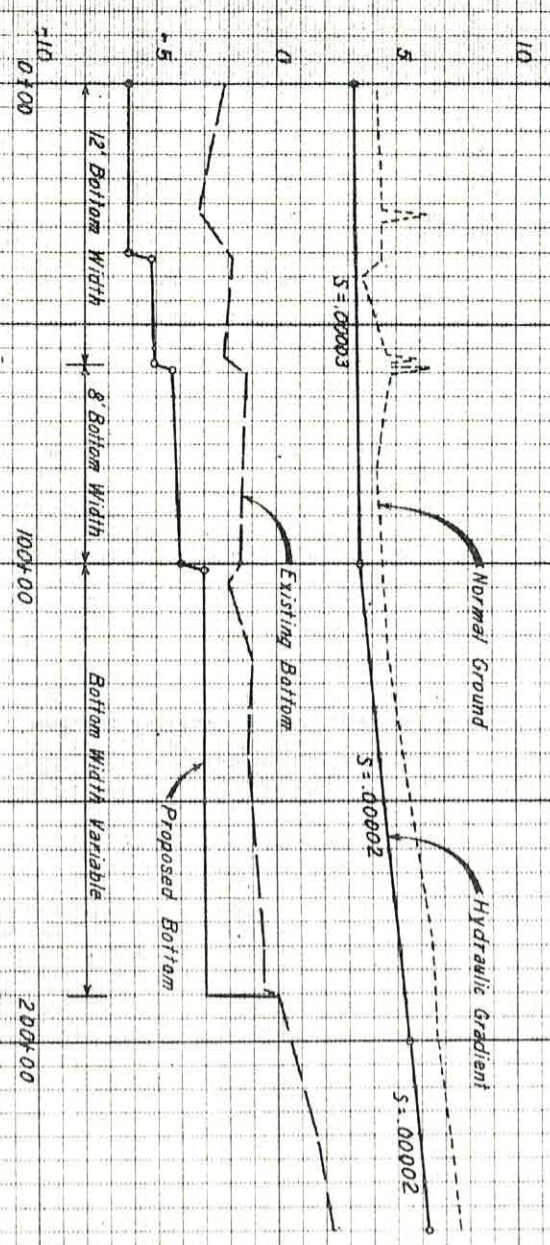


SECTION

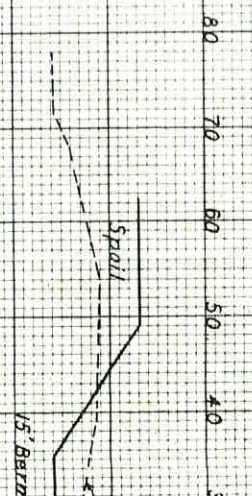
Figure 1  
**TYPICAL PLAN**  
 WATER CONTROL STRUCTURE NOS. 1, 2 & 3  
 SEVENTH WARD CANAL WATERSHED  
 VERMILION PARISH, LOUISIANA  
 U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE  
 ALEXANDRIA, LOUISIANA



