

GUADALUPE RIVER BASIN, TEXAS

DESIGN MEMORANDUM NO. 9C  
(REVISED DECEMBER 1970)

UPDATED MASTER PLAN  
CANYON RESERVOIR  
GUADALUPE RIVER, TEXAS

PART ONE

U. S. ARMY ENGINEER DISTRICT, FORT WORTH  
CORPS OF ENGINEERS  
FORT WORTH, TEXAS

DECEMBER 1970

(Army-Fort Worth, Texas)



DEPARTMENT OF THE ARMY  
FORT WORTH DISTRICT, CORPS OF ENGINEERS  
P. O. BOX 17300  
FORT WORTH, TEXAS 76102

SWFED-P

4 February 1971

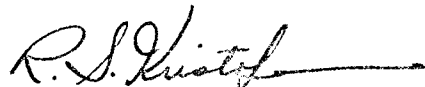
SUBJECT: Canyon Dam and Reservoir, Guadalupe River, Texas, Design  
Memorandum No. 9C (Revised December 1970)

THRU: Division Engineer, Southwestern

TO: Chief of Engineers

1. Inclosed is Design Memorandum No. 9C (Revised December 1970), updated master plan for the development and management of the Canyon project, Guadalupe River, Texas.
2. The updated plan includes existing and planned development at the project and is in compliance with previous indorsements.
3. The land use plan has been developed and is recommended for approval.

- 3 Incl
1. Design Memo 9C
  2. Land Use Maps
  3. Cost Estimate

  
R. S. KRISTOFERSON  
Colonel, CE  
District Engineer

(35 copies prepared)

ENGW-PV (SWFED-P 4 Feb 71) 4th Ind

12 August 1971

SUBJECT: Canyon Dam and Reservoir, Guadalupe River, Texas, Design  
Memorandum No. 9C (Revised December 1970)

2. Information in response to the above should be provided OCE,  
ATTN: ENGCV-PV.

FOR THE CHIEF OF ENGINEERS:



wd all incl

IRWIN REISLER  
Acting Chief, Planning Division  
Civil Works Directorate

SWDPL-R (SWFED-P 4 Feb 71) 5th Ind

DA, Southwestern Division, Corps of Engineers, 1114 Commerce Street,  
Dallas, Texas 75202 19 Aug 71

TO: District Engineer, Fort Worth



A.R.B. 8/17

ENGOW-PV (SWFED-P 4 Feb 71) 4th Ind  
SUBJECT: Canyon Dam and Reservoir, Guadalupe River, Texas, Design  
Memorandum No. 9C (Revised December 1970)

DA, Office of the Chief of Engineers, Washington, D. C. 20314 12 Aug 71

TO: Division Engineer, Southwestern

1. Design Memorandum 9C is approved subject to the comments expressed by SWDPL-R in the preceding 3rd Indorsement and to the following:

a. Paragraph 1-04. The plan should be revised to clearly indicate that for Canyon Lake it is the existing policy to further develop recreational facilities after 30 June 1980 on a cost-sharing basis rather than to state the requirements as being those of provisions of PL 89-72. (See Appendix I to ER 1120-2-404.)

b. Paragraphs 3-12b. and 4-06i. propose methods for developing and improving the existing wildlife resource. The proposal should be further described concerning methods of accomplishment, location, costs and a schedule for performing the work.

c. Paragraph 4-04. The design principles for recreation site and area developments should be accomplished in accordance with the instructions shown in ER 1110-2-400, Design of Recreation Sites, Areas and Facilities, dated 1 February 1971. In conformance with this ER consideration should be given to greater separation between those areas for overnight and those for daytime use.

d. Paragraph 4-06. Subparagraphs a. through h. should be expanded to more definitely describe and explain existing and proposed development. Vis-a-vis paragraph 4-06c., plates 10 and 18, and Table 4, Appendix A, do not relate to each other on proposed development. Plate 10 indicates the construction of camping units FY 71 through FY 80 while Plate 18 and Table 4, Appendix A indicate these facilities as existing.

e. Paragraph 4-06h. It is understood from discussions with representatives of the Environmental Branch, SWD, that roads, trails and parking space have been provided and are maintained in the park area to serve the needs of trout fishermen. Accordingly, the proposed waterborne toilet should be provided at Federal expense and the drawing revised to show such development.

f. Plate 12, Cranes Mill Park. Consideration should be given to restudying the area with a view to making the entire peninsula north of the concession access road a camping area, with picnic expansion or replacement to the south. The existing ramp would be utilized only by campers. The proposed ramp, if required, should be relocated to the picnic area.

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FOR CANYON RESERVOIR  
GUADALUPE RIVER, TEXAS

This report, prepared in the Planning Branch of the Engineering Division, Fort Worth District, has been coordinated with the Real Estate Division and the Operations Division and is recommended for approval.

  
Chief, Real Estate Division

  
Chief, Operations Division

GUADALUPE RIVER BASIN, TEXAS

DESIGN MEMORANDUM NO. 9C (REVISED DECEMBER 1970)

UPDATED MASTER PLAN  
FOR CANYON RESERVOIR  
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GUADALUPE RIVER BASIN, TEXAS

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UPDATED MASTER PLAN  
FOR CANYON RESERVOIR  
GUADALUPE RIVER, TEXAS

I - INTRODUCTION

1-01. Authority for project.- Congressional authority for construction of the Canyon Reservoir project on the Guadalupe River, Texas, is contained in the River and Harbor Act approved 2 March 1945 (Public Law 14, 79th Congress, 1st Session) in accordance with the plan outlined in House Document 247, 76th Congress, 1st Session. The project was modified by Flood Control Act of 3 September 1954 (Public Law 780, 83d Congress, 2d Session) to provide for local cash contributions during construction, and to permit the construction of hydroelectric power facilities at non-Federal expense. To date, the construction of facilities for hydroelectric power has not been initiated.

1-02. Authority for recreational program.- Congressional authority for the recreational program at reservoir projects under the control of the Department of the Army is contained in the Flood Control Act approved 22 December 1944 (58 Stat. 889) as amended. (See chapter 1 of SWDR 1130-2-7).

1-03. Authority for fish and wildlife program.- Congressional authority for the fish and wildlife program at reservoir projects under the control of the Department of the Army is contained in the Fish and Wildlife Coordination Act of 1958, as amended, Public Law 85-624 (72 Stat. 563).

1-04. Federal Water Project Recreation Act (PL 89-72).- The above referenced law and instructions from higher authority direct that the recreation facilities and improvements developed at the Canyon Reservoir project prior to 1966 are not subject to the cost sharing provisions. The facilities and improvements may be made available to non-Federal entities at no cost except for operation, maintenance, and further development at their expense. Further development with 711 funds of old areas remaining under operation and maintenance by the Corps of Engineers to meet current needs projected for three years will be under the old policy until 30 June 1980, after which time, further improvements would be considered under the new policy. All development of new areas at the project after FY 1966 is subject to the provisions of the new policy.

1-05. Scope of this report.- This design memorandum presents data showing existing conditions and development, proposed plans to guide in the administration, orderly development, and coordinated management of land and water areas of the Canyon Reservoir project. The concept is to obtain maximum utilization of the project area for public use, recreational activities, and other feasible uses.

1-06. Status of master plans.-

a. Preliminary.- Design Memorandum No. 9 was submitted to the Southwestern Division on 4 September 1956 and was approved by Office, Chief of Engineers, on 10 December 1956.

b. Master plan.-

(1) Design Memorandum No. 9B, the original master plan, was submitted to the Southwestern Division on 22 September 1961 and approved by Office, Chief of Engineers, on 26 March 1962.

(2) Design Memorandum No. 9B, Supplement No. 1, a comprehensive plan for the development of the recreational potential of Canyon Park which was developed by an architect-engineer to obtain the objective of creating a "model" recreation area, was submitted to the Southwestern Division on 14 January 1963 and approved by Office, Chief of Engineers, on 16 April 1963.

(3) Design Memorandum No. 9B, Supplement No. 2, to establish policy regarding the issuance of permits for the mooring of privately owned boathouses, boat docks, and barges on the waters of Canyon Reservoir, was submitted to the Southwestern Division on 8 November 1963 and approved by Office, Chief of Engineers, on 2 April 1964.

(4) Design Memorandum No. 9B, Supplement No. 3, to establish design criteria and unit cost estimates for four individual recreational facilities for Canyon Park model recreational area, was submitted to the Southwestern Division on 26 February 1964 and approved by Office, Chief of Engineers, on 17 August 1964.

## II - DESCRIPTION AND CHARACTERISTICS OF THE PROJECT

2-01. Project purposes.- The Canyon Dam and Reservoir was constructed to serve primarily as a flood control and water conservation project. The Flood Control Act of 3 September 1954 (Public Law 780, 83rd Congress, 2nd Session) authorized the construction of hydroelectric power facilities at non-Federal expense; however, to date non-Federal agencies have not made a firm commitment or expressed a specific date as to when or whether hydroelectric power facilities will be constructed. It protects the flood plain below the dam from

Floods occurring above the project in the Guadalupe River watershed. The reservoir and adjacent areas have been developed for recreational purposes and the conservation of fish and wildlife resources.

2-02. Conservation storage contract.- The Federal Government entered into a contract during October 1957 with the Guadalupe-Blanco River Authority, a state agency, for the use of conservation storage space in Canyon Reservoir. The contract grants the Authority the right to use storage space between elevation 909.0, top of the conservation storage pool level, and elevation 800.0. The terms of the conservation storage contract are outlined in Design Memorandum No. 13, General, dated August 1959.

2-03. Location.- Canyon Dam is located at river mile 303.0 on the Guadalupe River, about 12 airline miles northwest of New Braunfels, Texas. The entire project is located in Comal County, Texas. The plan and profile of the dam are shown on plate 1.

2-04. Project area.- This area is entirely within the Edwards physiographical province of Texas, which lies generally north and west of the cities of San Antonio and New Braunfels. The Edwards Plateau region is an area of rocky, rugged hills and narrow valleys, and is sharply accentuated by the steep hills and limestone bluffs that mark the Balcones Escarpment. This escarpment is the dividing line between the plateau area and the Coastal Plains. The topography adjacent to the conservation pool level, elevation 909.0, varies from rolling to steep. The impounded water at elevation 909.0 inundates 8,240 acres and consists of 386,200 acre-feet, of which 19,800 acre-feet are allocated to sedimentation. At this elevation, the lake has a length of about 15 miles and a maximum width of about four miles. There are several creeks or draws in the reservoir area which provide suitable coves for the development and operation of commercial activities. The tree cover in the area consists of cedar, oak, elm, sycamore, pecan, hackberry, mesquite, cottonwood, and cypress. In the bottomlands, the tree cover was heavy except where clearing was accomplished for tilling purposes. On the uplands, the tree cover consists of cedar, mesquite, and oak.

2-05. Pertinent data.- Pertinent data regarding elevations, areas, and capacities applicable to this project are shown in table 1.

TABLE 1  
PERTINENT DATA

Feature	Elevation :(feet msl)	Area :(acres)	Capacity :(acre-feet)
Top of dam	974.0	18,900	1,215,400
Maximum design water surface	969.1	17,200	1,129,300
Upper guide contour for easement acquisition (1)	948.0	13,600	307,100
Top of flood control storage	943.0	12,890	740,900 (2)
Spillway crest	943.0	12,890	740,900
Fifty-year flood level	940.0	12,460	702,900
Five-year flood line	918.0	9,280	465,000
Top of conservation pool	909.0	8,240	386,200 (2)
Five-year drawdown	892.0	6,400	261,900
Ten-year drawdown	880.0	5,270	192,100
Streambed	750.0		

Shoreline at conservation pool - about 30 miles.

(1) Upper guide contour for easement acquisition applies to the flat pool area of the main part of the reservoir.

(2) Sediment reserve distributed as follows: 19,800 acre-feet below elevation 909.0; 8,300 acre-feet between elevations 909.0 and 943.0.

2-06. Status of project.- Construction was initiated in April 1958 with a contract for test embankment sections. A contract for the completion of the embankment and construction of the service bridge was awarded in the summer of 1960. Deliberate impoundment was initiated on 16 June 1964. The impounded water reached the top of the conservation pool level, elevation 909.0, in April 1968. As of 30 June 1970, the project was classified as 100 percent complete from a construction standpoint, except for the construction of additional recreational facilities.

2-07. Project structures.- The dam is a rolled earth fill structure with the main embankment 4,410 feet long and 224 feet above the streambed. The spillway is an uncontrolled broadcrested weir 1,260 feet long. The spillway is located about 2,500 feet from the right abutment of the main embankment. The crest of the uncontrolled spillway is at elevation 943.0. The flood control outlet works consist of a 10-foot-diameter conduit controlled by two 5-foot 8-inch by 10-foot hydraulically operated slide gates with the intake invert at elevation 775.0 and outlet invert at elevation 760.0. The conduit is

located near the center of the dam. The capacity of the conduit is 4,671 cubic feet per second when the water level is at the top of the conservation pool, elevation 909.0. The Madaluna-Plano River Authority, the purchaser of the conservation storage space, has not submitted plans for the construction of a water supply intake structure. Upon receipt of request from this state agency, water supply is released through the 15-foot-diameter flood control conduit. An overlook and viewing area was developed on the left abutment near the north end of the dam for the visiting public to view construction. This facility has been maintained since it was completed, as it has continued to serve the visiting public.

2-08. The headquarters area is located near the south end of the main embankment. An overlook area, with shelter and public toilets, located between the headquarters area and the uncontrolled spillway has been developed. Access to these facilities is available over a hard surfaced road located below the dam. This hard surfaced road connects with State Highway (FM) No. 306, which provides access to the north side of the reservoir and a paved county road leading to State Highway (FM) No. 2673, which provides access to the south side of the reservoir. Facilities in the headquarters area consist of an administration and maintenance building, a paint and oil storage building, and an equipment storage building.

2-09. Fluctuation of pool.- Hypothetical regulation of the reservoir for the period February 1915 to June 1957 was used as a basis for determining the frequency of reservoir drawdown as shown on plate 2. The flood frequency curve shown on plate 2 was constructed for floods occurring during the period 1915-1957, based upon the assumption of a full conservation pool at the beginning of each flood and upon ultimate capacity. Water depths in the reservoir at conservation pool level, elevation 909.0, are shown on plate 3.

2-10. Land.- Land for the Canyon project was acquired under the 1953 joint policy Department of the Army and Department of the Interior. The basis for establishing the five-year flood frequency, the fee acquisition line, the upper guide contour, and the easement acquisition line is discussed in Design Memorandum No. 12, Hydrology (Revised). Fee title was acquired to lands blocked out based on the 918 contour, plus additional lands required for project purposes and public recreation requirements. Flood flowage easements were acquired over all lands in the flat pool area between the fee line and the 948.0 contour. The envelope curves shown on exhibit 2 in Supplement No. 1 of the above mentioned design memorandum dictate the elevations to which flood flowage easements have been acquired in the upper reaches of the reservoir. The present allocation of land and water areas acquired for this project is shown in table 2. The recommended priority of use for project land and water areas is shown in table 3.

### III - RECREATIONAL RESOURCES

3-01. General.-- Canyon Reservoir is located in one of Texas' most interesting counties, both for natural setting and population. Economy is based on farming, livestock, and tourist trade. Comal and adjoining counties are highly advertised as the "Hill Country." (See paragraph 3-09 for further description of activities). There are many spring-fed streams, notably the Comal River rising in Comal Springs at New Braunfels.

3-02. Factors and resources considered.-- Such factors as climate, topography, accessibility, tree cover, fish and wildlife resources, and the facilities and services provided are some of the influences which attract the public to the general area and specific sites for the enjoyment of the outdoor recreation. The economic status and population within the zones of influence and the recreational attractions in the general area also have a bearing on the number of visitors the project will attract for recreational activities.

3-03. Climate.-- Canyon Reservoir lies in a moderately humid region and experiences a generally mild climate. The summer days are hot and the nights cool. The winter periods are normally short and comparatively mild, but occasional cold periods of short duration result from the rapid duration of cold, high pressure air masses from the northwestern polar regions and the continental western highlands. Freezing temperatures are experienced annually and snowfall occasionally. Southerly winds prevail during the spring, summer and fall months, and northerly winds prevail during the winter months. The mean annual temperature over the basin is about 68 degrees. Temperatures in the watershed have ranged from a maximum of 112 degrees recorded at Boerne to a minimum of minus 7 degrees recorded at Kerrville. The average length of the growing season between killing frosts varies from 221 days at Kerrville in the upper portion of the basin, to 265 days at Luling in the central portion, and 296 days at Victoria in the lower portion. The mean annual precipitation over that portion of the basin lying above the Canyon Dam site is 30.1 inches.

3-04 Region served.-- For the purpose of preparing an overall plan of development, two major zones of influence have been considered. The primary zone includes the territory within the 50-mile radius, and the secondary zone includes the area between the 50-mile radius and the 100-mile radius of the dam. The area includes all or portions of 43 counties. Visitation surveys show that the majority of the visitors are attracted from the primary zone of influence, with a substantial number from the secondary zone of influence. Some visitors are attracted from beyond the secondary zone of influence.

TABLE 2

ALLOCATION OF LAND AND WATER AREAS, IN ACRES, AS OF 30 JUNE 1970

	Outgranted to				Not	
	Other	Local			outgranted	Total
	Federal	governmental	Concessions	Organizations	Subtotal	Corps
Conservation Pool						
Priority 1 - Recreation	2	18			20	3,220
Land Area Above Dam						9,240
Priority 1 - Parks						
North						
Canyon			18		18	45
Jacobs Creek	162				162	447
Potters Creek		4			4	109
Crane's Mill						330
Comal		9			9	236
Overlook						115
Guadalupe						36
Roads, parking areas						104
and launching ramps						
Operation and maintenance	4				4	835
Dam Site						50
Land Area Below Dam						50
Operation and maintenance						243
Total - Fee Lands	162	6	45	4	217	10,770
						10,987

RECOMMENDED PRIORITY OF USE FOR PROJECT LAND AND WATER AREAS,  
IN ACRES, FOR PRESENT AND FUTURE

	Present outgrants and land recommended for outgrants	Subtotal	from table 2 : Concessions : Expansion : easements : Corps : (A. 15)
Conservation Pool		20	30
Public Use			
Priority 1 - Parks			
North			
Canyon	18		
Jacobs Creek	166	15	10
Potters Creek		15	
Crane Mill	9		5
Comal		15	
Overlook			
Guadalupe			
Subtotal - parks	193	45	15
Priority 2			
Priority 3			
Priority 4			
Subtotal			
Operation and maintenance			
Aesthetics			
Total fee			
Total flowage easement			
TOTAL			

3-05. Accessibility.- Canyon Reservoir is readily accessible over hard surfaced state highways and county roads. There are no U. S. highways providing direct access to the project, however, there are several hard surfaced state highways, including farm-to-market roads which connect U. S. highways and provide access to the project area. These are State (FM) Highways Nos. 306, 454, and 30 lying to the north side of the reservoir and connecting with State Highway No. 59 with U. S. Highway No. 281. State (FM) Highway No. 2073 provides access to the south side of the reservoir, which connects with State (FM) Highway No. 306. The Texas Highway Department proposes to construct an improved road system around the entire reservoir project. The location and proposed alignment of the state (FM) highways and county roads are shown on plate 7. The nearest railhead is at Gruene, Texas, about 14 road miles from the dam.

3-06. Population.- The 1960 census population recorded approximately 1,000,000 persons residing within the 50-mile (primary) zone of influence and approximately 480,000 persons residing within the area between the 50-mile and 100-mile radii (secondary zone) of the dam. This made a total of about 1,480,000 persons residing within the two zones of influence. Projections of the 1960 population of counties located wholly or partially within the 100-mile zone of influence indicated the following estimates of growth based on series C population projections.

1970 - 1,750,000	2025 - 3,825,000
1975 - 1,880,000	2030 - 4,050,000
1980 - 2,035,000	2035 - 4,312,000
1985 - 2,210,000	2040 - 4,537,000
1990 - 2,380,000	2045 - 4,800,000
1995 - 2,565,000	2050 - 5,075,000
2000 - 2,750,000	2055 - 5,350,000
2005 - 2,950,000	2060 - 5,650,000
2010 - 3,160,000	2065 - 5,950,000
2015 - 3,380,000	2070 - 6,235,000
2020 - 3,600,000	

3-07. Estimated attendance.- The operation and maintenance of existing and the development of additional facilities at the project will have an upward effect on future attendance. During the first three full years of operation, the project attracted an average of 1,233,400 visitors. During the preparation of the original master plan, it was estimated that the project would attract 1,650,000 annually within three years after the project was placed in useful operation. It was also estimated that the potential number of visitors could exceed 3,000,000 during the life of the project.

3-08. Design load.- The design load is based on 3,000,000 visits per annum. The attendance surveys reveal that during the summer months of June, July and August, the project attracts about 38 percent of its annual visitors and that 64 percent are attracted on weekends during summer months. Based on the above statistics, the design load is about 28,000. The design load and facility requirements were calculated as shown in table 4.

3-09. Related recreation areas.-

a. In the 100-mile zone of influence, there are three completed and four authorized reservoirs under the jurisdiction of the Corps of Engineers, eight reservoirs under the jurisdiction of state and local governmental agencies, and 13 state parks under the jurisdiction of the Texas Parks and Wildlife Department. The location of these recreational opportunities in relation to Canyon Reservoir is shown on plate 5.

b. The advertised "Hill Country" is scenic and attracts many visitors annually. The principal attractions are historical sites, dude ranches, and organized and private camps. The spring fed streams attract many fishermen. The area also has an abundant population of deer and small game which attracts many hunters during the open season.

c. The land above the Government acquisition line is one of the most highly developed areas of any reservoir project under the jurisdiction of the Fort Worth District. These subdivisions are developed as homes by senior citizens who have retired and people living in the metropolitan areas who use and occupy the cottages during weekends and vacation periods.

d. Canyon Reservoir complements but does not compete with the recreational attractions in the "Hill Country."

3-10. Archeological and paleontological resources.- A survey of the reservoir area was made in August and September 1949 under the direction of the National Park Service of the archeology and paleontology features that would be adversely affected by the construction and development of the project.

a. Archeology.- The survey located 20 sites, of which eight were recommended for salvage. The results of the excavations at three sites are discussed in a report entitled, "Salvage Archeology of Canyon Reservoir: The Wunderlich, Footbridge, and Oblate Sites." Copies of this report are on file in the district office. A summary of the findings and conclusions of these excavations is as follows:

TABLE 4

RECREATION ANALYSIS

Design load computations: 14,966

Project: Canyon

Total annual attendance: 1,600,000 (1980)

Design day load:

1,600,000 total annual attendance x .38 visits during summer months x  
.64 which occurs on weekends = 389,120 total number of weekend users.  
Total number of weekend users ÷ 26 weekend days = 14,966 design day load.

Picnicking:

Design day load x .20 of total are picnickers = number of picnickers  
No. of picnickers x .40 of picnickers requiring facilities = number of  
picnickers requiring facilities.  
No. of picnickers requiring facilities ÷ turnover rate of 2 ÷ 3.5  
persons per vehicle = 171 picnic units required.

Camping:

Design day load x .10 of total are campers = number of campers  
No. of campers ÷ 3.5 persons per vehicle = 428 camping units required.

Boat ramps:

Design day load ÷ load factor of 3.5 = number of vehicles.  
No. of vehicles x .19 of vehicles with boats = number of boats  
No. of boats ÷ 60 launchings per day = 14 boat launching ramps required.

Beaches:

Design day load x .37 swimmers = number of swimmers  
No. of swimmers x .60 swimmers on beach = number of beach users  
No. of beach users ÷ turnover rate of 3 = number of users on beach at  
any one time  
No. of users on beach at same time x 50 square feet of beach per person =  
1.27 acres of land area required for sand beach  
No. of swimmers x .30 are swimmers in water = number of swimmers in  
water  
No. of swimmers in water ÷ turnover rate of 3 = number of swimmers in the  
water at any one time  
No. of swimmers in the water at any one time x 100 square feet of water  
surface per user = 1.27 acres water surface required.

10% of swimmers need no additional land.

TABLE 4A

RECREATION TABLE

Design load computations: 28,000

Project: Canyon

Total annual attendance: 3,000,000 (ultimate)

Design day load:

3,000,000 total annual attendance x .38 visits during summer months x  
.64 which occurs on weekends = 729,600 total number of weekend users  
Total number of weekend users ÷ 26 weekend days = 28,000 design day load

Picnicking:

Design day load x .20 of total are picnickers = number of picnickers  
No. of picnickers x .40 of picnickers requiring facilities = number of  
picnickers requiring facilities  
No. of picnickers requiring facilities ÷ turnover rate of 2 ÷ 3.5  
persons per vehicle = 320 picnic units required.

Camping:

Design day load x .10 of total are campers = number of campers  
No. of campers ÷ 3.5 persons per vehicle = 800 camping units required

Boat ramps:

Design day load ÷ load factor of 3.5 = number of vehicles  
No. of vehicles x .19 of vehicles with boats = number of boats  
No. of boats ÷ 60 launchings per day = 25 boat launching ramps required

Beaches:

Design day load x .37 swimmers = number of swimmers  
No. of swimmers x .60 swimmers on beach = number of beach users  
No. of beach users ÷ turnover rate of 3 = number of users on beach at  
any one time  
No. of users on beach at same time x 50 square feet of beach per person =  
2.37 acres of land area required for sand beach  
No. of swimmers x .30 are swimmers in water = number of swimmers in water  
No. of swimmers in water ÷ turnover rate of 3 = number of swimmers in  
water at any one time  
No. of swimmers in the water at any one time x 100 square feet of water  
surface per user = 2.37 acres water surface required.

10% of swimmers need no additional land.

(1) Findings.--

(a) Wunderlich, A Burned-Rock Midden Site.-- The number of artifacts recovered consisted of 355. Also, a relatively large number of snail and mussel shells, as well as a few animal bone fragments, were found.

(b) Footbridge, A Terrace-Site.-- The number of artifacts recovered consisted of 396. Animal bones found were not well preserved nor were they very numerous. The few forms that could be identified include deer, bison and turtle, in that order of frequency. In contrast to animal bones, snail and mussel shells were abundant.

(c) Oblate, A Rockshelter Site.-- The number of artifacts recovered consisted of 1,609.

(2) Conclusions.-- Three multi-component Indian campsites in the Canyon Reservoir area were excavated in 1959 and 1960 by the Texas Archeological Salvage Project. Intermittent occupations at the sites are attributed principally to the Archaic Edwards Plateau Aspect, and to a lesser extent, to the Central Texas Aspect. Two of the sites, Wunderlich and Oblate, yielded data which permits a tentative sequential ordering of certain Edwards Plateau Aspect dart point types. These data, especially when compared with those from related Central Texas sites, suggest that the Edwards Plateau Aspect can advantageously, but tentatively, be divided into four time periods: Early, Middle, Late, and Transitional Archaic. Brief comparison with other dart point sequences in Texas and northern Mexico indicates that Edwards Plateau Aspect dart points have close stylistic ties to the west.

b. Paleontology.-- The excavation of pleistocene faunal assemblage from Freizehnen Cave in Bexar County, some 20 miles to the southwest of the reservoir area, and the abundance of solution cavities in the reservoir area, prompted the stationing of a paleontologist in the Canyon project area in 1961. To date, this office has not received a report on his findings.

c. Development of historical resources will be accomplished by initiating a historical research program conducted by competent historians. The program will be coordinated with state universities, and state historical commissions and societies.

3-11. Fisheries.--

a. Resource analysis.-- This reservoir supports a warm water fishery consisting in part of largemouth bass, Texas spotted bass, channel catfish, flathead catfish, white crappie, bluegill, redear sunfish, and Rio Grande perch. A trout fishery has been established below the dam in

the cold tailrace waters by the Texas Parks and Wildlife Department with the cooperation of the Lone Star Brewing Company of San Antonio, Texas. The Parks and Wildlife Department also stocked walleye in the reservoir, but apparently they were not successful. An appropriate fishery management program is necessary to provide a constant, well balanced fish population. Ways and means need to be found to control rough fish populations, increase game fish, and increase the harvest of both by anglers.

b. Methods of improvement.- The primary responsibility for the management of the fishery rests with the Texas Parks and Wildlife Department. The Corps of Engineers will cooperate with the state in every feasible way. By controlling pollution, the habitat is protected, and the Corps field personnel maintain a constant surveillance of the project and adjacent lands with a view to correcting all sources of pollution. The Corps, by providing easy access and boat ramps, increases the number of anglers and the total catch. The District biologist keeps in close coordination with federal and state representatives on restocking of additional game or predatory species and other methods of improving game fish harvest.

### 3-12. Wildlife.-

a. Resource analysis.- This reservoir area supports a variety of wildlife consisting in part of wild turkey, white tailed deer, mourning dove, fox, squirrels, cottontails, grey foxes, and raccoons. Bobwhites are scarce and are completely protected by adjacent landowners. Waterfowl are not abundant but do afford some hunting.

b. Methods of improvement.- The primary objective in developing the wildlife resource is to attract and hold the greatest variety and number of each species. To accomplish this objective, it is proposed to develop a cover restoration program with plants which will provide both food and cover, creating edge conditions, limiting or excluding grazing and providing food plots and nesting aids. Parking areas and foot trails will be developed for the visiting public.

## IV - PLAN OF RECREATIONAL DEVELOPMENT

4-01. General.- The plan of development presented herein is intended to provide for the development of recreational sites and facilities, program of land management, and the development of wildlife and fishing resources. The plan is flexible enough to meet changing conditions and to serve as a guide for the comprehensive use of the reservoir area through planned use of specific areas. All public use areas and their related facilities have been located on lands acquired

in fee title for the Canyon Reservoir. Appropriate provisions are included in the plan for providing recreational facilities for day camping and vacation use. It is also proposed to provide sufficient services and supplies to meet the visitor's needs and demands. The general development plan is shown on plate 6.

4-02. Selection of areas to be developed.- Factors considered in selecting the areas for recreational development as presented in the preliminary master plan are as follows:

- a. Access to existing roads.
- b. Topography of the area.
- c. Scenery.
- d. Location of the area with respect to usable exposure of the water for recreational activities.
- e. Degree of shelter for the protection of boats.
- f. Water depths in coves where marinas are located or proposed.

4-03. Plan of development.- The proposed plan of development for each area as presented in the master plan is intended to depict a feasible plan to provide for maximum public use. No differentiation is indicated in the proposed plan of development between the work to be accomplished by the Corps of Engineers and that to be accomplished by others, and nothing on the drawings or in the text is intended to commit either the Corps of Engineers or others to any specific amount of development. The location of major recreational facilities is shown on the drawings. Location of roads, parking areas, boat ramps, toilets, service buildings, etc. will be located in the field by the Corps of Engineers contracting officer.

4-04. Recreational facilities.- The recreational facilities developed at this project will be based on approved plans. The facilities include but are not limited to roads, parking areas, boat launching ramps, sanitary facilities, potable water supplies, public camping areas, signs, both informational and directional, and essential safety measures required in connection with such facilities.

4-05. Recreational and commercial activities.-

- a. Table 5 presents data on outgrants pertaining to recreational and commercial activities.

b. See SMDR 1130-1-7 for instructions on awarding additional recreational and commercial outgrants as follows:

- (1) Chapter 15 for parks and recreation grants.
- (2) Chapter 16 for commercial outgrants.
- (3) Chapter 17 for boats with cabin.

4-06. Public use areas.- A brief description of each public use area is presented in the following subparagraphs. Tables and plates showing pertinent data subject to change each year are listed in the table of contents.

a. North Park.- This park is located on the north side of the reservoir adjacent to and upstream of the north end of the dam. Access is available over the north access road to the dam. This bituminous surfaced road connects with State Highway (FM) 306. A visitors parking area and fenced overlook area were constructed on the high side of the dam site prior to initiating construction to afford the visiting public an observation point to view construction of the dam. The parking and overlook area has been maintained since construction of the dam has been completed. The area lying to the west of the parking area and overlook area has been developed with internal roads, drinking water, and sanitary and picnic facilities since impoundment of water was initiated. The area is a promontory with a rather steep slope below the 1000-foot contour and has a good tree cover of oaks and junipers. Waterborne sanitary facilities and drinking water have not been provided at the overlook site but are recommended for approval when justified by public use and demand. A parking area and boat launching ramp are also proposed at the conservation pool level when justified by public demand. A layout is shown on plate 7. An aerial mosaic of this park is included as plate 15.

b. Jacobs Creek Park.- This park is located on the north side of the reservoir. The terrain varies from flat to steep. Tree cover on the southern portion is sparse and on the northern portion is dense, consisting of oaks and junipers. Access is available over a hard surfaced road which connects with State Highway (FM) No. 306. A portion of this area has been outgranted to two military organizations with headquarters in San Antonio, Texas, and a yacht club with private property above the Government's fee acquisition line. See table 5 for details on these outgrants. It is recommended that this park be expanded to the northwest when the visiting public is presently utilizing it for picnicking and camping. The acquisition of additional land will not be required. A commercial concession activity is recommended for approval in this park when justified by public demand. A layout of this park is shown on plate 8. Plate 16 is an aerial mosaic of this park.

TABLE 5

## OUTGRANTS AUTHORIZING RECREATIONAL AND COMMERCIAL ACTIVITIES

Issued	Type of Outgrant	Activity or Purpose	Issued to	Period of Time		Acreage Included		Park Area	Estimated Investment
				Years	Begin	End	Land	Water	
1	Permit	Noncommercial Nonprofit	Fourth Army	50	Dec 65	Nov 2015	110.0	0	Jacobs Creek \$277,400
2	Permit	Noncommercial Nonprofit	Randolph AFB	50	Jan 68	Dec 2018	51.6	0	Jacobs Creek 99,600
3	Lease	Yacht club	Lake Canyon Yacht Club	25	Jan 68	Dec 1993	3.9	0	Jacobs Creek 38,500
4	Lease(CofEngrs)	Commercial concession	Canyon Lake Marina	25	May 66	Apr 1991	18.0	13.0	Canyon 343,900
5	Lease(CofEngrs)	Commercial concession	Cranes Mill Marina	25	Apr 67	Mar 1992	9.0	5.0	Cranes Mill 78,200
6	*Easement or license	Roads, parking areas, launching ramps	Comal County	4-50	8	launching ramp sites consisting of 11 launching lanes			50,800
<u>Recommended</u>									
7	Lease(CofEngrs)	Commercial concession	Individual						Jacobs Creek
8	Lease(CofEngrs)	Commercial concession	Individual						Potter Creek
9	Lease(CofEngrs)	Commercial concession	Individual						Comal

\*Comal County has constructed and accepted responsibility for maintenance for seven of these facilities. The location of these outgrants is shown on plate 7, General Development plan.

c. Canyon Park.-- This park is located on the north side of the reservoir. Terrain in the area varies from steep along the northwest side to flat and rolling in the remaining portion. Access is available over a hard surfaced road which connects with State Highway (FM) No. 306. The area has a fair tree cover of oaks and junipers. This area has been developed as a "model" recreation area. The plan for developing this park was prepared by an architect-engineer and approved by higher authority. (See paragraph 1-266(2) for reference as to the approved supplement). A layout of this park is shown on plates 9 and 10. An aerial mosaic of this park is shown on plates 17 and 18.

d. Potters Creek Park.-- This park is located on the north side of the reservoir. Terrain in the area is generally gently sloping. The area has a fair tree cover of oaks and junipers. Access is available over a hard surfaced road connecting with State Highway (FM) No. 306. A commercial concession activity is recommended for approval in this park when justified by public demand. A layout of this park is shown on plate 11. An aerial mosaic of this park is shown on plate 19.

e. Cranes Mill Park.-- This park is located on the south side of the reservoir. Terrain within the area varies from flat to steep. Tree cover in the area is sparse with a few scattered oaks. Access is available over a hard surfaced county road, known locally as Cranes Mill Road. It is recommended that this park be expanded to the southwest where the visiting public is presently utilizing it for picnicking and camping. The acquisition of additional land will not be required. A layout of this park is shown on plate 12. An aerial mosaic of the park is shown on plate 20.

f. Comal Park.-- This park is located on the south side of the reservoir. The terrain has both flat areas and steep slopes. It has a fair tree cover of oaks and junipers. Access is available over a hard surfaced county road leading from Startzville, Texas. A commercial concession activity is recommended for this park when justified by public demand. A layout for this park is shown on plate 13. An aerial mosaic of this park is shown on plate 21.

g. Overlook Park.-- This park is located on the south side of the reservoir and lies between the south end of the dam and the uncontrolled spillway. The terrain is relatively flat. The tree cover is medium and consists principally of oaks. Access is available over a hard surfaced road located below the dam which connects with State Highways (FM) Nos. 306 and 2673. The headquarters area is located adjacent to this park. This park was principally developed to provide the visiting public a better view of the lower reaches of the reservoir and the upstream face of the dam. A layout for this park is shown on plate 14. An aerial mosaic of this park is shown on plate 22.

n. Guadalupe Park.- This park is located below the dam and adjacent to the Guadalupe River. It was designed as Public Use Area No. 10 in the original master plan. The area on the south side of the river, below the dam, was used as a borrow area during the construction of the dam; therefore, a layout for this park was not included in the original master plan. As discussed in paragraph 3-11, Fisheries, the river serves as a cold water trout fishery on a put and take basis. A copy of a report entitled, "Evaluation of Estable Rainbow Trout Fishery," is incorporated as appendix I of this design memorandum. To date, no facilities have been developed in this park; therefore, any future development falls under the provisions of Public Law 89-72 and requires a non-Federal sponsor. Every effort will be exerted to encourage a non-Federal sponsor to make formal application to lease this area and accept responsibility for developing and maintaining it under the provisions of Public Law 89-72. Since this area attracts many fishermen, it is recommended that a waterborne toilet be constructed in the interest of public health and safety. The recommended site for the waterborne toilet is near the confluence of the outlet channel and the Guadalupe River. There is an existing water well at this site which was used as a potable water supply for an office during the construction period. There are two concrete slabs at this site from which the buildings have been removed that are adequate for parking at the present time. A layout of the area will be developed in coordination with a sponsor and submitted for approval with a recommended lease agreement.

i. Nature study and wildlife areas.- No specific areas have been selected and allocated for this purpose since a large percentage of the land between the top of the conservation pool and the fee acquisition line is allocated to priority 1 where subdivisions have been developed adjacent to and above the fee acquisition line. Trails and limited parking areas will be developed in the areas allocated to priority 1 lands and not needed for general development of facilities at the present time or reserved as priority 1 lands.

4-07. Water supply.- The water supply at this project is obtained from a number of wells. The majority of these wells are located in the designated public use areas. Water from these wells is from the Glen Rose limestone formation. They vary in depths from about 225 to 500 feet.

4-08. Sewage disposal.-

a. The sewage from the headquarters and overlook structures is handled by a septic tank. There is also a septic tank in Canyon Park which has been constructed by the concessionaire.

b. Masonry and frame toilets have been constructed in the designated public use areas where development has been accomplished. Masonry toilets are a double unit with concrete vaults and are generally

located above the 50-year flood elevation. Frame toilets are single units with concrete vaults. They are located below the 50-year flood elevation. The frame toilets are usually located in areas attracting high density use and the 50-year flood level is too far removed to adequately serve the visitors. Frame toilets are also constructed to serve until a pattern of public use is established, then replaced with masonry toilets where feasible.

c. A sanitary dump station to serve mobile campers has been constructed in Canyon Park. Additional sanitary dump stations are proposed in the designated public use areas. The location of these stations is shown on the respective park maps.

4-09. Electric power.- The reservoir area is served by the Pedernales Electric Coop. Electric power lines have been extended to serve each of the concessionaires. Cutoff switches have been provided at or above the 948.0 contour. Electric power lines have been extended to serve each of the water wells. Agreements have been entered into with the power company to provide lights for night use at each of the boat ramps and masonry toilets maintained by the Corps of Engineers.

#### V - LAND MANAGEMENT

5-01. General.- In general, land at this project has been acquired under two categories. These are fee title and a lesser interest, of which the majority are flowage easements. The total amount of land acquired under these categories is shown in table 6. Table 6 also shows the allocation of the land area above the conservation pool level acquired in fee title and allocated for various uses.

5-02. Outgrants.- Several outgrants have been awarded authorizing recreational and commercial activities. These outgrants cover both land and water areas. Data applicable to these outgrants are listed in table 5.

5-03. Fish and wildlife.- Conservation interests have not expressed a desire to lease any of the land and/or water areas at this project for the development and improvement of fish and wildlife resources; however, conservation interests have developed a cold water trout fishery downstream of the dam as discussed in paragraphs 3-11 and 4-06h. Personnel in the Fort Worth District will continue to encourage conservation interests to assume responsibility for developing and improving the fish and wildlife resources over the entire project. Personnel will also continue to coordinate the activities accomplished by the Corps of Engineers in the development and improvement of these resources with respect to federal and state agencies.

5-04. Allocations and discussions.- The maps designated as the land use maps (plates 23-26) show the allocation of uses, either existing

or proposed, for the project lands. Adaptability to different uses varies according to the immediate surroundings, scenic beauty, availability of utilities, access to water's edge, access to state and county roads, and location in respect to other developed areas and to trading centers. Allocations made to the recreational priorities are consistent with operation and maintenance requirements and the foreseeable public demands over the life of the project. Based on the estimated requirements, these allocations assume the maximum sustained benefits for the greatest number of people. Lands for project operational purposes, priorities 1, 2, 3 and 4 are outlined in the following subparagraphs.

a. Project use.-- The land use map (plates 23-26) and table 6 show the lands designated for project use, public use, and other uses which include esthetic areas to complement public use areas.

b. Priority 1.-- Areas shown on the land use map for priority 1 and wildlife areas are above the conservation pool level, elevation 909.0. Priority 1 areas are reserved for use by the general public and are to be developed and administered by the Corps of Engineers or by federal and state and local governmental agencies for park and recreational purposes and commercial concession purposes.

c. Priority 2.-- Priority 2 land was selected for use by a nonprofit organization or agency for the purpose of rendering a public recreational educational service of a charitable or character building nature on a nonexclusive basis. Consideration was given to scenic beauty, tree cover, adaptability, access to water's edge, sheltered water for boat protection and swimming, open water for other sports, and proximity of other developed features of the reservoir area. The priority 2 and 3 lessee may exercise permissive use, along with the general public, below the five-year flood frequency of 918 feet use to the water's edge (see plate 28). There are two sites located on the reservoir in this plan.

d. Priority 3.-- These lands are available to accommodate the need for nonprofit organizations or agencies providing public recreational opportunity. It is required that organizations requesting a site present a development program that will reflect authorization of the land for public use benefits (see plate 27). There is one site in this plan.

e. Priority 4.-- This priority provides land for private clubs which includes club development for the protection and care of private boats on a noncommercial basis or other club use. Priority 4 use will have a provision prohibiting the construction of buildings for human habitation below the upper guide contour of 948 feet mean sea level. There has been one application for priority 4 which has been located east of Jacobs Creek Park. Considerable residential and cottage type developments have enveloped the reservoir due to the project. Comal County has constructed

TABLE 6  
LAND USE ACREAGE

<u>Project use</u>	
Permanent pool	8,240
Dam and operational purposes	<u>293</u>
Total	8,533
<u>Public use</u>	
Priority 1 park area	1,626
Priority 2	37
Priority 3	69
Priority 4	<u>4</u>
Total	1,736
<u>Other land use</u>	
Esthetics	<u>718</u>
Total	718
Total fee	10,987
Total flowage easement	<u>3,620</u>
Total	14,607

The total acreage is in accordance with GSA Form 1166 dated 30 June 1970.

boat ramps and parking areas adjacent to the subdivisions which have provided access and service to the subdivision residents and general public for fishing and boating purposes. It is the interest of this plan to enhance the beauty of the shoreline and keep the surroundings esthetically pleasing.

f. Easements.-- All outgrants, including easements for roads and utility lines, will be processed on an individual case basis. The policy of attempting to have roads and utility lines located on privately owned lands will be adhered to. Flowage easement acquired provides for periodic inundation by reservoir waters and no building for human habitation to be constructed on flowage easement lands. The written consent of the District Engineer shall be obtained for the type and location of any structure and for appurtenances thereto now existing or to be erected or constructed on flowage easement land.

#### VI - COORDINATION WITH OTHER AGENCIES

6-01. General.-- The Flood Control Act (see paragraph 1-02) provides that recreational development of reservoir areas under the control of the Department of the Army shall be in the public interest and that preference for management and development of areas suitable for recreational purposes shall be given to Federal, State and local governmental agencies. Throughout the period of investigations and studies made in preparation of the original master plan, these agencies were contacted during the planning stage.

6-02. This updated plan of development has not been coordinated with other Federal, State or local governmental agencies; however, it is considered that the plan is in consonance with the policies and comments stated by these agencies when the original master plan was developed. Liaison will be maintained with these agencies to insure that recreational development at the project is in the best public interest.

6-03. National Park Service.-- On 14 and 15 March 1950, representatives of the Region Three office, National Park Service, and the Corps of Engineers reconnoitered the Canyon Reservoir area to evaluate the recreational potential of the project. The National Park Service submitted a report on this survey in April 1950, copies of which are incorporated in the original master plan dated September 1961 as appendix I and are on file in the Fort Worth District office. The Service, in its report, made the following comments and recommendations:

a. The reservoir will offer considerable appeal for recreation including day, weekend and, to some extent, vacation uses, and it is not believed that the proposed plan of reservoir operation would be especially detrimental to such values.

c. Recreational use made of the chain of reservoirs on the nearby Colorado River is indicative of recreational needs in this part of the state, and it is concluded that opportunities offered by the Canyon Reservoir will complement the values of the existing reservoirs.

d. It is found that no National Park Service area, or interest, or any state park will be affected by the Canyon Reservoir project.

e. It is recommended that the recreational potential of the Canyon Reservoir be accorded consideration commensurate with its importance in planning integrated reservoir area utilization.