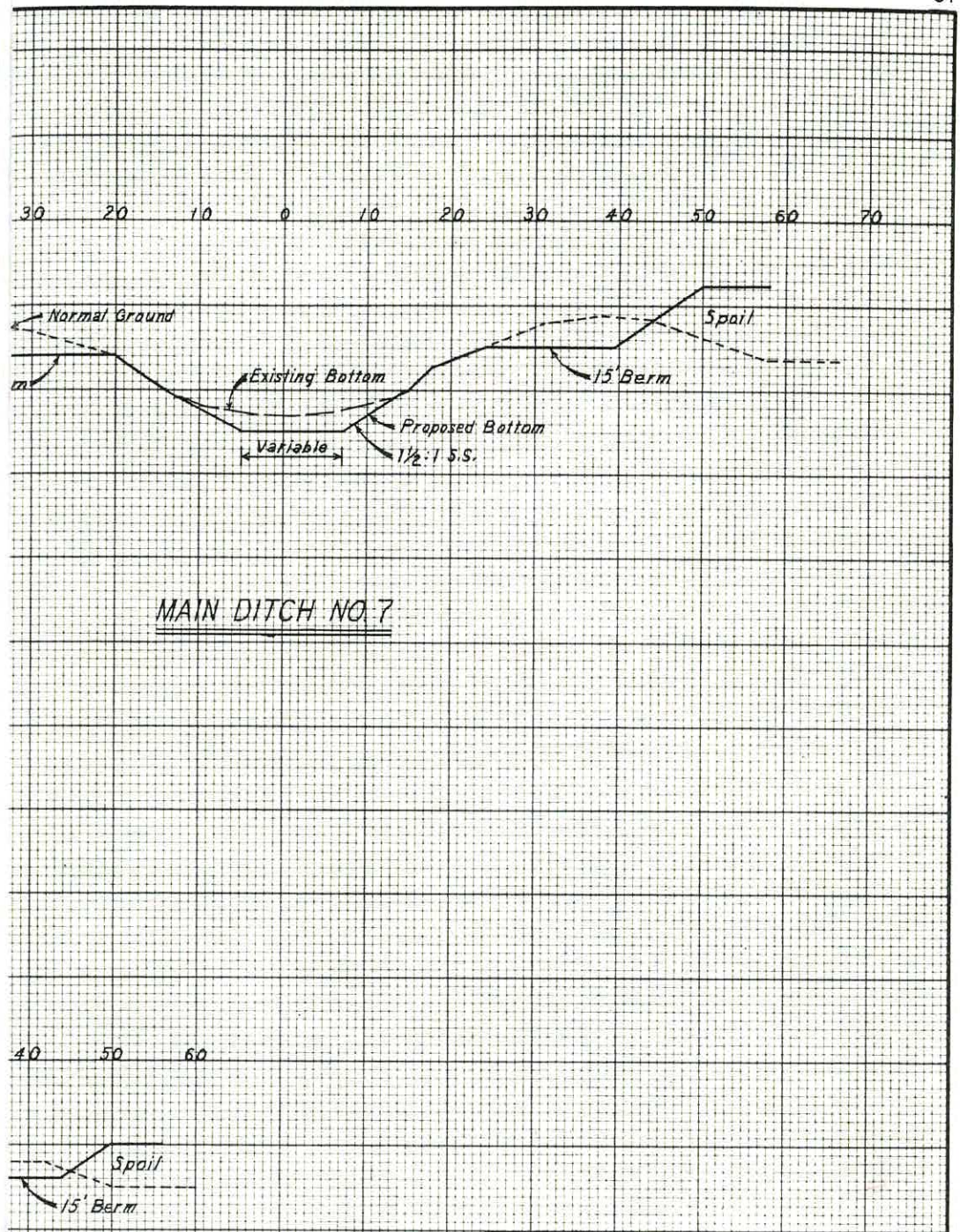
MAIN DITCH NO. 7



LATERAL-3B



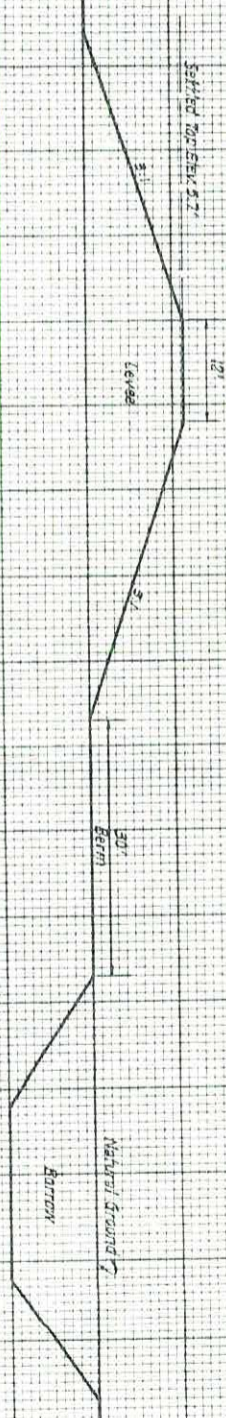
LATERAL-3B



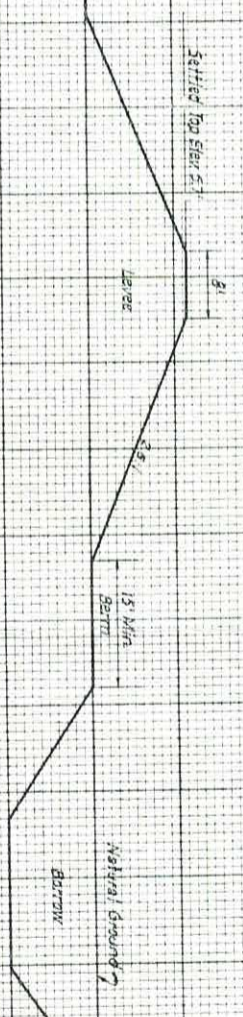
MAIN DITCH NO. 7

S.

<p>FIGURE 3 TYPICAL CHANNEL PROFILES AND CROSS SECTIONS SEVENTH WARD CANAL WATERSHED VERMILION PARISH, LOUISIANA</p>			
<p>U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE</p>			
Designed <i>N.L.S.</i>	Date <i>3-64</i>	Approved by _____	
Drawn _____		HEAD, ENGINEERING & WATERSHED PLANNING UNIT, FORT WORTH, TEXAS	
Traced <i>W.C.F.</i>	Date <i>4-64</i>	STATE CONSERVATION ENGINEER'S OFFICE ALEXANDRIA, LOUISIANA	
Checked <i>P.O.M.</i>	Date <i>3-64</i>	Sheet <i>1</i> of <i>1</i>	Drawing No. <b>4-R-18,979</b>



TYPICAL CROSS SECTION - ORGANIC SOIL



TYPICAL CROSS SECTION - MINERAL SOIL

FIGURE 4

TYPICAL LEVEE CROSS SECTION  
 SEVENTH WARD CANAL WATERSHED  
 VERMILION PARISH, LOUISIANA

DESIGNED BY	DATE	PROJECT NO.	SECTION NO.
N.C.S.	3-54	4-R-18.5	1
CHECKED BY	DATE	PROJECT NO.	SECTION NO.
P.O.M.	3-54	4-R-18.5	1