6-04. Public Health Service.- In October 1958, the Department of Health, Education and Welfare, Public Health Service, Communicable Disease Center, in cooperation with the Texas Department of Public Health, submitted a report entitled, "Revised Evaluation Report on Vector Problems Related to the Corps of Engineers Canyon Reservoir Project, Guadalupe River, Texas." A copy of the report is incorporated in this design memorandum as appendix II since a copy was not incorporated in the original master plan, Design Memorandum No. 9B. The Service's recommendations for vector control were reservoir clearing, water level management, and entomologic surveillance.

6-05. Fish and Wildlife Service.- In February 1960, the Bureau of Sport Fisheries and Wildlife of the U. S. Fish and Wildlife Service, with the concurrence of the Texas Game and Fish Commission (now the Texas Parks and Wildlife Department), submitted a report on the fish and wildlife resources of the Canyon Reservoir, copies of which were incorporated in the original master plan dated September 1961 as appendix II and are on file in the Fort Worth District office. A synopsis of the Service's findings and recommendations is included in this report as appendix III. The Service's report included seven recommendations. Five of the seven recommendations have, in general, been complied with. Recommendations 4 and 6 have not been complied with. The three areas downstream from the dam were not acquired by the Federal Government. The Federal Government acquired interest in land required for the operation and maintenance of the project, and for public use.

6-06. State agencies.- The Texas State Parks Board submitted a letter in April 1959 expressing an interest in leasing an area for development as a state park; however, a final lease agreement was never consummated.

6-07. Local agencies.- During 1960, the city of New Braunfels and Comal County and the city of San Marcos and Hays County expressed an interest in leasing all or a portion of several of the areas selected

for the purpose of the project. The project was never consummated with any of the above-mentioned areas.

The project was also approved by the Texas State Board of Military Installations and the Texas State Board of Land and Water. See table 1 for details of the project.

The project was also approved by the Texas State Board of Land and Water. On 11 August 1961, a public hearing of about 15 people, which included representatives of various federal, State, and local governmental agencies and interested individuals. The purpose of the hearing was to inform the public of the location and extent of the areas selected for development for public use, the proposed plan of recreation development, and to secure information relative to the extent that State and local governmental agencies would desire to participate in the development and operation of the recreational facilities and activities in the interest of the general public. Copies of the transcript of the public hearing were incorporated in the original master plan dated September 1961 and are on file in the district office.

#### VII - SPECIAL FEATURES

7-01. General.-- There are specific project features that require special consideration because of their relationship to recreation and resource development.

7-02. Project clearing.-- The plan for clearing the reservoir was presented in Design Memorandum No. 8, based on criteria outlined in EM 415-2-301, dated 1 June 1959. Horizontal clearing was accomplished within one mile of the upstream face of the dam and appurtenant structures and one-half mile of each recreation area, except over the steep slopes within these units. The vertical limits of clearing were between elevations 909.0, top of conservation pool, and 875.0, five feet below the 10-year drawdown. Trees located below elevation 875.0, but extending above this elevation, were topped at or below elevation 875.0, or felled at the option of the contractor. Some selective clearing was also accomplished above elevation 909.0 in the areas to be developed for public use where the timber growth was dense, especially the underbrush. About 4,980 acres were cleared under this plan. A mosaic showing the limits of clearing is shown on plate 4.

7-03. Project excavation requirements for recreation and resource development.-- The proposed future marina concession sites in Potters Creek and Comal Parks will require some excavation prior to developing marinas. Determination will be made prior to advertising the proposed leases as to whether the excavation will be accomplished by the Corps of Engineers or be the responsibility of the successful bidders. All excavation will be in accordance with the provisions of Public Law 91-190.

7-04. Documentation.-- Documents are being set along the Government's fee acquisition line and iron pins at strategic locations along the flowage easement line in order to improve administration of the lands over which the Government has acquired fee title or a lesser interest.

7-05. Fencing.-- Fencing will be provided where necessary for safety purposes. Any additional fencing of Government-owned land on leases for grazing purposes or to protect new vegetative plantings. Fencing required in connection with outgrants for grazing purposes will be stated in the leases. Fencing required to protect new vegetative plantings will be included in the cost of the proposed vegetative program and accomplished by the Corps of Engineers.

7-06. Subimpoundments.-- There are no subimpoundments on the Government-owned land that are suitable for improvement in the interest of fish and wildlife programs or that will require drainage for safety or other justifiable reasons.

7-07. Beautification.-- Beautification will be considered in facility design, excavation and spoil areas, clearing, development and improvement of facilities, landscaping and planting plans.

7-08. Fees and charges.-- For information on fees and charges, see table 7.

## VIII - POLICIES, ADMINISTRATION, AND MANAGEMENT

8-01. Policies.-- The policies regarding the administration and management of the project are formulated to make the majority of the lake and the Government-owned land available to the visiting public to the fullest extent compatible with an orderly and planned development. These policies control the administration, management, and development of the project area but will not conflict with the operation of the project for its authorized purposes. They will be based on legislation enacted by Federal, State and local governmental agencies and experience gained in the operation and development of similar projects, public parks, etc.

8-02. Administration and management.-- The administration and management of the project is accomplished jointly through the district office and field personnel of the Fort Worth District.

a. District office.-- District office personnel are principally concerned that the project is operated and managed in accordance with the purposes for which it was authorized; the nature, extent, location, construction codes, and requirements of development and improvements; coordination and reconciliation of activities relative to policies and regulations; relations with representatives of other agencies and individuals; processing of leases, licenses, and permits not delegated to field personnel for issuance; and public relations.

TABLE 1  
FEES AND CHARGES

<u>Authorization</u>	<u>Type</u>	<u>Dates Applicable</u>	<u>Park</u>	<u>Amount</u>
Section 210 of the Flood Control Act of 1968 (Public Law 90-483)	Camping (user fee)	26 June through 7 September 1970	Canyon	\$1.00 per night per vehicle

b. Field office.- The field personnel are trained in the rudiments of activities that are favorable to the operation and maintenance of the project. Some of these are fire control, vector control, safety, etc. Sufficient materials and equipment are available at the project for the field personnel to conduct these activities when the conditions demand. The reservoir manager assigned responsibility for all field activities has been delegated as much authority as is practicable in order to maintain expeditious and beneficial administration and management of the project. He has been furnished with copies of all rules and regulations pertaining to maintenance and management of the project, including a manual outlining his procedures, policies, responsibilities and duties. (See Chapter 3 of SWDR 1130-2-7).

c. Law enforcement.- Enforcement of civil and criminal laws at the project will remain the responsibility of duly constituted officers of Federal, State and local governmental agencies. The Corps of Engineers, through the reservoir manager and his assistants, have and will continue to cooperate fully with law enforcement officers who are responsible for enforcement of civil actions, game and fish conservation, public health and sanitation, and prevention of pollution.

d. Rules and regulations governing public use.- Basic rules and regulations governing public use of this reservoir area were prescribed by the Secretary of the Army and published in the Federal Register dated 4 May 1962. They are incorporated as Title 36, Chapter III, Part 311, Code of Federal Regulations. They have been supplemented by the District Engineer. Printed copies of the rules and regulations and project pamphlet maps are readily available at the project office. (See Chapter 29 and Exhibit A of SWDR 1130-2-7).

e. Water Safety Act.- In May 1959, the state of Texas enacted a law to promote safety for persons and property in and connected with the use, operation and equipment of vessels and to promote uniformity of laws. Copies of the Water Safety Act are available from the Texas Parks and Wildlife Department.

f. Access by adjoining landowners.- The type of use which may be permitted falls into two categories: permits and easements or licenses. (See Chapter 23 of SWDR 1130-2-7).

g. Boating.- Boat permits are required for some floating craft. (See Chapter 5 of SWDR 1130-2-7).

h. Signs.- Signs will be constructed and installed in accordance with instructions outlined in ER 1130-2-312 and Handbook on Signs issued by the Southwestern Division.

8-03. Mooring policy.- During November 1963, the District Engineer adopted a mooring policy for this project. It restricts the placement of

privately owned boathouses, boat docks, and barges on the impounded water and also prohibits the construction or placement of piers in the reservoir area. This policy was adopted to protect and preserve the scenic attractiveness of the area and the shoreline for public use and access. Individuals desiring to place floating equipment on the impounded water are required to make prior arrangements with authorized commercial concessionaires or yacht clubs to store and care for such equipment. They are also required to obtain a permit from the reservoir manager for boats not registered by the state prior to placing the floating facility on the impounded water for a period in excess of three days.

8-04. Fire control.- A fire control plan has been developed by the reservoir manager and burning will not be authorized or permitted on the project lands without his approval and supervision. Local volunteer fire departments at Canyon City and Startzville have agreed to assist in the suppression of fires on the project area. Fire departments from New Braunfels, San Marcos, and Boerne will also assist when necessary. Fire departments from the Fourth Army and Randolph Air Force Base in or near San Antonio will also assist when needed.

8-05. Vegetative cover.- The principal grasses native to this region, known as the Edwards Plateau and Blacklands, are big and little bluestem, indiagrass, grama switchgrass, dropseeds, buffalograss and Texas wintergrass. Where the grasses have been overgrazed, annual weeds, less desirable grasses, and woody plants are growing. Bermudagrass and Johnsongrass prevail around the reservoir area, especially where cultivation was practiced. The native woodlands consist of oak, hackberry, elm, mesquite, cottonwood, cedar and pecan timber.

8-06. Vector problem and control.- The Public Health Service in a revised report dated October 1958 advised that malaria is not known to be a public health problem in Comal County, but cases of encephalitis among horses were reported in Comal County in 1948 and 1949. Mosquito inspections have been made to determine the status of mosquito production associated with the project. To date, the count of disease carrying mosquitos has not been of sufficient number to require control methods. If such counts occur, control methods will be initiated.

8-07. Obnoxious weed control.- Obnoxious weeds have not created a problem to date, probably due, in part, to the short periods of freezing weather each winter and the natural turbidity of the water. If such types of plants become a problem, a control program will be initiated.

8-08. Land and water zoning.-

a. The land area has been zoned for allocation to the various priority uses.

b. The water area has been zoned and buoys placed which limit the speed of watercraft to five miles per hour in some of the coves, in the commercial concession sites, and adjacent to portions of the public use areas. Buoys have been and will be placed at designated swimming beaches.

c. Zoning for special events of short duration will be permitted after approval of the reservoir manager.

8-09. Safety measures.- Safety programs and measures have been administered in accordance with instructions incorporated in the Operation and Maintenance Manual and SWDR 1130-2-7.

## IX - JUSTIFICATION FOR DEVELOPMENT

9-01. Economic effect.- Prior to the construction of the project there was considerable fishing in the Guadalupe River by local residents, as well as visitors. A large number of cottages had been constructed adjacent to the Guadalupe River between the Canyon Dam site and New Braunfels. This was attributed to the scenic and wildlife aspects of the area, as well as the pleasant climate. Although recreational activities such as resorts, fishing camps, etc. had been developed along the river, the development of a reservoir type fishing and recreation areas was in great demand. The influx of permanent and vacation visitors has increased business activities and enhanced property values in the immediate vicinity of the project, as well as along the Guadalupe River below the dam site. A large amount of land above the Government acquisition line has been subdivided on which both permanent homes and vacation cottages have been constructed.

9-02. Benefits.- The benefits that will be derived by the visiting public from the use of the Government-owned land, the facilities developed for recreational activities, and the impounded water will be in the form of pleasure and relaxation. Recreational benefits have more monetary benefits to certain individuals than to others, depending upon the individual's recreational interests, ability, and willingness to pay for recreational activities. Computation of benefits is as follows:

### Recreation

General - 2,010,000 visitors @ \$1.00 =	\$2,010,000
Sport fishing and hunting	
Sport fishing - 190,000 man-days @ \$1.50 =	285,000
Waterfowl - 100 man-days @ \$6.00 =	600

### Fish and wildlife

Commercial fishing - 10,000 lbs @ \$0.10 =	1,000
--	-------

Wildlife and nature study areas

All 'other' visitors - 40,000  
3% will use area, equals 1,200 @ \$1.00 = \$ 1,200

Total annual benefits 2,297,800

9-03. Personnel requirements.- The full or part time services of the personnel shown in the following tabulation will be required for recreation and resource management.

Reservoir manager, GS-11  
Clerk-typist, GS-05

Public use

Reservoir recreation specialist, GS-09  
Biologist, GS-09  
Reservoir ranger, GS-07  
Two reservoir rangers, GS-05

Operation and maintenance

Dam equipment lead foreman, WS-05  
Four equipment repairers, WB-07  
Six reservoir construction and maintenance workers (T), WB-03  
Four laborers (T), WA-03  
Seasonal laborers, as required

X - CONCLUSIONS AND RECOMMENDATIONS

10-01. Conclusions.- The plan of development presented herein has not been coordinated with representatives of local interests, state or other Federal officials; however, it is believed that it complies with their expressions made at the public hearing and reports submitted either prior or subsequent to the hearing.

10-02. The plan of development and management as presented herein complies with requirements of the Flood Control Act of 22 December 1944, as amended, and existing policies adopted and instructions issued by higher authority.

10-03. Recommendations.- It is recommended that the updated master plan as presented herein involving development for public use and land management be approved.

JOB PROGRESS REPORT

As required by

FEDERAL AID IN FISHERIES RESTORATION ACT

TEXAS

Federal Aid Project No. F-2-R-16

REGION 2-B FISHERIES STUDIES

Job No. E-9: Evaluation of Catchable Rainbow Trout Fishery

Project Leader: Richard L. White

J. R. Singleton  
Executive Director  
Texas Parks and Wildlife Department  
Austin, Texas

Marion Toole  
D-J Coordinator

Eugene A. Walker  
Director, Wildlife Services

October 7, 1969

APPENDIX I

#### Abstract

A total of 7,000 rainbow trout was stocked in the tailrace waters of Canyon Reservoir, Comal County, Texas in the spring of 1968. Creel census operations indicated an angler harvest of 35 per cent of the number stocked. Water quality studies and bottom sampling indicated the continuance of the area as suitable trout habitat. Fishermen harvest of 3,000 trout stocked in the late fall of 1968 was about 30 per cent.

Despite the per cent harvest being lower than previous years (owing to high water releases from the reservoir hindering fishermen efforts) the fishery was still felt to be quite successful. Project personnel recommend that it be continued.

## Job Progress Report

State of Texas

Project No. F-2-R-16

Name: Region 2-B Fisheries Studies

Job No. E-9

Title: Evaluation of Catchable Trout Fishery

Period Covered: February 1, 1968 to January 31, 1969

### Background:

In April 1966, rainbow trout, Salmo gairdneri, were purchased by the Lone Star Brewing Company, San Antonio, Texas, and stocked with the assistance of project personnel in the tailrace waters below Canyon Dam, Comal County, Texas. This action was instigated by the private concern after they had learned that the Canyon Reserve Project Report (February 1960 prepared by the Branch of River Basin Studies) indicated the possibility of the trout fishery in the cold tailrace waters below the dam. A 3-year stocking program including approximately 32,000 catchable trout donated by Lone Star Brewing Company ended with the May 1968 stocking of 7,000 fish. Evaluation through creel census of the 1967 stocking indicated a 59 per cent harvest of the trout. The initiation of this trout fishery provided better than 10,000 man hours of fishing in a 7-month period in an area where heretofore it would have been less than 500 man hours for the same period of time. The increased fishing pressure also provided an economic boost of over \$10,000 per year for the immediate area in terms of fishing tackle, bait, food, etc., purchased.

Water quality studies, bottom fauna studies, and monthly sampling of the trout indicated that the tailrace continued to provide suitable trout habitat.

Further background on this project may be found in Job Progress Report E-9, Project No. F-2-R-15, Evaluation of Catchable Rainbow Trout Fishery, 1968.

### Objectives:

1. To determine the per cent of return of stocked fish.
2. To determine the length of time a plant of trout contributes to the fishery.
3. To determine the average catch per man hour of fishing.
4. To determine the average catch per fishing trip.
5. To determine the average length of time per fishing trip.
6. To determine the economic factors involved, namely, the value of the returns.
7. To determine through water quality studies the continuance of Canyon Dam Tailwaters to provide suitable trout habitat.

8. To determine through bottom sample studies the available food supply for a trout population.
9. To determine the utilization of available food by the trout.

#### Procedures:

Approximately 7,000 eight to nine-inch rainbow trout were fin-clipped (right pelvic) by project personnel on a trip in May 1968 to the Amyx Trout Farm, Rockbridge Missouri. The trout were held at the hatchery for 26 days to observe any mortality or disease outbreak. Malachite green was flushed through the raceways 4 times during this period to inhibit disease and fungus. Twenty-six fish died in the raceways during this period.

On May 27, 1968 approximately 3,500 trout were stocked in the Canyon tailrace and a like number were stocked on May 30, 1968. Figure 1 illustrates the trout stocking stations over the 8.9-mile area.

Creel census operations began immediately and each drop site was checked every 2 hours from dawn until dusk. A creel census card, Figure 2, was filled out on each fisherman and a post card, Figure 2a, was also given to him to fill out and mail in at the end of the fishing day. This post card method allowed project personnel to compile total catch on the fishermen who left the area between creel census rounds. The creel census was conducted for 5 consecutive days and 2 consecutive weekends following each drop, with creel checks every other weekend thereafter.

In conjunction with the creel census, an economic evaluation sheet, Figure 3, was filled out on every tenth fisherman. This procedure was included to determine what the trout fishery lent to the economy of the immediate area.

Limited bottom sampling was carried out on the tailrace area to determine available food for the trout. High water impeded more extensive bottom sampling. The samples were preserved in 70 per cent alcohol solution and returned to the San Marcos Laboratory for identification.

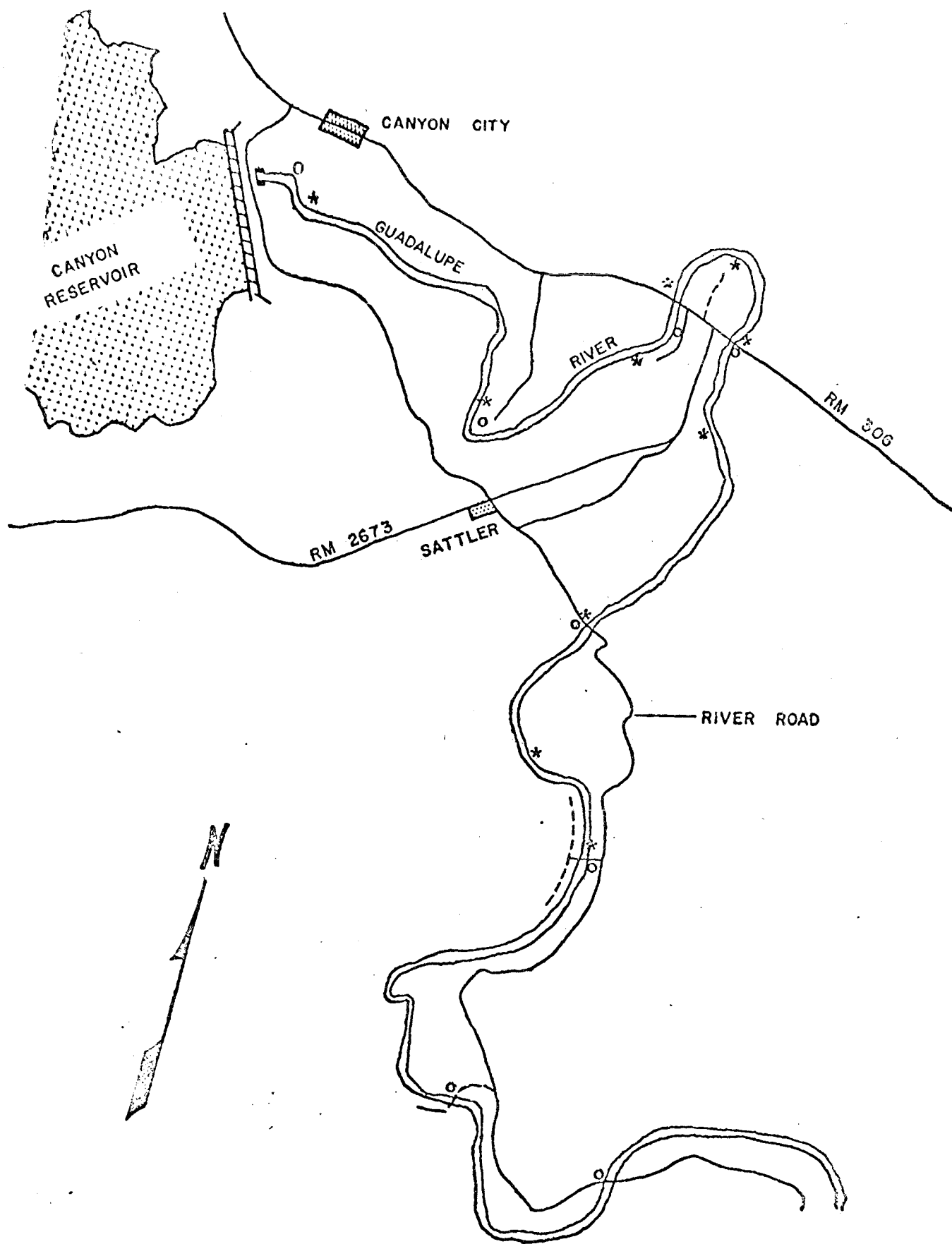
Water quality studies were periodically run on the tailrace in order to determine the continuing suitability of water for trout. Dissolved oxygen, carbon dioxide, alkalinity, and temperature were recorded.

#### Findings:

Creel census procedures and compilations used in this report are described in Job E-9, F-2-R-15, Evaluation of Catchable Rainbow Trout Fishery.

The total harvest estimate was obtained by the regression method described by Leslie and Davis (1939) which is based on the principle that population size can be estimated from the day to day decline in catch per unit of effort as the population size decreases. In the application of this method, daily catch per man hour (Y axis) has been plotted against cumulative catch (X axis) of marked fish.

FIGURE 1.



\* drop sites

DEPARTMENT OF HEALTH, EDUCATION AND WELFARE  
PUBLIC HEALTH SERVICE-COMMUNICABLE DISEASE CENTER  
ATLANTA, GEORGIA

REVISED EVALUATION REPORT ON VECTOR PROBLEMS  
RELATED TO THE CORPS OF ENGINEERS  
CANYON RESERVOIR PROJECT  
GUADALUPE RIVER, TEXAS

OCTOBER 1958

REPORT PREPARED BY COMMUNICABLE DISEASE CENTER  
IN COOPERATION WITH THE  
TEXAS STATE DEPARTMENT OF HEALTH

SPONSORED BY THE U. S. ARMY DISTRICT, FORT WORTH  
CORPS OF ENGINEERS  
DEPARTMENT OF THE ARMY

APPENDIX II

REVISED EVALUATION REPORT ON VECTOR PROBLEMS  
RELATED TO THE CORPS OF ENGINEERS  
CANYON RESERVOIR PROJECT  
GUADALUPE RIVER, TEXAS

This second revised evaluation report regarding vector problems associated with the Canyon Reservoir project is based on a written request from the Fort Worth District, Corps of Engineers. The first revised vector control report for this project, entitled "Revised Reconnaissance Malaria Survey Report on the Proposed Canyon Reservoir on the Guadalupe River in Texas," was submitted in May 1950.

Status of Project

Construction of the Canyon Reservoir project was initiated during April 1958.

Location

The Canyon Dam site is located at river mile 303.0 on the Guadalupe River about 12 airline miles northwest of New Braunfels, Texas. The reservoir will be within the limits of Comal County, Texas.

Purposes of Project

The Canyon Reservoir will be operated for the control of floods, water conservation, and other beneficial uses.

Proposed Operation of Reservoir

The proposed plan of operation for the reservoir would maintain the water level at the top of the conservation pool (elevation 909) insofar as practicable. Floods would raise the water surface above this elevation and droughts would **tend** to lower the elevation of the pool. It is estimated that the maximum flood of record superimposed on a full conservation pool would result in the water surface in the reservoir reaching approximate elevation 943, the spillway crest. A recurrence of the most severe dry period of record probably would result in a drawdown of 109 feet below the top of the conservation pool to elevation 800.

Development of Public Use Areas

Six areas have been selected for development for public use and access -- No. 1 in the vicinity of the dam site; Nos. 2, 3, and 4 on the north shore; and Nos. 5 and 6 on the south shore.

## VECTOR PROBLEMS

### Malaria

Malaria is not known to be a public health problem in Comal County. The malaria mosquito (*Anopheles quadrimaculatus*) is an uncommon species in the region.

### Encephalitis

Cases of encephalitis among horses were reported in Comal County in 1948 and 1949, according to records of the U. S. Department of Agriculture. The encephalitis mosquito -- Culex tarsalis -- is known to occur in the region.

## ANTICIPATED EFFECTS OF PROJECT UPON VECTOR PROBLEMS

It is unlikely that the Canyon Reservoir project will create malaria or encephalitis hazards of any great significance. However, as a public health safeguard, it would seem a wise course of action for the Corps of Engineers to carry out a few preventative measures. These measures are outlined below.

## RECOMMENDATIONS FOR VECTOR CONTROL

1. Reservoir clearing.-- For mosquito control, it would be helpful to clear the normal summer fluctuation zone where the reservoir areas are within  $\frac{1}{4}$  mile of a populated area (including recreational areas).
2. Water level management.-- An over-all seasonal recession of the pool level -- beginning about July 1 and extending into September -- would benefit mosquito control.
3. Entomologic surveillance.-- Postimpoundage mosquito inspections should be made to determine the status of mosquito production associated with the project. Upon request, the Texas State Department of Health and the Public Health Service will be pleased to cooperate with the Corps of Engineers in conducting a postimpoundage mosquito survey.

Bureau of Sanitary Engineering  
Texas State Department of Health  
Austin, Texas

State Aids Section  
Technology Branch  
Communicable Disease Center  
U. S. Public Health Service  
Atlanta, Georgia

October 1958



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
BUREAU OF SPORT FISHERIES AND WILDLIFE

P. O. BOX 1306

ALBUQUERQUE, NEW MEXICO

February 3, 1960

SOUTHWEST REGION

(REGION 2)

ARIZONA

COLORADO

KANSAS

NEW MEXICO

OKLAHOMA

TEXAS

UTAH

WYOMING

ADDRESS ONLY THE  
REGIONAL DIRECTOR  
2-RBS

District Engineer  
Corps of Engineers, U. S. Army  
P. O. Box 1600  
Fort Worth, Texas

Dear Sir:

This is a synopsis of my report on the relation of fish and wildlife resources to the construction of Canyon Reservoir, Texas. The report was prepared under authority of the Fish and Wildlife Coordination Act, 48 Stat. 401, as amended; 16 U.S.C. 661 et seq. Detailed material is presented in the attached report.

This report has been reviewed by the Texas Game and Fish Commission. The report and, specifically, the recommendations which follow have been endorsed by the Texas Game and Fish Commission as indicated in the letter to this office dated January 28, 1960, from H. D. Dodgen, Executive Secretary of that Commission, a copy of which is appended.

Canyon Reservoir is being constructed for the purposes of flood control and storage of water for municipal, industrial, and possible future irrigational uses. The dam will be on the Guadalupe River in Comal County at river mile 303. About 11,800 acres of land will be purchased in fee simple. Flowage easement will be taken on about 3,200 acres between elevations 918-948. Most of the affected bottom land is in cultivation. The remaining reservoir area is used for grazing. Maximum releases from the reservoir will be 3,000 second-feet; minimum releases will be zero. The Guadalupe-Blanco River Authority has indicated that a constant minimum release of 100 to 200 second-feet would be made during normal water years.

Canyon Reservoir lies in an area where there is a shortage of public fishing facilities and where people must travel long distances to secure reasonable fishing opportunities. Fishing pressure on the affected reach of the Guadalupe River will result in about \$40,000 annually in associated sportsmen's expenditures.

Canyon Reservoir will eliminate a short segment of stream fishery in the Guadalupe River within the project area, improve the downstream fishery, possibly produce a rainbow trout or smallmouth bass habitat in the 10-mile reach of stream downstream from the dam, and create a reservoir-type fishery which is in great demand in the area. It is estimated that fisherman use

of the river below the dam will result in sportsmen's expenditures of about \$200,000 annually if a trout fishery develops. Sportsmen's expenditures associated with reservoir fishing will be about \$2,000,000 annually.

White-tailed deer and wild turkeys are of economic importance in the project area. Demands to hunt these species are far greater than hunting opportunities. Sportsmen will spend about \$30,000 and \$4,000, respectively, for deer and turkey hunting annually within the reservoir area. Except for a sportsmen's expenditure of about \$2,000 annually for dove hunting, upland-game hunting is of minor importance.

Construction of Canyon Reservoir is expected to result in complete loss of deer and turkey populations and hunting opportunities for these species in the project area. Losses to mourning dove populations will also occur. From sportsmen's expenditures associated with hunting wildlife in the project area, there will be an annual loss of \$31,000 as a result of the project.

The fish and wildlife plans recommended for the project include features designed to provide maximum benefits to fish and mitigate wildlife losses as a result of project construction. Enhancement to the fishery can be attained by providing a constant minimum release into the stream downstream from the dam, by stocking rainbow trout on a put-and-take basis in this reach, and by providing access areas to the downstream fisheries and parking facilities around the reservoir. The exact amount of release required can only be determined when the project is completed and put into operation, but a minimum release of 150 second-feet is deemed necessary to maintain a satisfactory trout fishery. Losses to wildlife can be partially mitigated through acquisition in fee simple of lands peripheral to the reservoir.

It is recommended:

- (1) That 8 parking areas, as shown on plates 2 through 6, and three access areas, as shown on plates 7 through 9, be purchased in fee simple and included as nonreimbursable project costs.
- (2) That boat-launching ramps be constructed at each proposed parking and downstream access area and also included as nonreimbursable project costs.
- (3) That a minimum instantaneous release of 150 second-feet or the natural inflow of the river, whichever is less, be provided at Canyon Dam.
- (4) That three access areas downstream from the dam be made available to the Texas Game and Fish Commission under a General Plan, as provided in Section 3 of the Fish and Wildlife

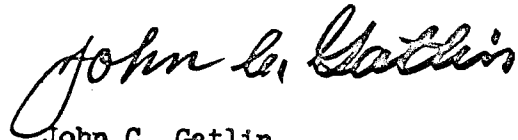
Coordination Act, 48 Stat. 401, as amended; 16 U.S.C. 661 et seq.

(5) That timber clearing in the reservoir area be kept to a minimum, except for clearing in parking and boat-launching areas and for construction and efficient operation of the project. Clearing in the downstream access areas should be limited to understory vegetation.

(6) That land acquisition policy take into consideration the mitigation of wildlife losses through purchase in fee simple, to the maximum extent practicable, of lands peripheral to the reservoir.

(7) That Federally owned land that is not within the wildlife management area be open to free public use, except for sections reserved for safety, efficient operation, and protection of public property.

Sincerely yours,

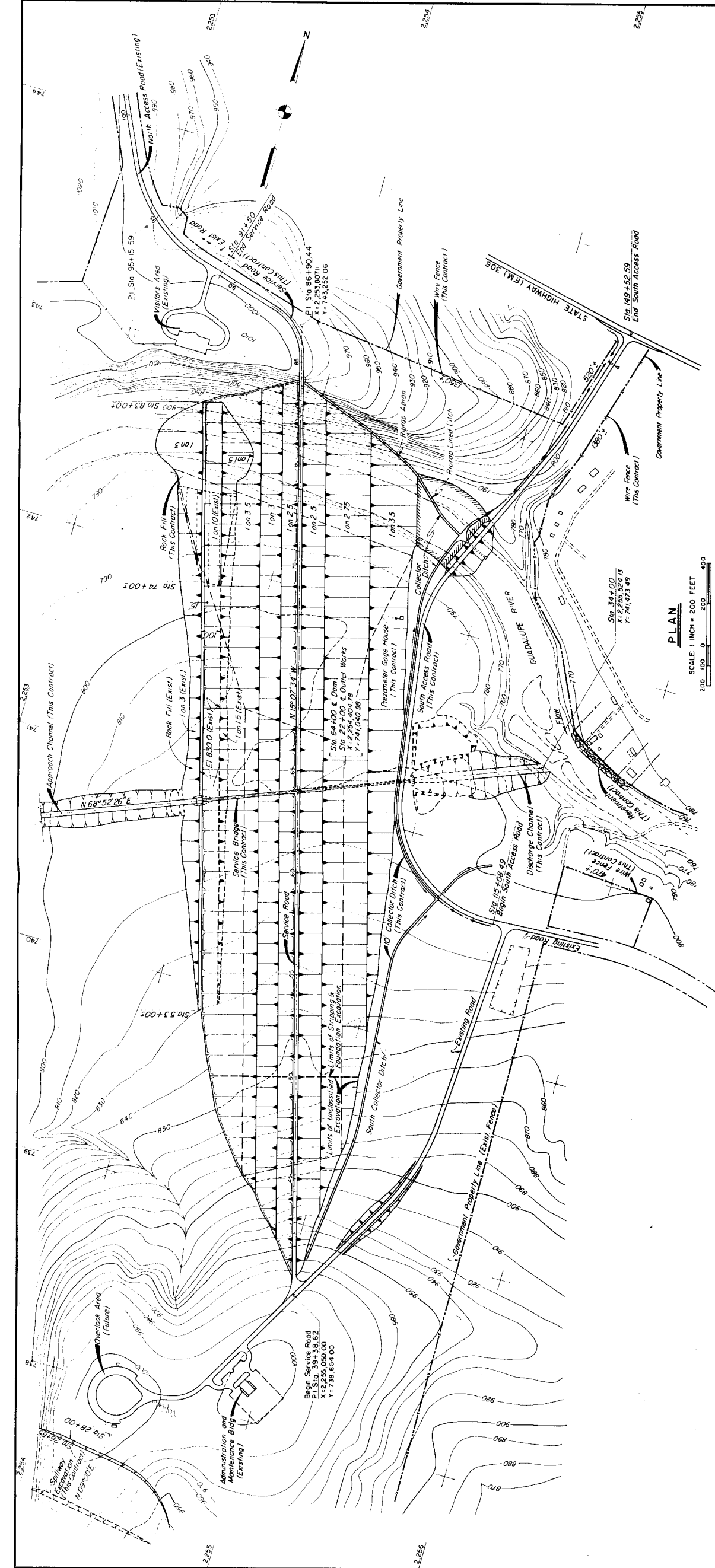


John C. Gatlin  
Regional Director

Copies (10)

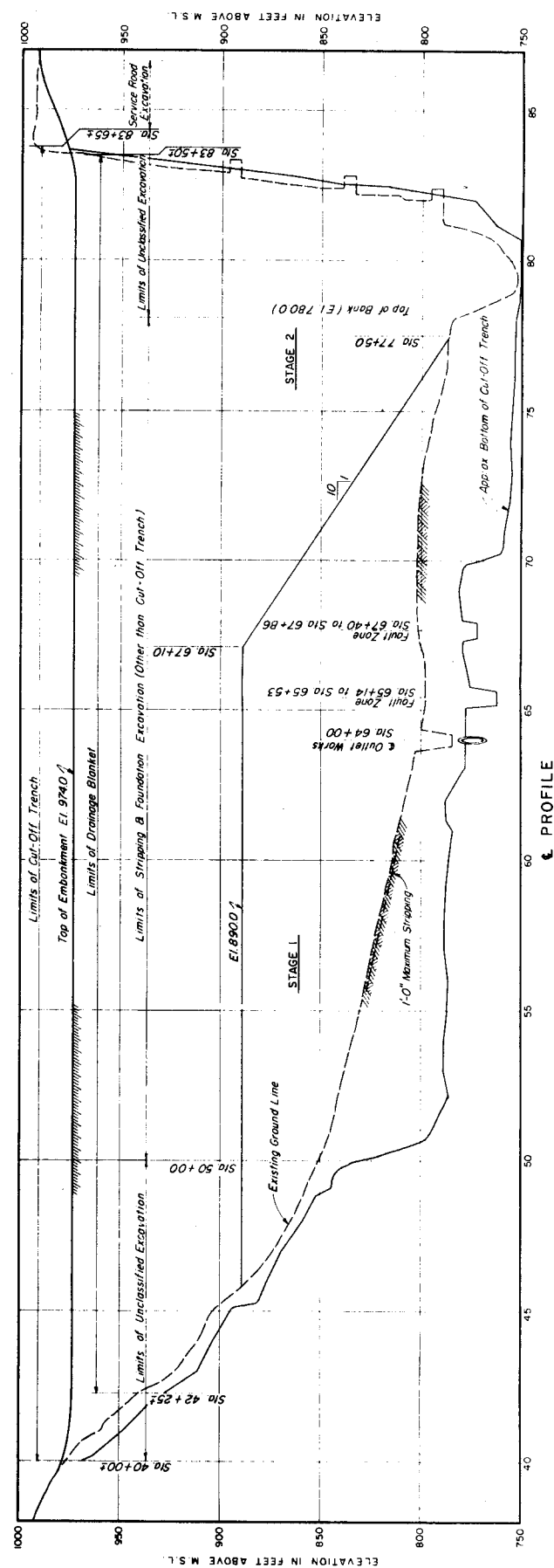
Distribution:

- (2) Executive Secretary, Texas Game and Fish Commission, Austin, Texas
- (1) Director, Marine Laboratory, Texas Game and Fish Commission, Rockport, Texas
- (1) Regional Director, Region 5, Bureau of Reclamation, Amarillo, Texas
- (1) Regional Director, Region 3, National Park Service, Santa Fe, New Mexico
- (1) Regional Engineer, Region VII, Public Health Service, Department of Health, Education, and Welfare, Dallas, Texas
- (1) Commissioner, U. S. Study Commission - Texas, Houston, Texas



NOTE  
Fault zones at Sta 65+14 and Sta 67+40 and other fault zones encountered during excavation of the cutoff trench may require grouting (See Contract Specifications)

PLAN  
SCALE 1 INCH = 200 FEET



PROFILE  
SCALE 1 INCH = 20 FEET

GUADALUPE RIVER BASIN, TEXAS  
CANYON RESERVOIR  
GUADALUPE RIVER, TEXAS  
**EMBANKMENT**  
PLAN AND PROFILE

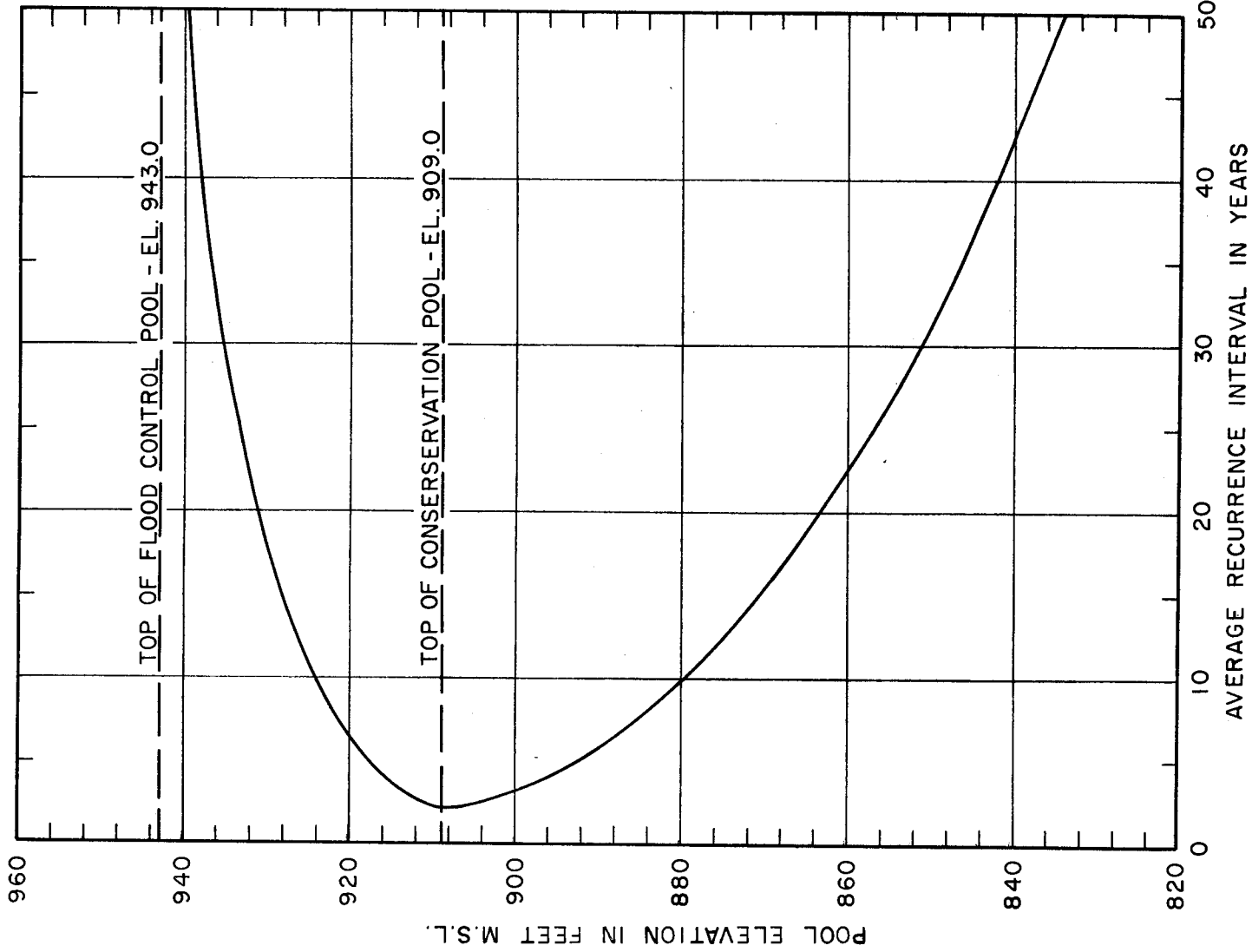
SCALE IN FEET  
200 0 200 400

U.S. ARMY ENGINEER DISTRICT, FORT WORTH  
TO ACCOMPANY DESIGN MEMORANDUM  
NUMBER 9C-MASTER PLAN (UPDATED)

SEPT. 1970

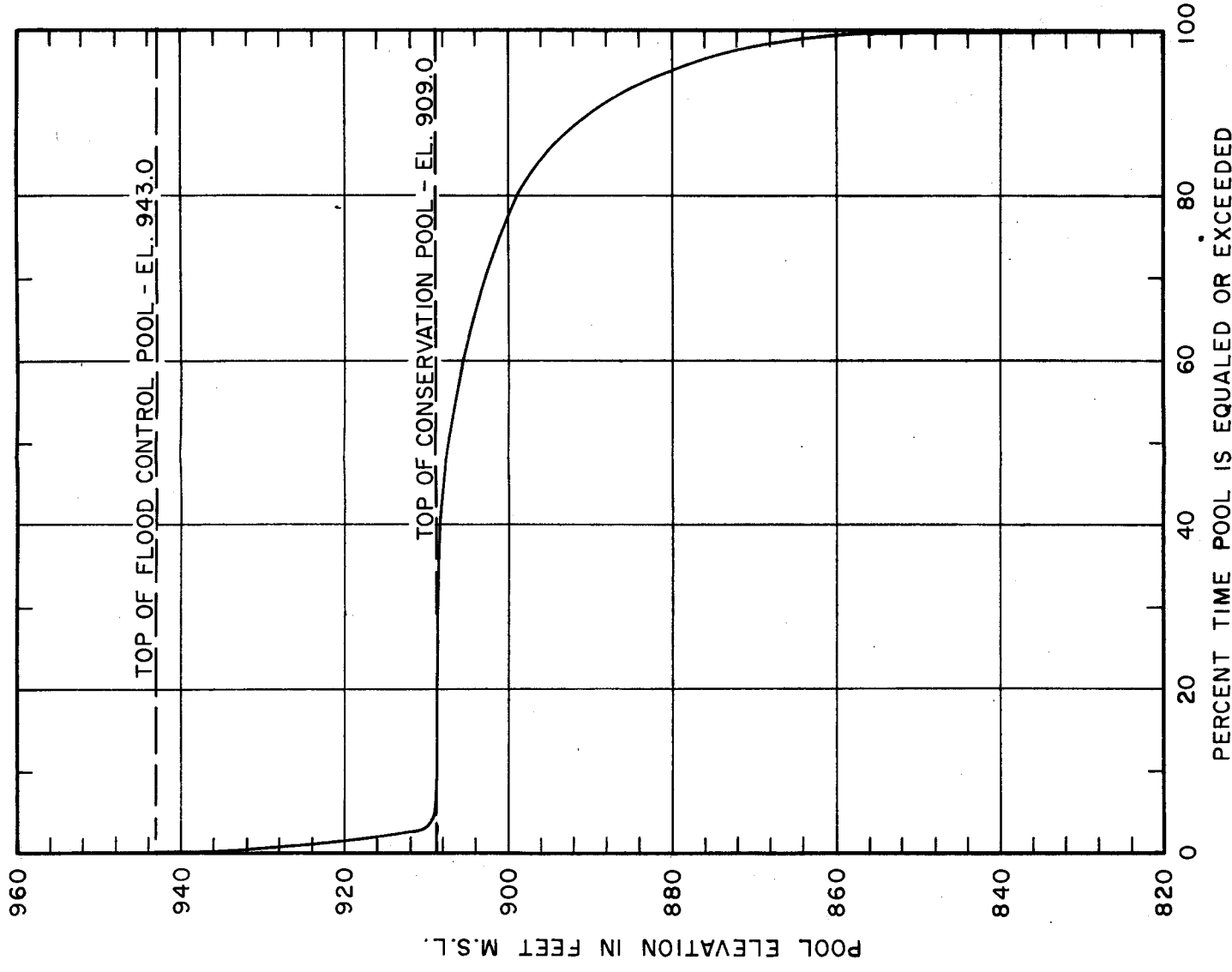
CONTINUED ON 9C-11-113-011-1 61 100

FILE: GUAD. 705-1 NO. 9C  
TO ACCOMPANY DESIGN MEMORANDUM NUMBER 9C-MASTER PLAN  
PLATE 1



NOTE:

CURVES BASED UPON HYPOTHETICAL RESERVOIR OPERATION DURING THE PERIOD FEBRUARY 1915 TO JUNE 1957 - MAXIMUM REGULATED RELEASE 3000 C.F.S. WHEN CONDITIONS WARRANT, OUTFLOW MAY BE REGULATED TO MAXIMUM OF 5000 C.F.S.



GUADALUPE RIVER BASIN, TEXAS  
CANYON RESERVOIR  
GUADALUPE RIVER, TEXAS

POOL ELEVATION

PROBABILITY AND DURATION CURVES

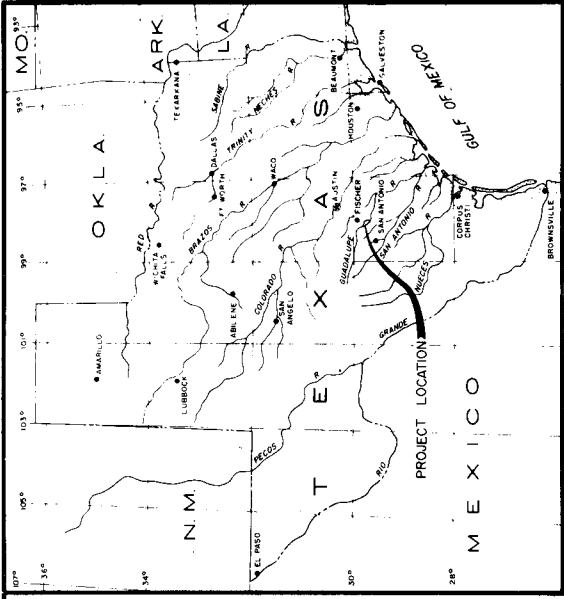
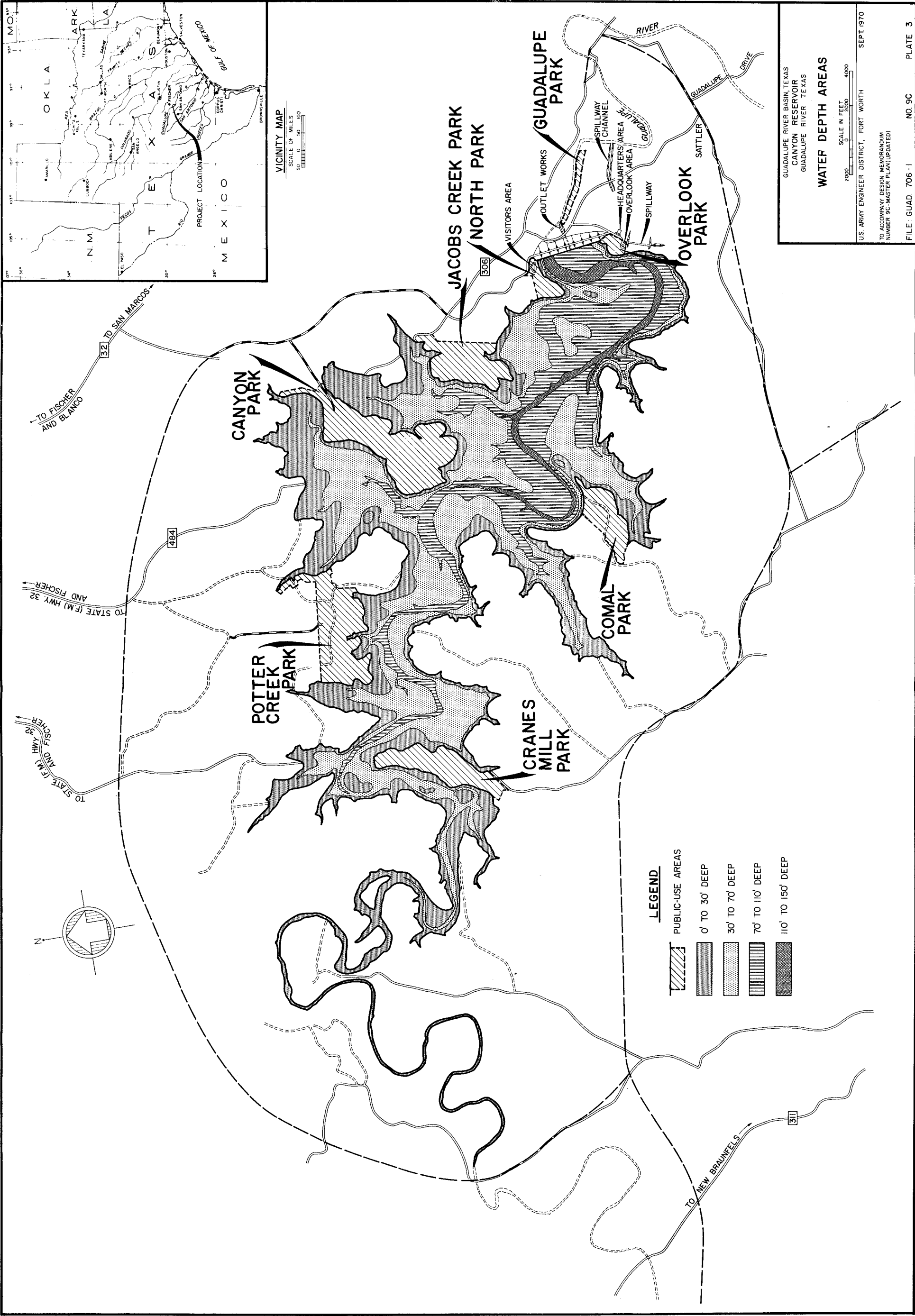
SCALE AS SHOWN

U.S. ARMY ENGR. DIST., FT. WORTH SEP. 1970

TO ACCOMPANY DESIGN MEMORANDUM NO. 9C -  
MASTER PLAN (UPDATED)

FILE: GUAD. 706-1 NO. 9C

PLATE 2



VICINITY MAP  
SCALE OF MILES  
0 50 100

**LEGEND**

PUBLIC-USE AREAS

- 0' TO 30' DEEP
- 30' TO 70' DEEP
- 70' TO 110' DEEP
- 110' TO 150' DEEP

GUADALUPE RIVER BASIN, TEXAS  
CANYON RESERVOIR  
GUADALUPE RIVER, TEXAS

**WATER DEPTH AREAS**

SCALE IN FEET  
0 2000 4000

U.S. ARMY ENGINEER DISTRICT, FORT WORTH  
SEPT 1970

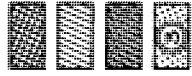
TO ACCOMPANY DESIGN MEMORANDUM  
NUMBER 9C-MASTER PLAN (UPDATED)

FILE: GUAD 706-1 NO. 9C PLATE 3



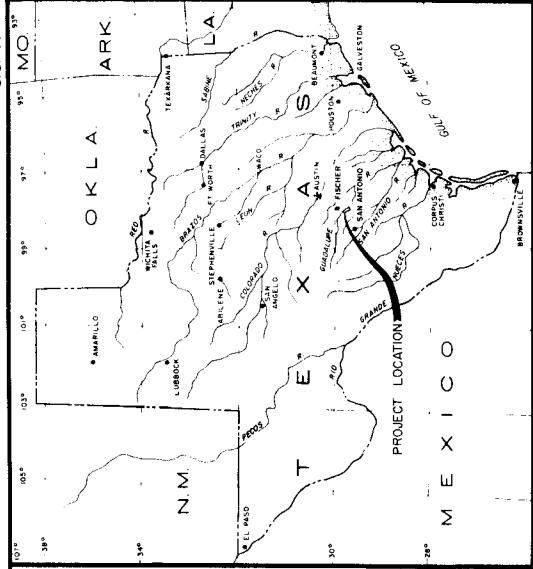
LEGEND

- TOTAL CLEARING  
BETWEEN EL. 2000 AND EL. 2500
- LIMITED CLEARING  
BETWEEN EL. 2500 AND EL. 3000
- AREAS WITHIN THE CLEARING LIMITS  
WHICH DO NOT REQUIRE CLEARING
- RECREATION AREA AND NUMBER
- TERMINATION RANGES (NOT IN THE CONTRACT)



SCALE IN FEET

U. S. ARMY ENGINEER DISTRICT, FORT WORTH	
DIVISION OF ENGINEERING	
FORT WORTH, TEXAS	
PROJECT: CANYON RESERVOIR	
SUBJECT: CANYON RESERVOIR	
DRAWN BY: [Signature]	
CHECKED BY: [Signature]	
DATE: 11-1-54	
GENERAL PLAN	
SHEET 1 OF 1	
DRAWN BY: [Signature]	
CHECKED BY: [Signature]	
DATE: 11-1-54	
GENERAL PLAN	
SHEET 1 OF 1	



VICINITY MAP

SCALE OF MILES  
0 50 100  
0 50 100  
0 50 100

LEGEND

C. OF E. PROJECTS

COMPLETED

UNDER CONSTRUCTION

AUTHORIZED

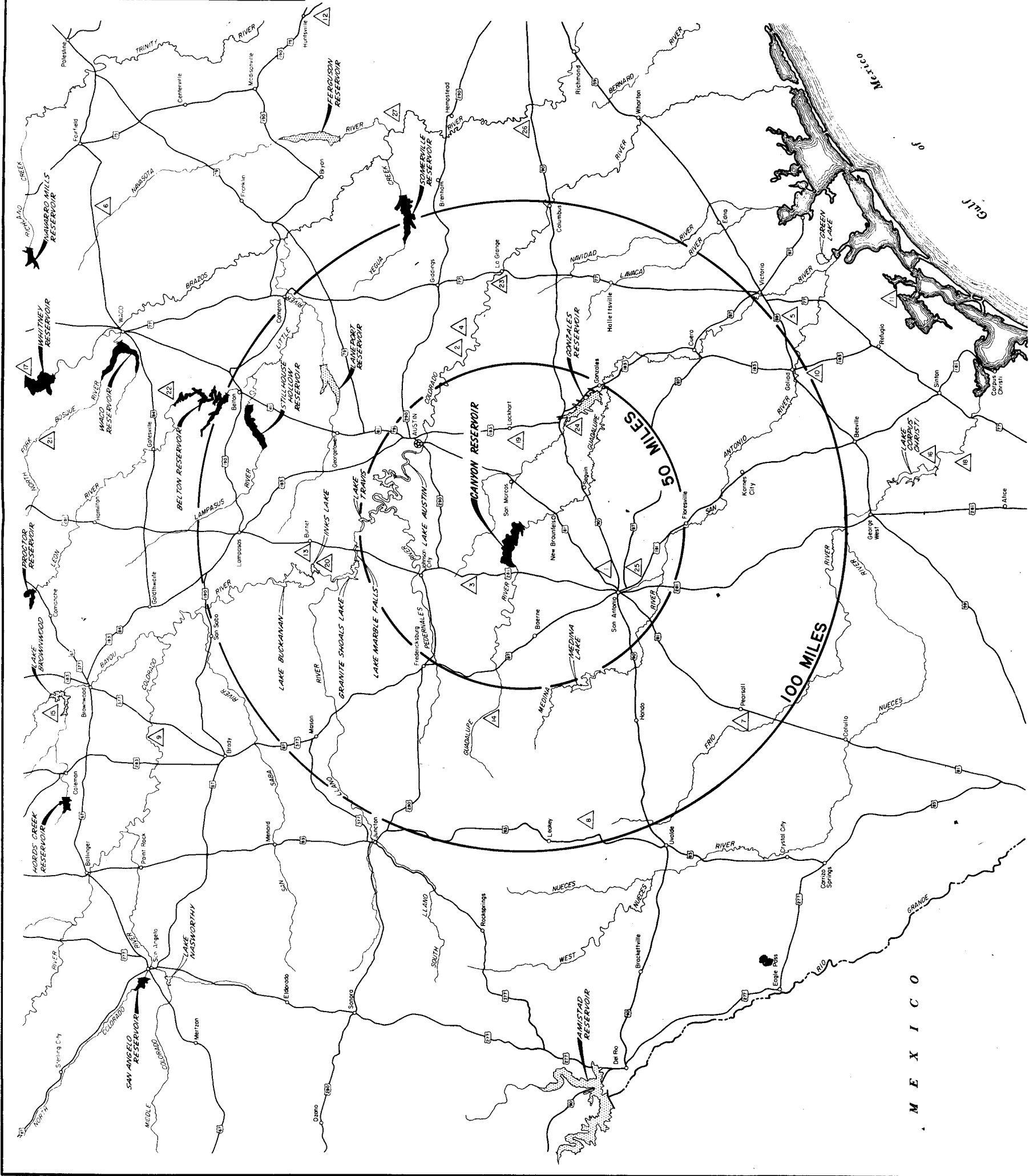
OTHER PROJECTS

LAKES AND RESERVOIRS BY OTHER AGENCIES

POINTS OF INTEREST

INDEX TO POINTS OF INTEREST

1. Alma State Park
2. Badin State Park
3. Blanco State Park
4. Buecher State Park
5. Fannin Battlefield State Park
6. Fort Parker State Park
7. Frio State Park
8. Garner State Park
9. Geological Center of the State of Texas
10. Gold State Park
11. Goose Island State Park
12. Huntsville State Park
13. Inks Lake State Park
14. Kerrville State Park
15. Lake Brownwood State Park
16. Lake Corpus Christi State Park
17. Lake Whitney State Park
18. Llanillo State Park
19. Lockhart State Park
20. Longhorn Cavern State Park
21. Meridian State Park
22. Mother Neff State Park
23. Mount Hill State Park
24. Palmetto State Park
25. San Jose Mission State Park
26. Stephen F. Austin State Park
27. Washington State Park



MEXICO

GUADALUPE RIVER BASIN, TEXAS

CANYON RESERVOIR

GUADALUPE RIVER, TEXAS

REGIONAL RECREATION AREAS

SCALE IN MILES  
0 50 100  
0 50 100  
0 50 100

U.S. ARMY ENGINEER DISTRICT FORT WORTH, TEXAS

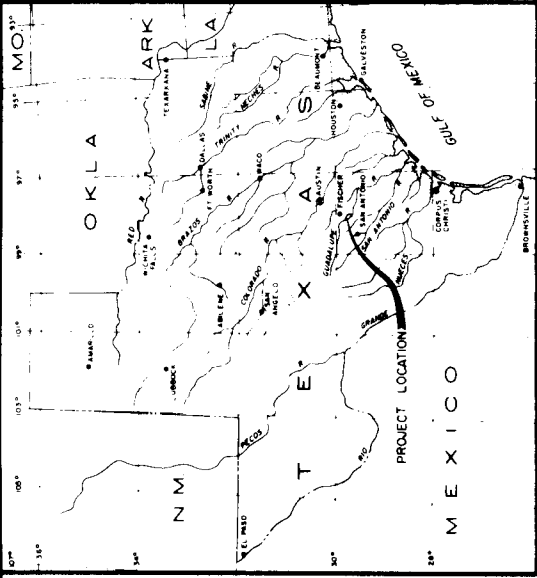
TO ACCOMPANY DESIGN MEMORANDUM  
NUMBER SC - MASTER PLAN (UPDATED)

SEPT. 1970

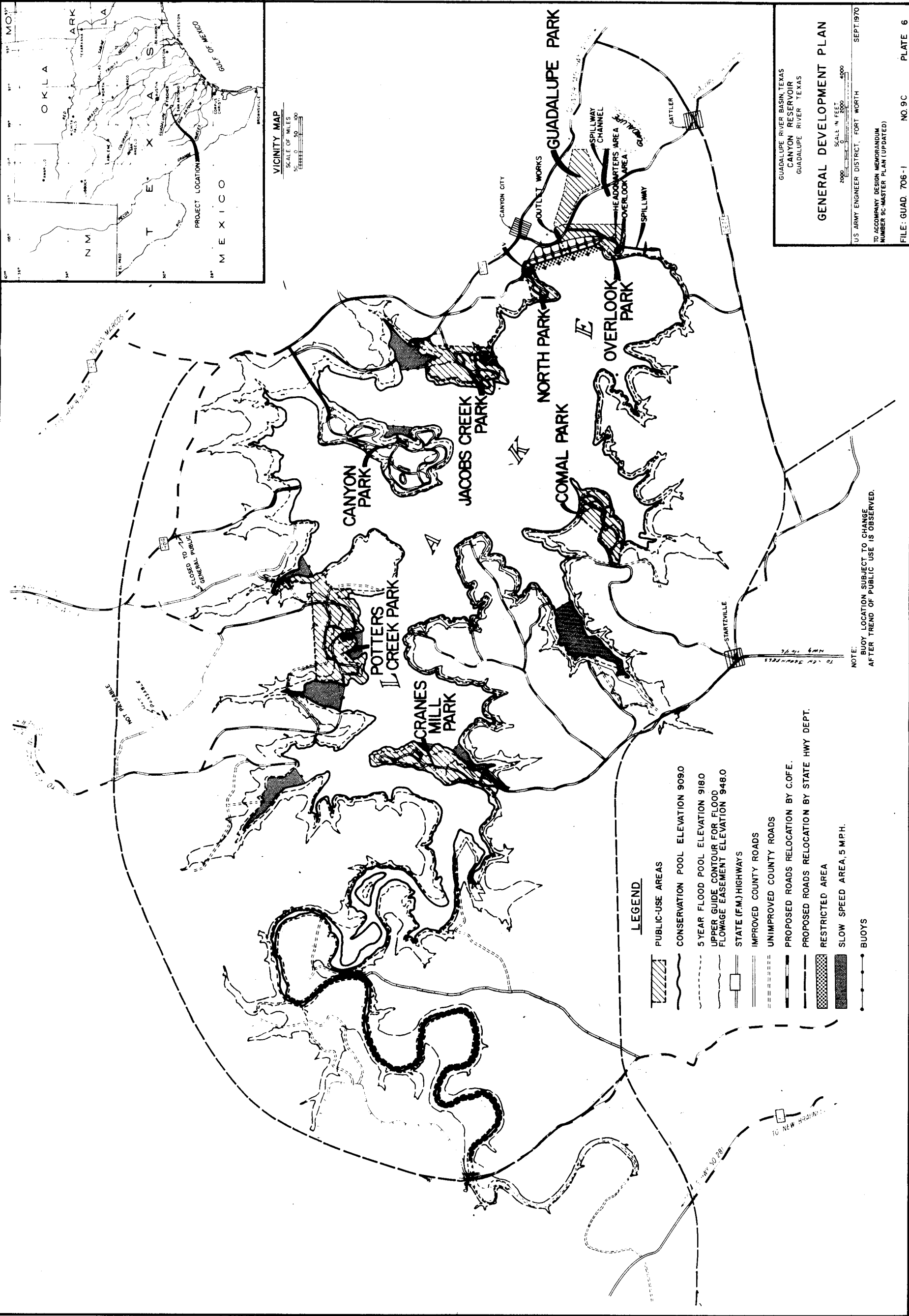
FILE: GUAD 706-1

NO. 9C

PLATE 5



VICINITY MAP  
SCALE OF MILES  
0 10 20 30  
0 10 20 30  
0 10 20 30  
0 10 20 30



NOTE: BUOY LOCATION SUBJECT TO CHANGE AFTER TREND OF PUBLIC USE IS OBSERVED.

GUADALUPE RIVER BASIN, TEXAS  
CANYON RESERVOIR  
GUADALUPE RIVER, TEXAS

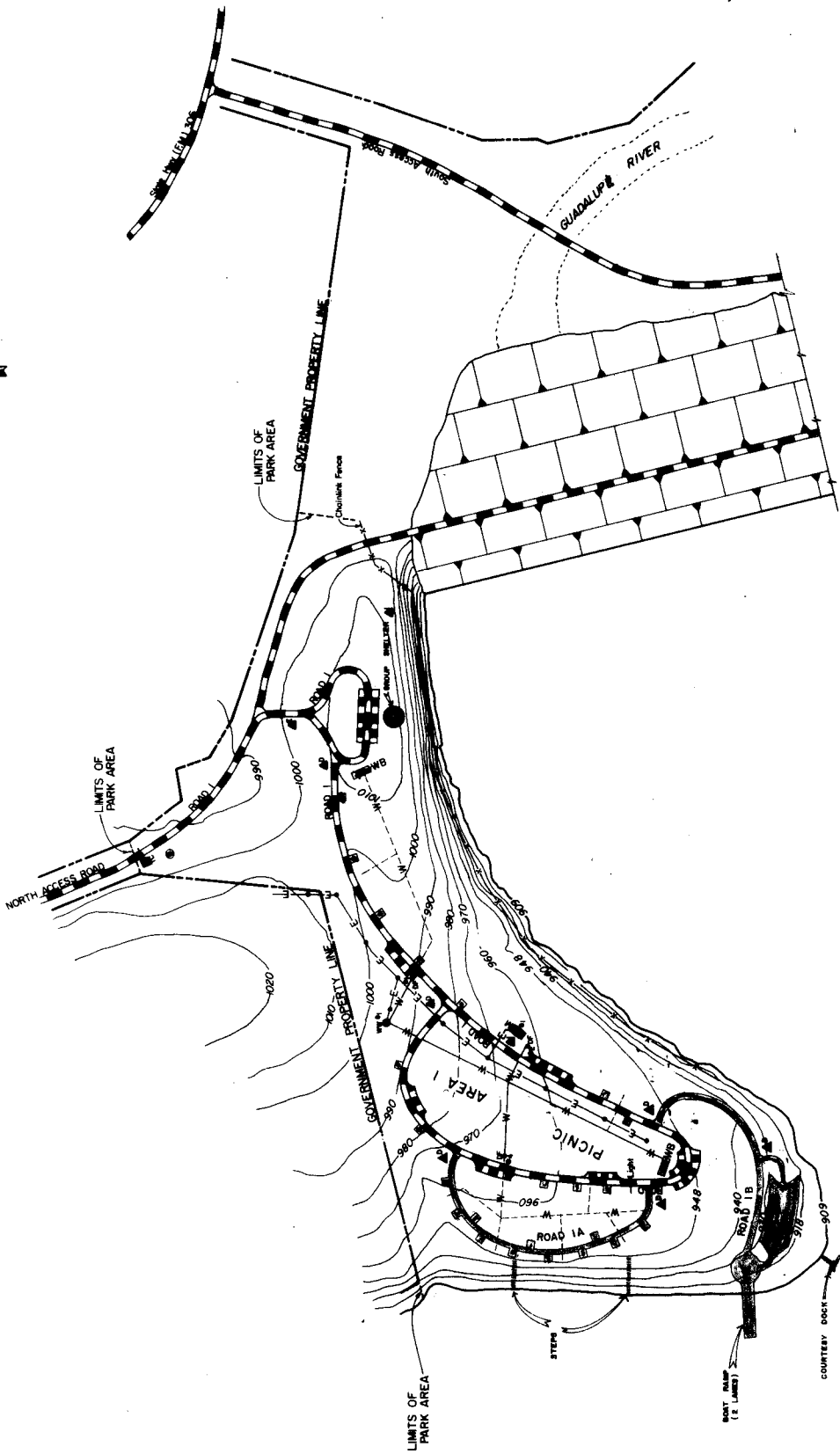
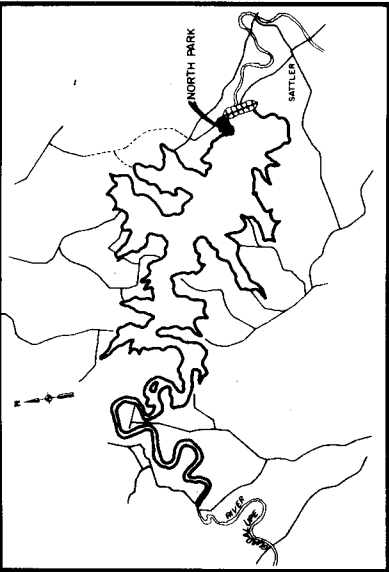
GENERAL DEVELOPMENT PLAN

SCALE IN FEET  
0 1000 2000 4000

U.S. ARMY ENGINEER DISTRICT, FORT WORTH

TO ACCOMPANY DESIGN MEMORANDUM  
NUMBER SC-MASTER PLAN (UPDATED)

FILE: GUAD. 706-1 NO. 9C PLATE 6



POOL ELEVATIONS  
CONSERVATION POOL PLUS YEAR FLOOR-----908.0  
CONSERVATION POOL PLUS YEAR FLOOR-----918.0  
TOP OF FLOOR-CONTROL STORAGE-----943.0  
UPPER GUIDE CONTOUR-----948.0

- LEGEND**
- |                                    | EXISTING | BY  | BY  | FUTURE |
|------------------------------------|----------|-----|-----|--------|
| GRAVEL ROADS                       | ---      | --- | --- | ---    |
| PAVED ROADS                        | ---      | --- | --- | ---    |
| SECONDARY ROADS                    | ---      | --- | --- | ---    |
| GRAVEL PARKING AREAS               | ---      | --- | --- | ---    |
| PAVED PARKING AREAS                | ---      | --- | --- | ---    |
| FRAME TOILETS (CONCRETE VAULT)     | ---      | --- | --- | ---    |
| MASONRY TOILETS (CONCRETE VAULT)   | ---      | --- | --- | ---    |
| MASONRY TOILETS (WATER BORNE)      | ---      | --- | --- | ---    |
| BOAT RAMPS                         | ---      | --- | --- | ---    |
| BUILDING STRUCTURE (AS DESIGNATED) | ---      | --- | --- | ---    |
| WATER WELLS (SUPPLY)               | ---      | --- | --- | ---    |
| WATER LINES                        | ---      | --- | --- | ---    |
| ELECTRIC SERVICE LINES             | ---      | --- | --- | ---    |
| RESERVOIR INFORMATION SIGNS        | ---      | --- | --- | ---    |
| PARK ENTRANCE SIGNS                | ---      | --- | --- | ---    |
| DIRECTIONAL SIGNS                  | ---      | --- | --- | ---    |
| BUOYS                              | ---      | --- | --- | ---    |
| REGISTRATION BOOTH                 | ---      | --- | --- | ---    |
| TREE COVER                         | ---      | --- | --- | ---    |
| TRAFFIC COUNTERS                   | ---      | --- | --- | ---    |
| SWIMMING BEACH                     | ---      | --- | --- | ---    |
| LIMITS OF CONVESSION AREAS         | ---      | --- | --- | ---    |
| LIMITS OF LICENSE OR LEASE AREAS   | ---      | --- | --- | ---    |
| UPPER LIMITS (FLOWAGE EASEMENT)    | ---      | --- | --- | ---    |
| GOVERNMENT PROPERTY LINE           | ---      | --- | --- | ---    |
| PLANNED DEVELOPMENT (FYTHRU FY78)  | ---      | --- | --- | ---    |

PICNIC FACILITIES		EXISTING		PLANNED	
PICNIC AREA NO.	ITEM	BY	BY	BY	BY
1	TABLES	20	40	40	40
	BENCHES	10	10	10	10
	SHADES	10	10	10	10
2	TABLES	20	40	40	40
	BENCHES	10	10	10	10
	SHADES	10	10	10	10
3	TABLES	20	40	40	40
	BENCHES	10	10	10	10
	SHADES	10	10	10	10
4	TABLES	20	40	40	40
	BENCHES	10	10	10	10
	SHADES	10	10	10	10
5	TABLES	20	40	40	40
	BENCHES	10	10	10	10
	SHADES	10	10	10	10
6	TABLES	20	40	40	40
	BENCHES	10	10	10	10
	SHADES	10	10	10	10

GUADALUPE RIVER BASIN, TEXAS  
CANYON RESERVOIR  
GUADALUPE RIVER TEXAS

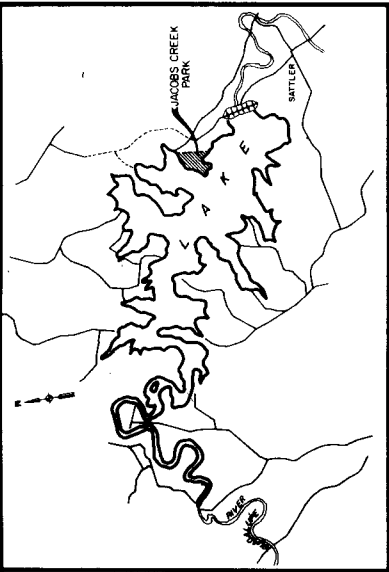
**NORTH PARK**

SCALE OF FEET  
0 100 200

U.S. ARMY ENGINEER DISTRICT, FORT WORTH SEP. 1970

TO ACCOMPANY DESIGN MEMORANDUM  
NUMBER 9C - MASTER PLAN (UPDATED)

FILE: GUAD. 706-1 NO. 9C



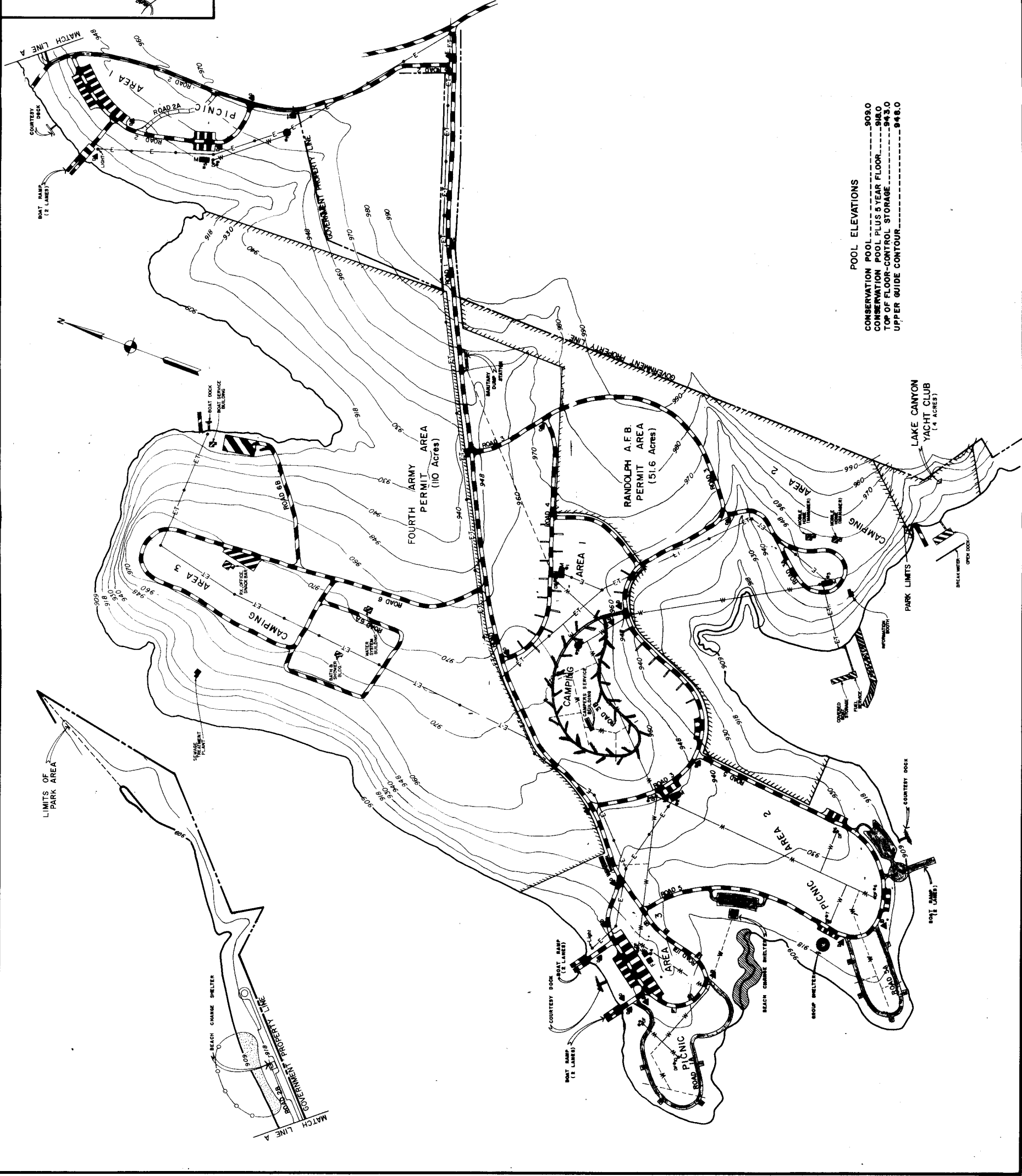
KEY MAP  
NOT TO SCALE

LEGEND

- EXISTING FUTURE  
C OF E C OF E  
GRAVEL ROADS  
PAVED ROADS  
SECONDARY ROADS  
GRAVEL PARKING AREAS  
PAVED PARKING AREAS  
FRAME TOILETS (CONCRETE VAULT)  
MASONRY TOILETS (WATER BORNE)  
BOAT RAMPS  
BUILDING STRUCTURE (AS DESIGNATED)  
WATER WELLS (SUPPLY)  
ELECTRIC SERVICE LINES  
RESERVOIR INFORMATION SIGNS  
PARK ENTRANCE SIGNS  
DIRECTIONAL SIGNS  
BUOYS  
REGISTRATION BOOTH  
TREE COVER  
TRAFFIC COUNTERS  
SWIMMING BEACH  
LIMITS OF CONCESSION AREAS  
LIMITS OF LICENSE OR LEASE AREAS  
UPPER LIMITS (FLOWAGE EASEMENT)  
GOVERNMENT PROPERTY LINE  
PLANNED DEVELOPMENT (FYI THRU FY78)

PICNIC FACILITIES			CAMPING FACILITIES		
PICNIC AREA NO.	EXISTING	PLANNED	CAMPING AREA NO.	EXISTING	PLANNED
1	10	20	1	10	20
2	10	20	2	10	20
3	10	20	3	10	20
4	10	20	4	10	20
5	10	20	5	10	20
6	10	20	6	10	20

POOL ELEVATIONS  
CONSERVATION POOL.....909.0  
CONSERVATION POOL PLUS 5 YEAR FLOOR.....918.0  
TOP OF FLOOR-CONTROL STORAGE.....943.0  
UPPER GUIDE CONTOUR.....948.0



LAKE CANYON  
YACHT CLUB  
(4 ACRES)

COUNTRY DOCK

PARK LIMITS

CAMPING

GOVERNMENT PROPERTY LINE

ROAD 1

ROAD 2

ROAD 3

ROAD 4

ROAD 5

ROAD 6

ROAD 7

ROAD 8

ROAD 9

ROAD 10

ROAD 11

ROAD 12

ROAD 13

ROAD 14

ROAD 15

ROAD 16

ROAD 17

ROAD 18

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ROAD 296

ROAD 297

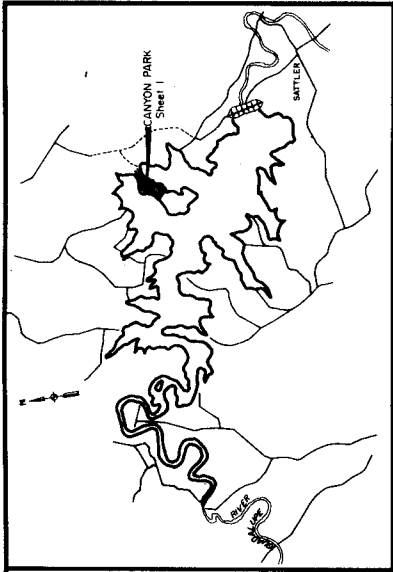
ROAD 298

ROAD 299

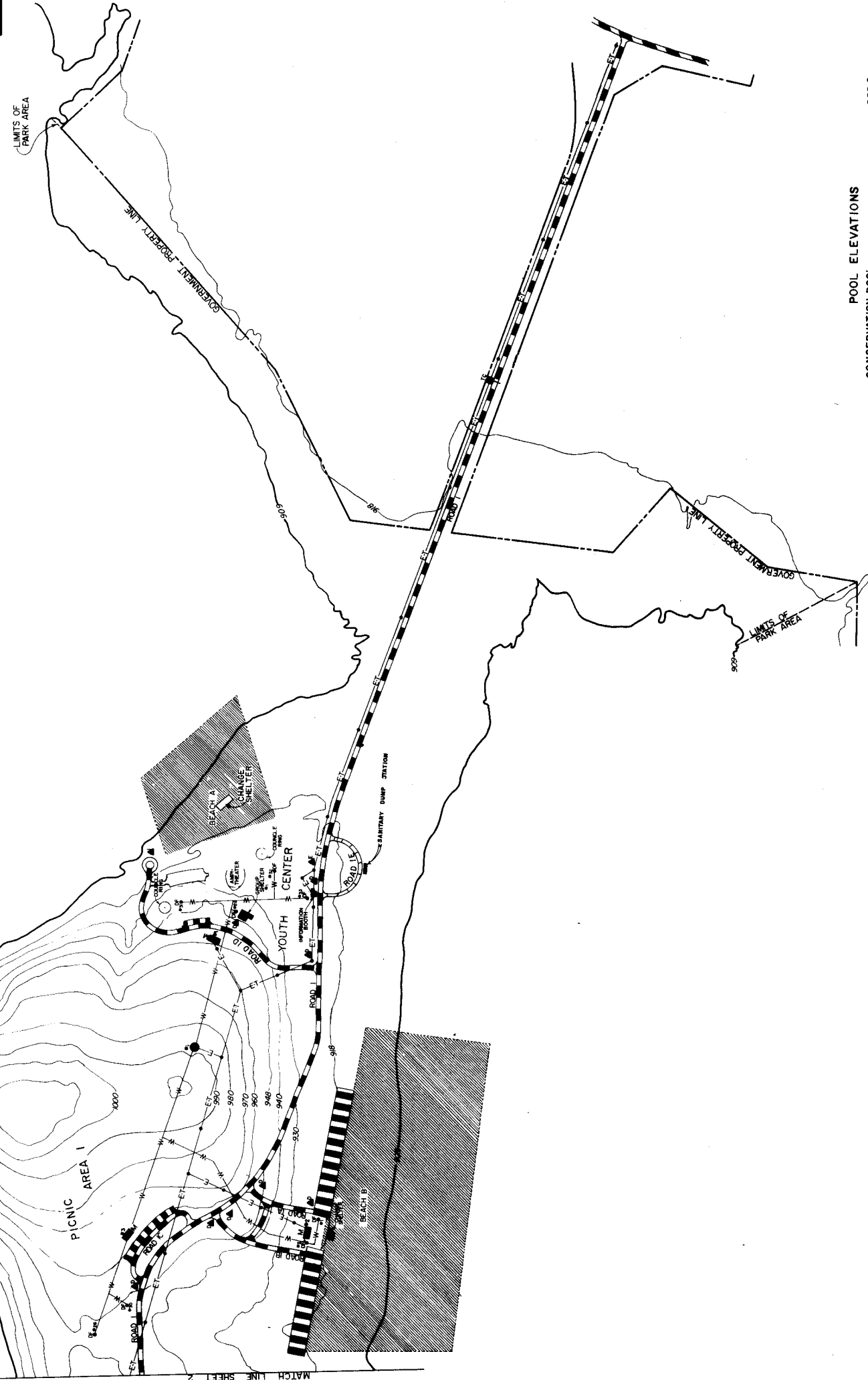
ROAD 300

ROAD 301

ROAD 302



KEY MAP  
NOT TO SCALE



POOL ELEVATIONS  
CONSERVATION POOL.....909.0  
CONSERVATION POOL PLUS STEAR FLOOR.....916.0  
TOP OF FLOOR-CONTROL STORAGE.....943.0  
UPPER GUIDE CONTOUR.....948.0

- LEGEND**
- EXISTING FUTURE  
BY OTHERS BY OTHERS  
C.B.E. C.B.E.
- GRAVEL ROADS
  - PAVED ROADS
  - SECONDARY ROADS
  - GRAVEL PARKING AREAS
  - PAVED PARKING AREAS
  - FRAME TOILETS (CONCRETE VAULT)
  - MASONRY TOILETS (WATER BORNE)
  - BOAT RAMPS
  - BUILDING STRUCTURE (AS DESIGNATED)
  - WATER WELLS (SUPPLY)
  - WATER LINES
  - ELECTRIC SERVICE LINES
  - RESERVOIR INFORMATION SIGNS
  - PARK ENTRANCE SIGNS
  - DIRECTIONAL SIGNS
  - BOOTS
  - REGISTRATION BOOTH
  - TREE COVER
  - TRAFFIC COUNTERS
  - SWIMMING BEACH
  - LIMITS OF CONCESSION AREAS
  - LIMITS OF LICENSE OR LEASE AREAS
  - UPPER LIMITS (FLOODAGE EASEMENT)
  - GOVERNMENT PROPERTY LINE
  - PLANNED DEVELOPMENT (FY71 THRU FY76)

PICNIC FACILITIES			CAMPING FACILITIES		
PICNIC AREA NO.	EXISTING	PLANNED	PICNIC AREA NO.	EXISTING	PLANNED
1	TABLETS FRANK CASH SHELTERS	TABLETS FRANK CASH SHELTERS	1	TABLETS FRANK CASH SHELTERS	TABLETS FRANK CASH SHELTERS
2	TABLETS FRANK CASH SHELTERS	TABLETS FRANK CASH SHELTERS	2	TABLETS FRANK CASH SHELTERS	TABLETS FRANK CASH SHELTERS
3	TABLETS FRANK CASH SHELTERS	TABLETS FRANK CASH SHELTERS	3	TABLETS FRANK CASH SHELTERS	TABLETS FRANK CASH SHELTERS
4	TABLETS FRANK CASH SHELTERS	TABLETS FRANK CASH SHELTERS	4	TABLETS FRANK CASH SHELTERS	TABLETS FRANK CASH SHELTERS
5	TABLETS FRANK CASH SHELTERS	TABLETS FRANK CASH SHELTERS	5	TABLETS FRANK CASH SHELTERS	TABLETS FRANK CASH SHELTERS
6	TABLETS FRANK CASH SHELTERS	TABLETS FRANK CASH SHELTERS	6	TABLETS FRANK CASH SHELTERS	TABLETS FRANK CASH SHELTERS

PICNIC FACILITIES			CAMPING FACILITIES		
PICNIC AREA NO.	EXISTING	PLANNED	PICNIC AREA NO.	EXISTING	PLANNED
1	TABLETS FRANK CASH SHELTERS	TABLETS FRANK CASH SHELTERS	1	TABLETS FRANK CASH SHELTERS	TABLETS FRANK CASH SHELTERS
2	TABLETS FRANK CASH SHELTERS	TABLETS FRANK CASH SHELTERS	2	TABLETS FRANK CASH SHELTERS	TABLETS FRANK CASH SHELTERS
3	TABLETS FRANK CASH SHELTERS	TABLETS FRANK CASH SHELTERS	3	TABLETS FRANK CASH SHELTERS	TABLETS FRANK CASH SHELTERS
4	TABLETS FRANK CASH SHELTERS	TABLETS FRANK CASH SHELTERS	4	TABLETS FRANK CASH SHELTERS	TABLETS FRANK CASH SHELTERS
5	TABLETS FRANK CASH SHELTERS	TABLETS FRANK CASH SHELTERS	5	TABLETS FRANK CASH SHELTERS	TABLETS FRANK CASH SHELTERS
6	TABLETS FRANK CASH SHELTERS	TABLETS FRANK CASH SHELTERS	6	TABLETS FRANK CASH SHELTERS	TABLETS FRANK CASH SHELTERS

GUADALUPE RIVER BASIN, TEXAS  
CANYON RESERVOIR  
GUADALUPE RIVER TEXAS

CANYON PARK

IN 2 SHEETS

SHEET 1

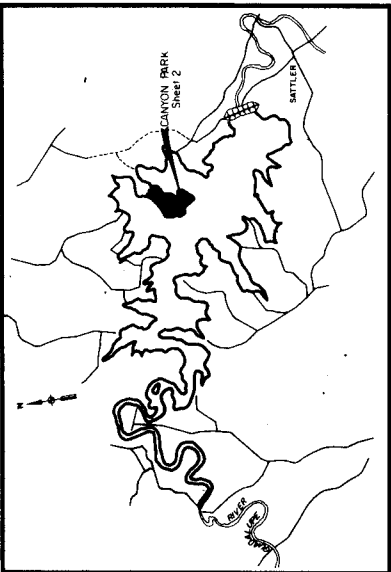
U.S. ARMY ENGINEER DISTRICT, FORT WORTH

SEP. 1970

TO ACCOMPANY DESIGN MEMORANDUM  
NUMBER 9C-MASTER PLAN (UPDATED)

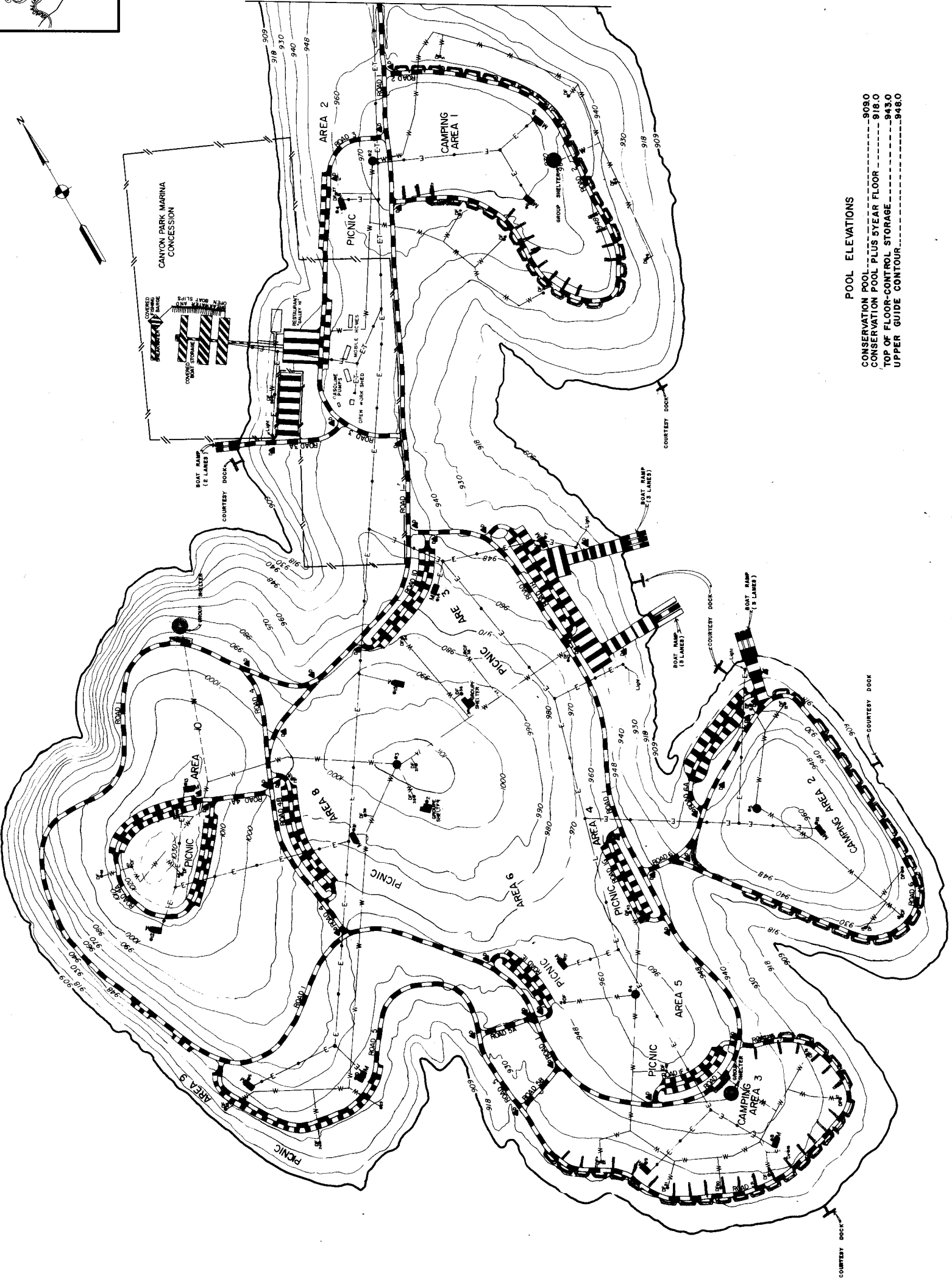
FILE: GUAD. 706-1 NO. 9C

PLATE 9



KEY MAP  
NOT TO SCALE

- LEGEND**
- EXISTING**
- GRAVEL ROADS
  - PAVED ROADS
  - GRAVEL PARKING AREAS
  - PAVED PARKING AREAS
  - FRAME TOILETS (CONCRETE VAULT)
  - MASONRY TOILETS (CONCRETE VAULT)
  - BOAT RAMPS
  - BUILDING STRUCTURE (AS DESIGNATED)
  - WATER LINES (SUPPLY)
  - ELECTRIC SERVICE LINES
  - RESERVOIR INFORMATION SIGNS
  - PARK ENTRANCE SIGNS
  - DIRECTIONAL SIGNS
  - BUOYS
  - REGISTRATION BOOTH
  - TREE COVER
  - TRAFFIC COUNTERS
  - SWIMMING BEACH
  - LIMITS OF CONCESSION AREAS
  - LIMITS OF LICENSE OR LEASE AREAS
  - UPPER LIMITS (FLOWAGE EASEMENT)
  - GOVERNMENT PROPERTY LINE
  - PLANNED DEVELOPMENT (THRU FY76)
- FUTURE**
- GRAVEL ROADS
  - PAVED ROADS
  - GRAVEL PARKING AREAS
  - PAVED PARKING AREAS
  - FRAME TOILETS (CONCRETE VAULT)
  - MASONRY TOILETS (CONCRETE VAULT)
  - BOAT RAMPS
  - BUILDING STRUCTURE (AS DESIGNATED)
  - WATER LINES (SUPPLY)
  - ELECTRIC SERVICE LINES
  - RESERVOIR INFORMATION SIGNS
  - PARK ENTRANCE SIGNS
  - DIRECTIONAL SIGNS
  - BUOYS
  - REGISTRATION BOOTH
  - TREE COVER
  - TRAFFIC COUNTERS
  - SWIMMING BEACH
  - LIMITS OF CONCESSION AREAS
  - LIMITS OF LICENSE OR LEASE AREAS
  - UPPER LIMITS (FLOWAGE EASEMENT)
  - GOVERNMENT PROPERTY LINE
  - PLANNED DEVELOPMENT (THRU FY76)



**POOL ELEVATIONS**

CONSERVATION POOL.....9090  
CONSERVATION POOL PLUS 5 YEAR FLOOR.....918.0  
TOP OF FLOOR-CONTROL STORAGE.....9430  
UPPER GUIDE CONTOUR.....9480

**PICNIC FACILITIES**

AREA NO.	ITEM	EXISTING	PLANNED	BY
1	TABLES	22	8	
2	TABLES	22	8	
3	TABLES	22	8	
4	TABLES	22	8	
5	TABLES	22	8	
6	TABLES	22	8	
7	TABLES	22	8	
8	TABLES	22	8	
9	TABLES	22	8	
10	TABLES	22	8	

**CAMPING FACILITIES**

AREA NO.	ITEM	EXISTING	PLANNED	BY
1	TABLES	22	8	
2	TABLES	22	8	
3	TABLES	22	8	
4	TABLES	22	8	
5	TABLES	22	8	
6	TABLES	22	8	
7	TABLES	22	8	
8	TABLES	22	8	
9	TABLES	22	8	
10	TABLES	22	8	

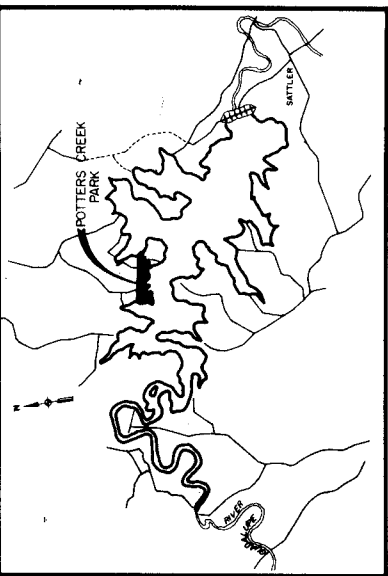
GUADALUPE RIVER BASIN, TEXAS  
CANYON RESERVOIR  
GUADALUPE RIVER TEXAS  
**CANYON PARK**

IN 2 SHEETS  
SCALE OF FEET  
SHEET 2

U.S. ARMY ENGINEER DISTRICT, FORT WORTH  
SEP. 1970

TO ACCOMPANY DESIGN MEMORANDUM  
NUMBER 9C--MASTER PLAN (UPDATED)

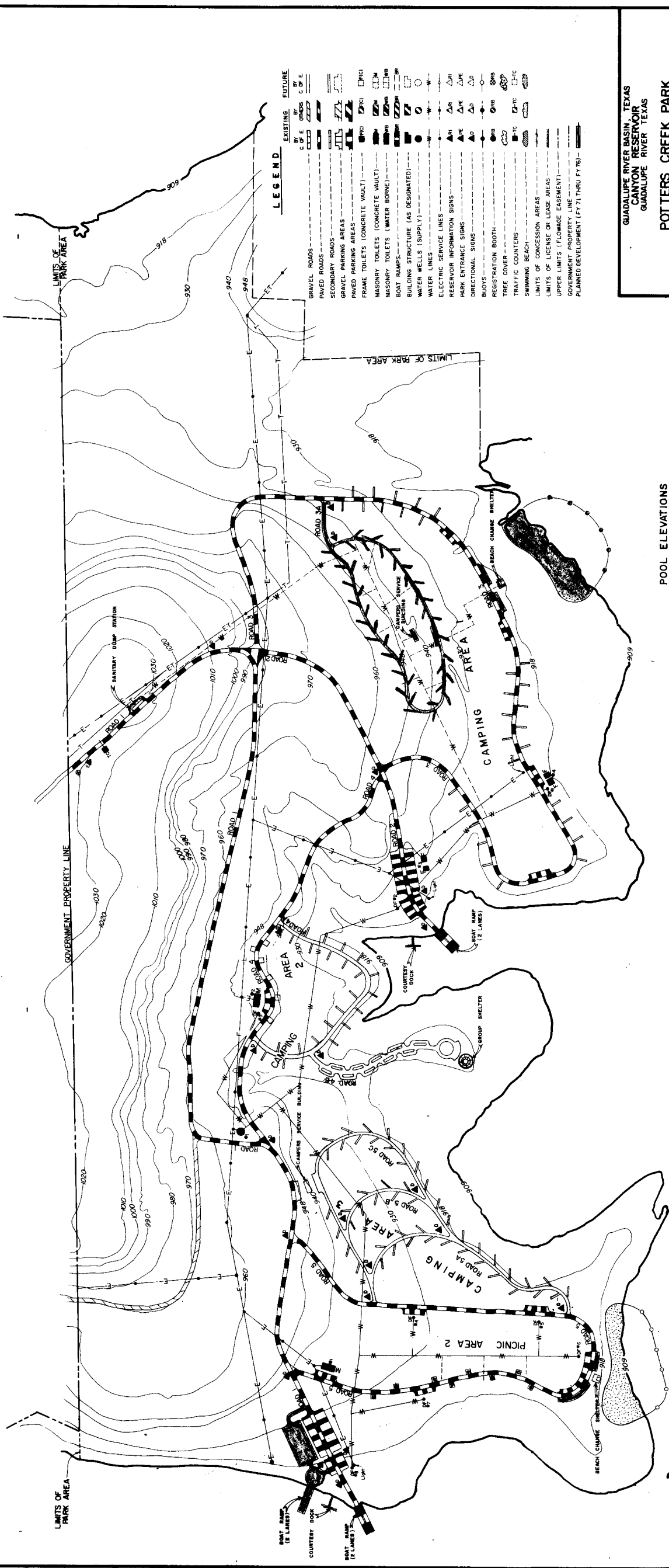
FILE: GUAD. 706-1 NO. 9C  
PLATE 10



KEY MAP  
NOT TO SCALE

CAMPING FACILITIES			
PICNIC AREA NO.	ITEM	EXISTING	PLANNED
1	TABLES	10	10
1	BENCHES	10	10
1	SEAT RAMP (2 LANE)	10	10
2	TABLES	10	10
2	BENCHES	10	10
2	SEAT RAMP (2 LANE)	10	10
3	TABLES	10	10
3	BENCHES	10	10
3	SEAT RAMP (2 LANE)	10	10
4	TABLES	10	10
4	BENCHES	10	10
4	SEAT RAMP (2 LANE)	10	10
5	TABLES	10	10
5	BENCHES	10	10
5	SEAT RAMP (2 LANE)	10	10
6	TABLES	10	10
6	BENCHES	10	10
6	SEAT RAMP (2 LANE)	10	10

PICNIC FACILITIES			
PICNIC AREA NO.	ITEM	EXISTING	PLANNED
1	TABLES	10	10
1	BENCHES	10	10
1	SEAT RAMP (2 LANE)	10	10
2	TABLES	10	10
2	BENCHES	10	10
2	SEAT RAMP (2 LANE)	10	10
3	TABLES	10	10
3	BENCHES	10	10
3	SEAT RAMP (2 LANE)	10	10
4	TABLES	10	10
4	BENCHES	10	10
4	SEAT RAMP (2 LANE)	10	10
5	TABLES	10	10
5	BENCHES	10	10
5	SEAT RAMP (2 LANE)	10	10
6	TABLES	10	10
6	BENCHES	10	10
6	SEAT RAMP (2 LANE)	10	10

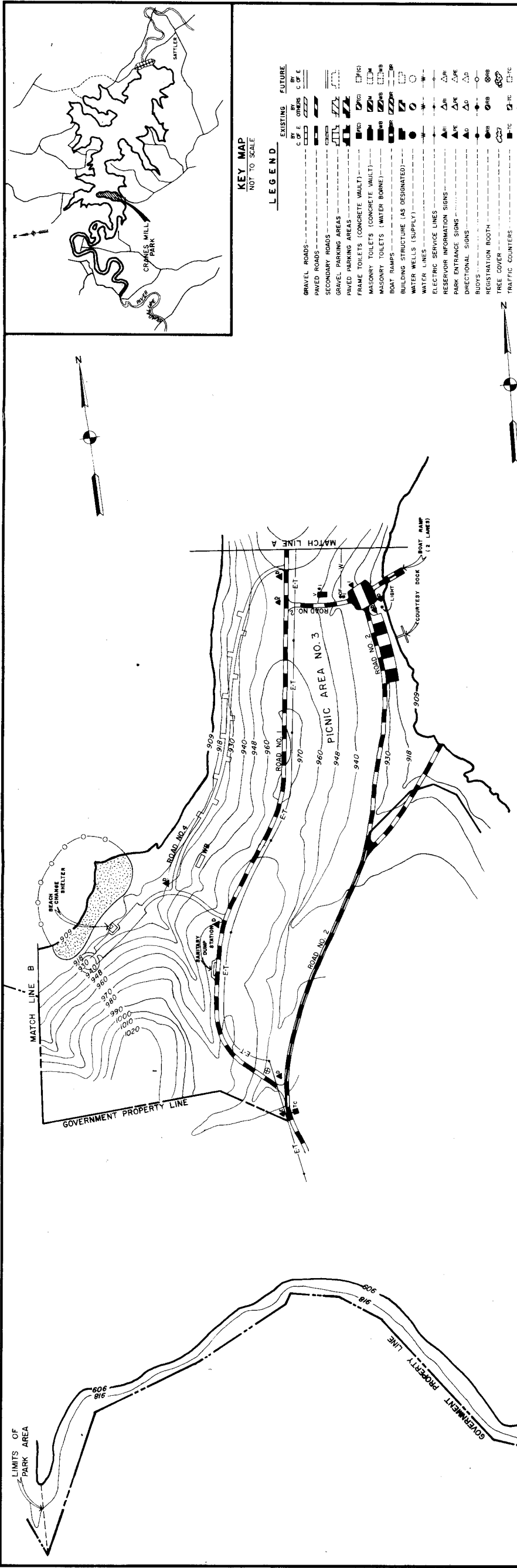


POOL ELEVATIONS	
CONSERVATION POOL	909.0
CONSERVATION POOL PLUS 5 YEAR FLOOR	918.0
TOP OF FLOOR-CONTROL STORAGE	943.0
UPPER GUIDE CONTOUR	948.0

LEGEND	
EXISTING	FUTURE
BY C OF E	BY C OF E
BY OTHERS	BY OTHERS
GRAVEL ROADS	GRAVEL ROADS
PAVED ROADS	PAVED ROADS
GRAVEL PARKING AREAS	GRAVEL PARKING AREAS
PAVED PARKING AREAS	PAVED PARKING AREAS
FRAME TOILETS (CONCRETE VAULT)	FRAME TOILETS (CONCRETE VAULT)
MASONRY TOILETS (CONCRETE VAULT)	MASONRY TOILETS (CONCRETE VAULT)
BOAT RAMPS	BOAT RAMPS
BUILDING STRUCTURE (AS DESIGNATED)	BUILDING STRUCTURE (AS DESIGNATED)
WATER LINES (SUPPLY)	WATER LINES (SUPPLY)
ELECTRIC SERVICE LINES	ELECTRIC SERVICE LINES
RESERVOIR INFORMATION SIGNS	RESERVOIR INFORMATION SIGNS
PARK ENTRANCE SIGNS	PARK ENTRANCE SIGNS
DIRECTIONAL SIGNS	DIRECTIONAL SIGNS
BOYS	BOYS
REGISTRATION BOOTH	REGISTRATION BOOTH
TREE COVER	TREE COVER
TRAFFIC COUNTERS	TRAFFIC COUNTERS
SWIMMING BEACH	SWIMMING BEACH
LIMITS OF CONCESSION AREAS	LIMITS OF CONCESSION AREAS
LIMITS OF LICENSE OR LEASE AREAS	LIMITS OF LICENSE OR LEASE AREAS
UPPER LIMITS (FLOWAGE EASEMENT)	UPPER LIMITS (FLOWAGE EASEMENT)
GOVERNMENT PROPERTY LINE	GOVERNMENT PROPERTY LINE
PLANNED DEVELOPMENT (FY 71 THRU FY 76)	PLANNED DEVELOPMENT (FY 71 THRU FY 76)

GUADALUPE RIVER BASIN, TEXAS  
CANYON RESERVOIR  
GUADALUPE RIVER TEXAS  
POTTERS CREEK PARK

U.S. ARMY ENGINEER DISTRICT, FORT WORTH SEP. 1970  
TO ACCOMPANY DESIGN MEMORANDUM  
NUMBER 9C MASTER PLAN (UPDATED)  
FILE: GUAD. 706-1 NO. 9C  
PLATE II



CONCESSION: CRANES MILL PARK MARINA, INC.  
APPROX. 14.5 ACRES OF LAND & WATER

KEY MAP  
NOT TO SCALE

LEGEND

- |                                      | EXISTING | FUTURE |
|--------------------------------------|----------|--------|
| GRAVEL ROADS                         | ---      | ---    |
| PAVED ROADS                          | ---      | ---    |
| SECONDARY PARKING AREAS              | ---      | ---    |
| GRAVEL PARKING AREAS                 | ---      | ---    |
| FRAME TOILETS (CONCRETE VAULT)       | ---      | ---    |
| MASONRY TOILETS (WATER BORNE)        | ---      | ---    |
| BOAT RAMPS                           | ---      | ---    |
| BUILDING STRUCTURE (AS DESIGNATED)   | ---      | ---    |
| WATER WELLS (SUPPLY)                 | ---      | ---    |
| ELECTRIC SERVICE LINES               | ---      | ---    |
| RESERVOIR INFORMATION SIGNS          | ---      | ---    |
| PARK ENTRANCE SIGNS                  | ---      | ---    |
| DIRECTIONAL SIGNS                    | ---      | ---    |
| BUDYS                                | ---      | ---    |
| REGISTRATION BOOTH                   | ---      | ---    |
| TREE COVER                           | ---      | ---    |
| TRAFFIC COUNTERS                     | ---      | ---    |
| SWIMMING BEACH                       | ---      | ---    |
| LIMITS OF CONCESSION AREAS           | ---      | ---    |
| LIMITS OF LICENSE OR LEASE AREAS     | ---      | ---    |
| UPPER LIMITS (FLOWAGE EASEMENT)      | ---      | ---    |
| GOVERNMENT PROPERTY LINE             | ---      | ---    |
| PLANNED DEVELOPMENT (FY71 THRU FY76) | ---      | ---    |

PICNIC FACILITIES			
PICNIC AREA NO.	EXISTING	PLANNED	
1	TABLES BENCHES SHADES SHUTTERS	BY BY BY BY	BY BY BY BY
2	TABLES BENCHES SHADES SHUTTERS	BY BY BY BY	BY BY BY BY
3	TABLES BENCHES SHADES SHUTTERS	BY BY BY BY	BY BY BY BY
4	TABLES BENCHES SHADES SHUTTERS	BY BY BY BY	BY BY BY BY
5	TABLES BENCHES SHADES SHUTTERS	BY BY BY BY	BY BY BY BY
6	TABLES BENCHES SHADES SHUTTERS	BY BY BY BY	BY BY BY BY

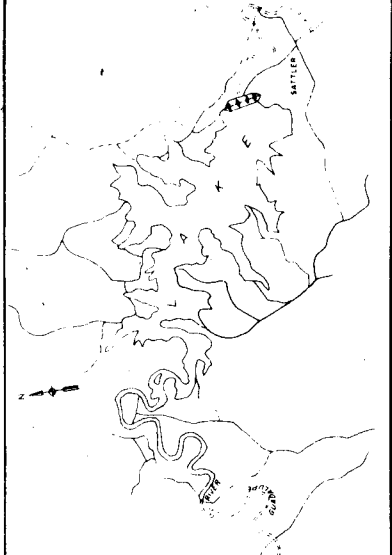
CAMPING FACILITIES			
PICNIC AREA NO.	EXISTING	PLANNED	
1	TABLES BENCHES SHADES SHUTTERS	BY BY BY BY	BY BY BY BY
2	TABLES BENCHES SHADES SHUTTERS	BY BY BY BY	BY BY BY BY
3	TABLES BENCHES SHADES SHUTTERS	BY BY BY BY	BY BY BY BY
4	TABLES BENCHES SHADES SHUTTERS	BY BY BY BY	BY BY BY BY
5	TABLES BENCHES SHADES SHUTTERS	BY BY BY BY	BY BY BY BY
6	TABLES BENCHES SHADES SHUTTERS	BY BY BY BY	BY BY BY BY

POOL ELEVATIONS  
CONSERVATION POOL-----909.0  
CONSERVATION POOL PLUS 5 YEAR FLOOR-----918.0  
TOP OF FLOOR-CONTROL STORAGE-----943.0  
UPPER GUIDE CONTOUR-----948.0

GUADALUPE RIVER BASIN, TEXAS  
CANYON RESERVOIR  
GUADALUPE RIVER, TEXAS  
CRANES MILL PARK

U.S. ARMY ENGINEER DISTRICT, FORT WORTH SEP 1970  
TO ACCOMPANY DESIGN MEMORANDUM  
NUMBER 9C - MASTER PLAN (UPDATED)  
FILE: GUAD. 706-1 NO. 9C  
PLATE 12





KEY MAP  
NOT TO SCALE

LEGEND	
GRAVEL ROADS	EXISTING
PAVED ROADS	EXISTING
SECONDARY ROADS	EXISTING
GRAVEL PARKING AREAS	EXISTING
PAVED PARKING AREAS	EXISTING
FRAME TOILETS (CONCRETE VAULT)	EXISTING
MASONRY TOILETS (CONCRETE VAULT)	EXISTING
MASONRY TOILETS (WATER BORNE)	EXISTING
BOAT RAMPS	EXISTING
BUILDING STRUCTURE (AS DESIGNATED)	EXISTING
WATER WELLS (SUPPLY)	EXISTING
ELECTRIC SERVICE LINES	EXISTING
RESERVOIR INFORMATION SIGNS	EXISTING
PARK ENTRANCE SIGNS	EXISTING
DIRECTIONAL SIGNS	EXISTING
BUOYS	EXISTING
REGISTRATION BOOTH	EXISTING
TREE COVER	EXISTING
TRAFFIC COUNTERS	EXISTING
SWIMMING BEACH	EXISTING
LIMITS OF CONCESSION AREAS	EXISTING
LIMITS OF LICENSE OR LEASE AREAS	EXISTING
UPPER LIMITS (FLOWAGE EASEMENT)	EXISTING
GOVERNMENT PROPERTY LINE	EXISTING
PLANNED DEVELOPMENT (FY70 THRU FY76)	FUTURE

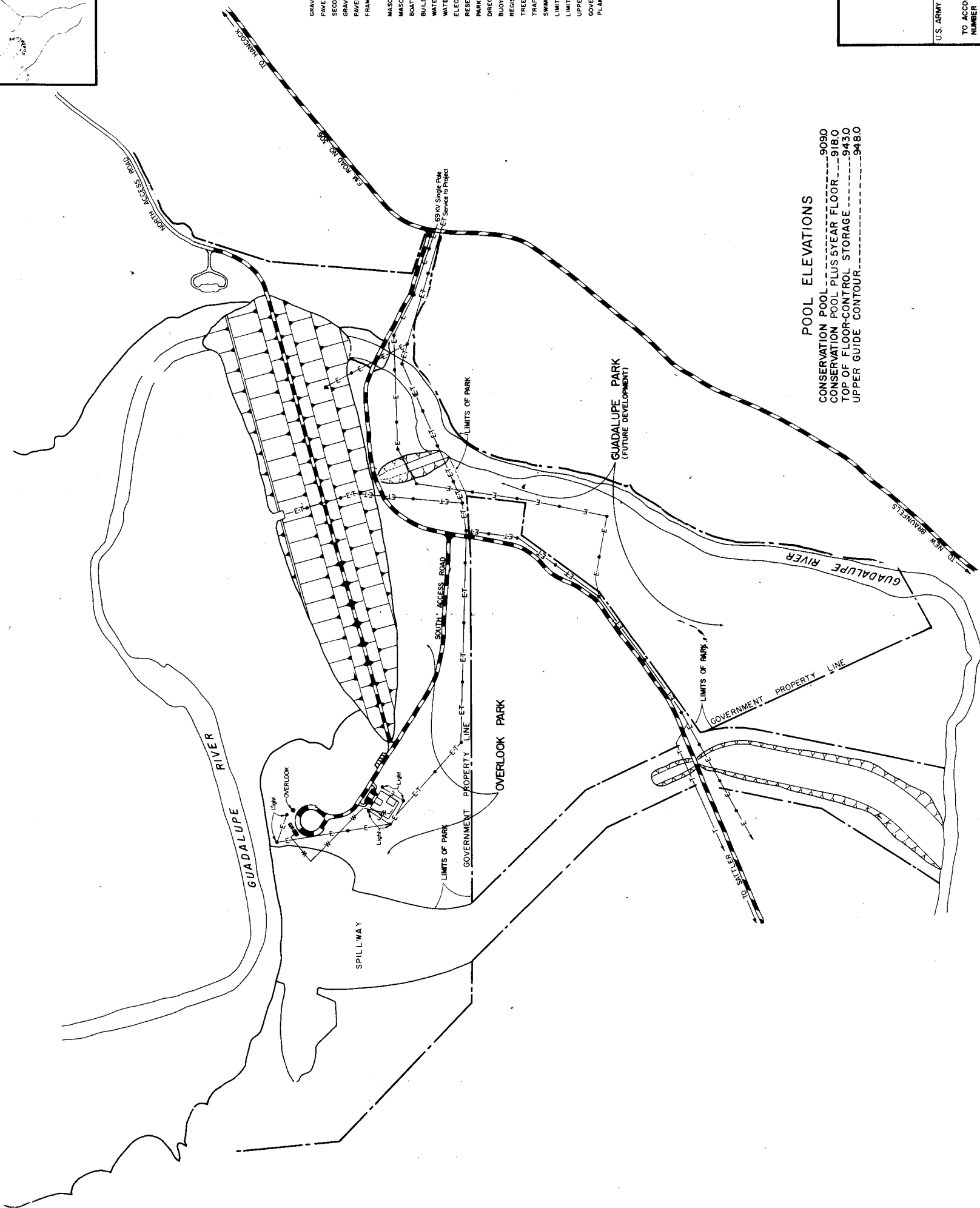
GUADALUPE RIVER BASIN, TEXAS  
CANYON RESERVOIR  
GUADALUPE RIVER, TEXAS  
OVERLOOK PARK  
AND  
GUADALUPE PARK

U.S. ARMY ENGINEER DISTRICT, FORT WORTH SEP. 1970

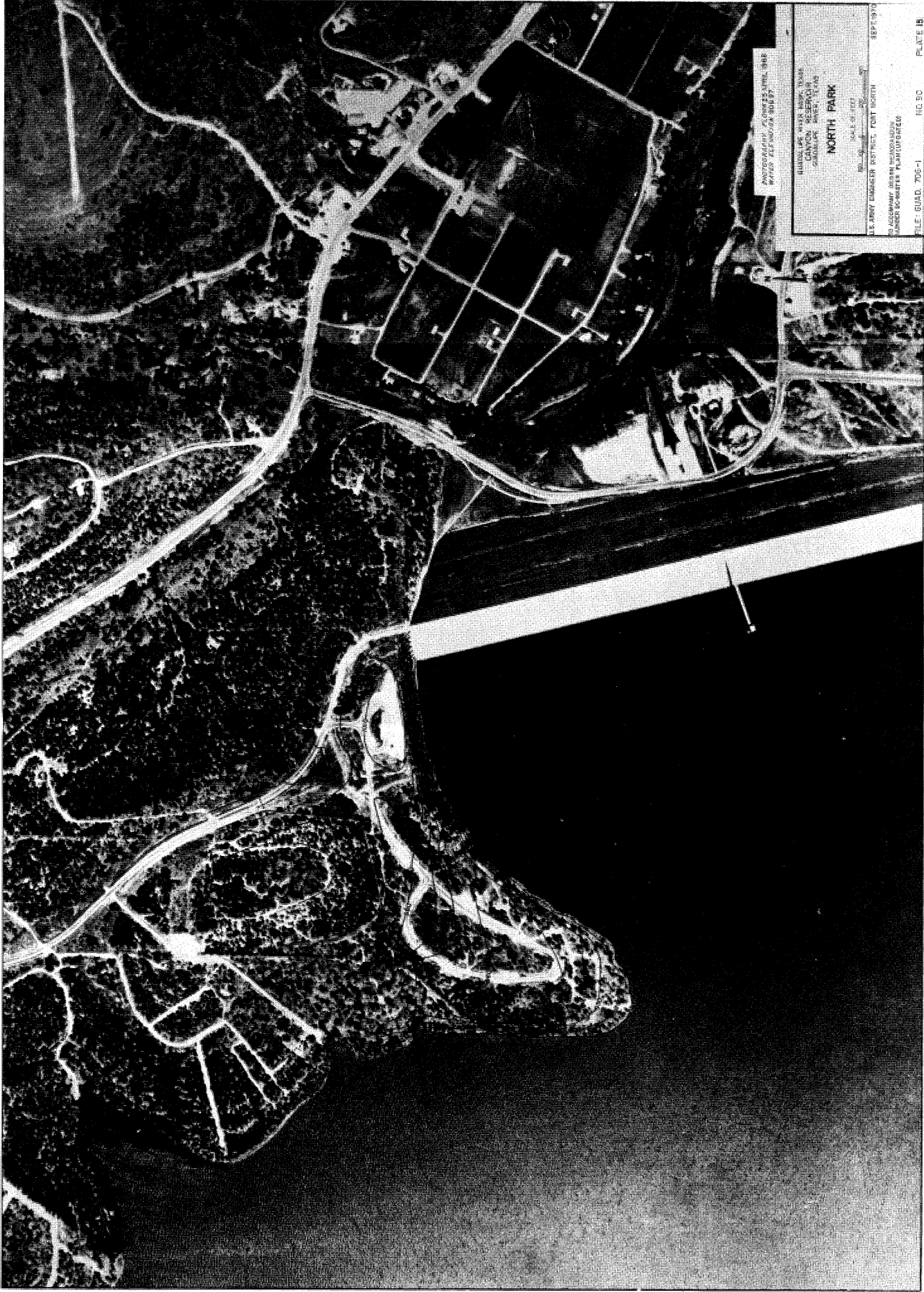
TO ACCOMPANY DESIGN MEMORANDUM  
NUMBER 9C - MASTER PLAN (UPDATED)

FILE: GUAD. 706-1 NO. 9C

SCALE OF FEET  
400 200 0 400 800



POOL ELEVATIONS  
CONSERVATION POOL ---9090  
CONSERVATION POOL PLUS YEAR FLOOR ---9180  
TOP OF FLOOR-CONTROL STORAGE ---9430  
UPPER GUIDE CONTOUR ---9480





PHOTOGRAPHY FLOWN 25 APRIL 1968  
WATER ELEVATION 908.97

GUADALUPE RIVER BASIN, TEXAS  
CANYON RESERVOIR  
GUADALUPE RIVER, TEXAS

JACOBS CREEK PARK

SCALE OF FEET  
0 100 200 400

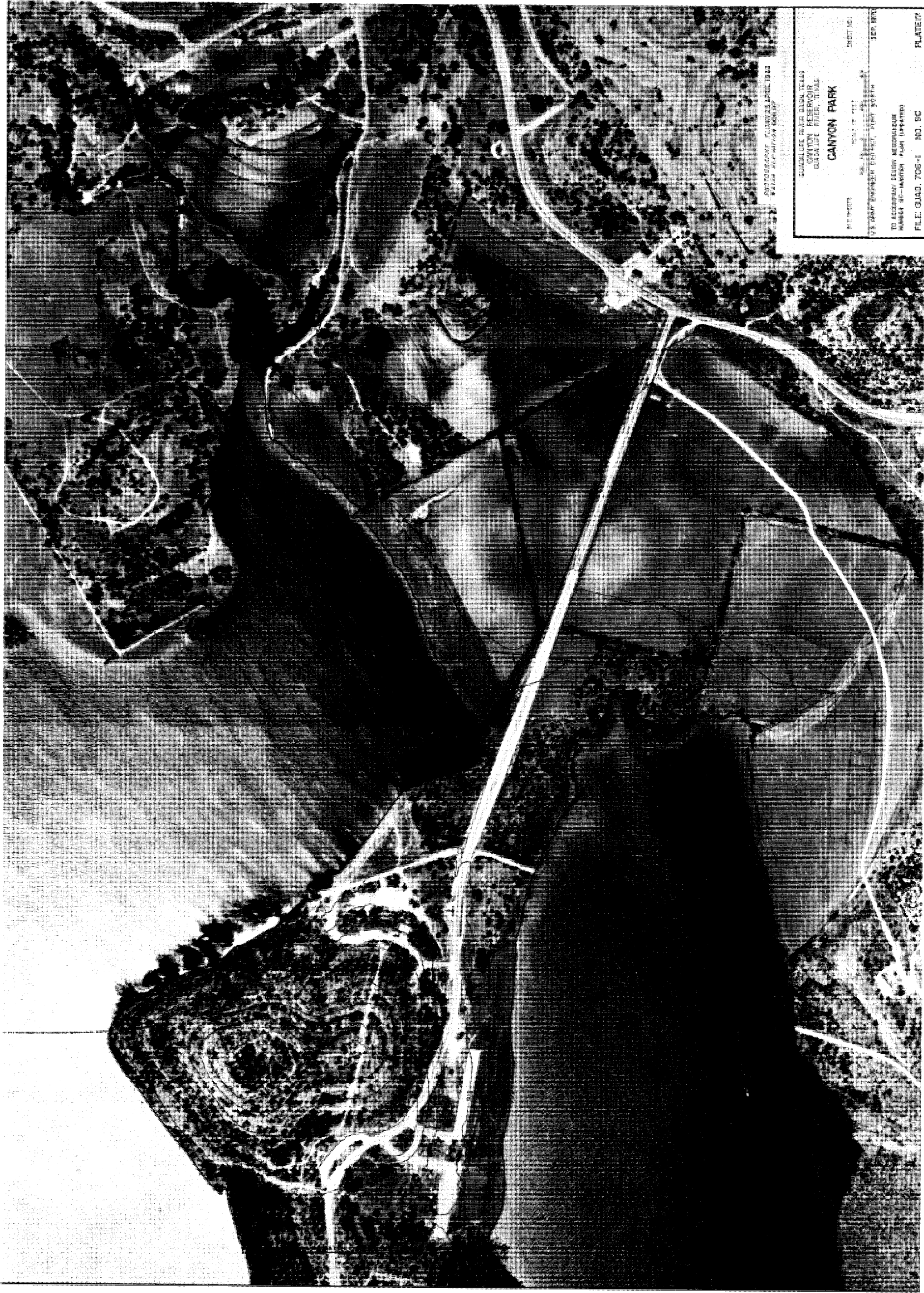
U.S. ARMY ENGINEER DISTRICT, FORT WORTH

SEP. 1970

TO ACCOMPANY DESIGN MEMORANDUM  
NUMBER 9C - MASTER PLAN (UPDATED)

FILE: GUAD. 706-1 NO. 9C

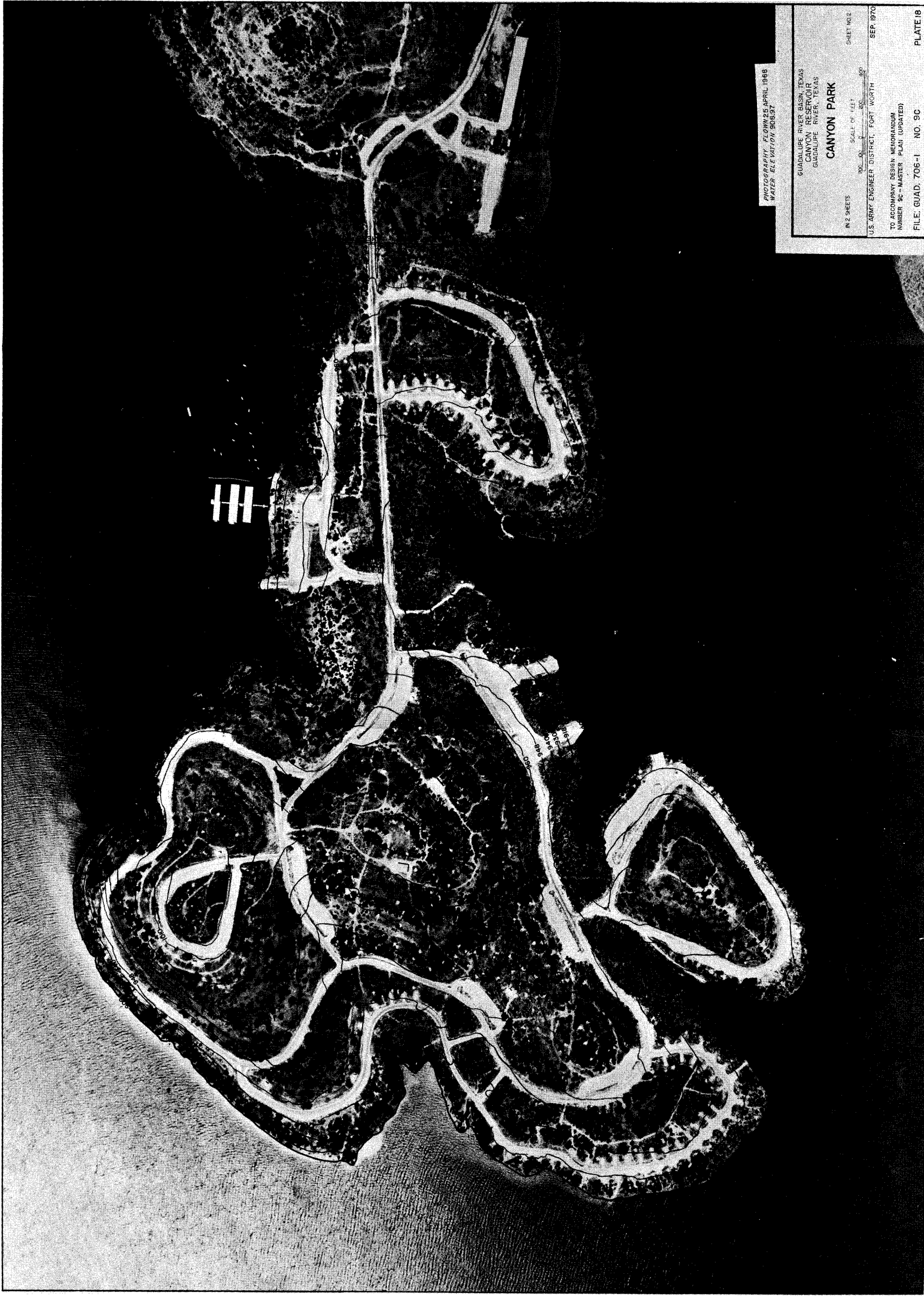
PLATE 6



PHOTOGRAPHED BY JAMES H. HARRIS  
APRIL 1963  
FBI PHOTO UNIT

CANYON PARK	
NO. 10000	SCALE OF FEET
U.S. GEOLOGICAL SURVEY, FORT WORTH	
TO ACCOMPANY FIELD MEMORANDUM NUMBER 10-10000-10000	
FILE QUAD. 10000-1 NO. 9C	

PLATE 17



PHOTOGRAPHY: FLOWN 25 APRIL 1968  
WATER ELEVATION 3053'

GUADALUPE RIVER BASIN, TEXAS CANYON RESERVOIR GUADALUPE RIVER, TEXAS	
CANYON PARK	
IN 2 SHEETS	SHEET NO. 2
SCALE OF FEET 0 100 200 300	
U.S. ARMY ENGINEER DISTRICT, FORT WORTH	
SEP. 1970	
TO ACCOMPANY DESIGN MEMORANDUM NUMBER 9C - MASTER PLAN (UPDATED)	
FILE: GUAD. 706-1 NO. 9C	
PLATE 18	



POSTERGRAPH "A" DATED APRIL, 1966  
WATER ELEMENTS ONLY

QUADRI-STATE WATER PARK, TEXAS  
CANTON, KENTUCKY  
CANTON, KENTUCKY

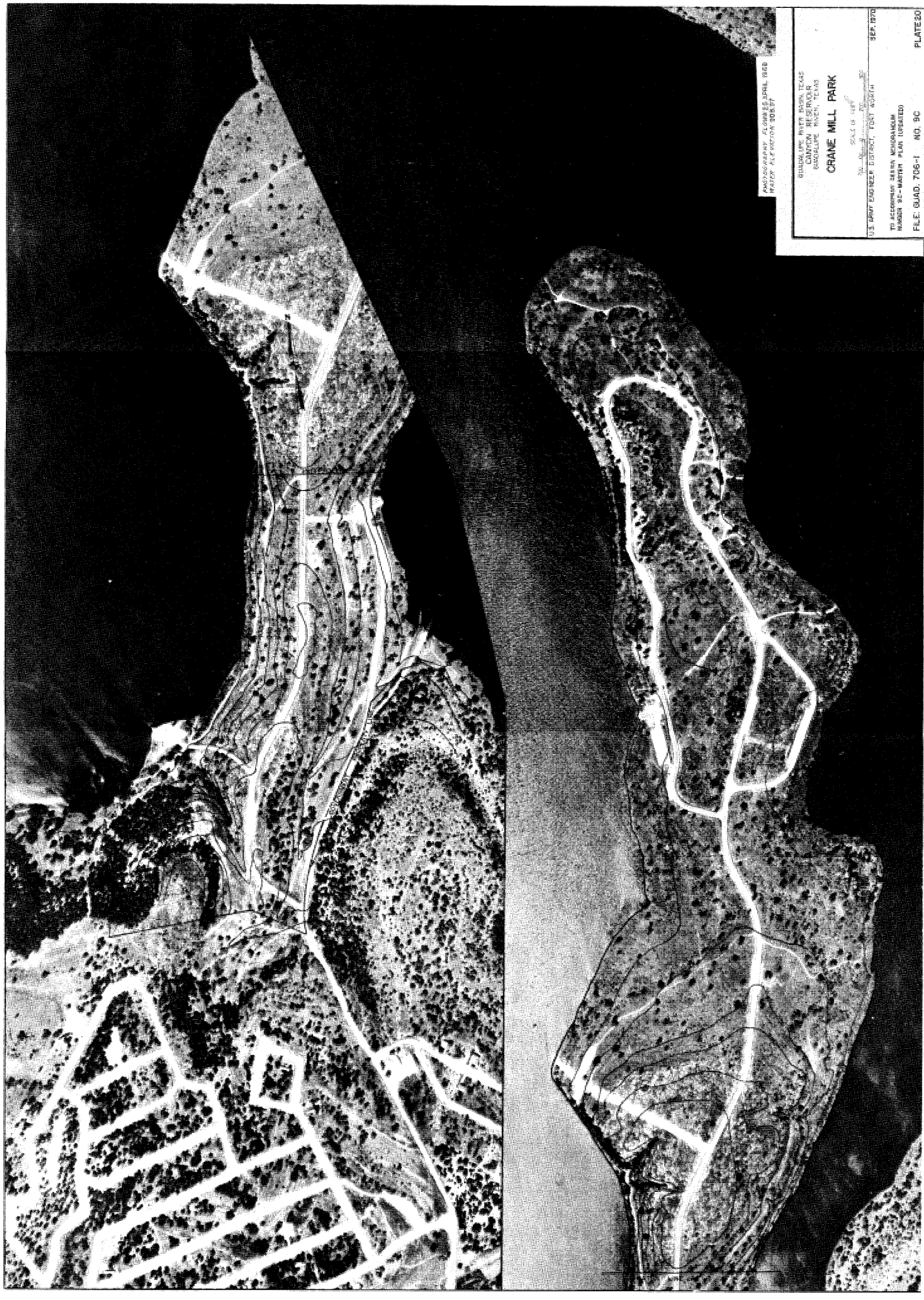
POTTERS CREEK PARK

SCALE OF 1:100  
1" = 100'

TO ACCOMPANY DESIGN MEMORANDUM  
NUMBER 10 - MASTER PLAN (OPTIONAL)

FILE: QUAD. 706-1 NO. 9C

PLATE 10



PHOTOGRAPH COURTESY OF THE  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

CRANE MILL PARK  
CRANE MILL PARK, TEXAS  
CRANE MILL PARK, TEXAS

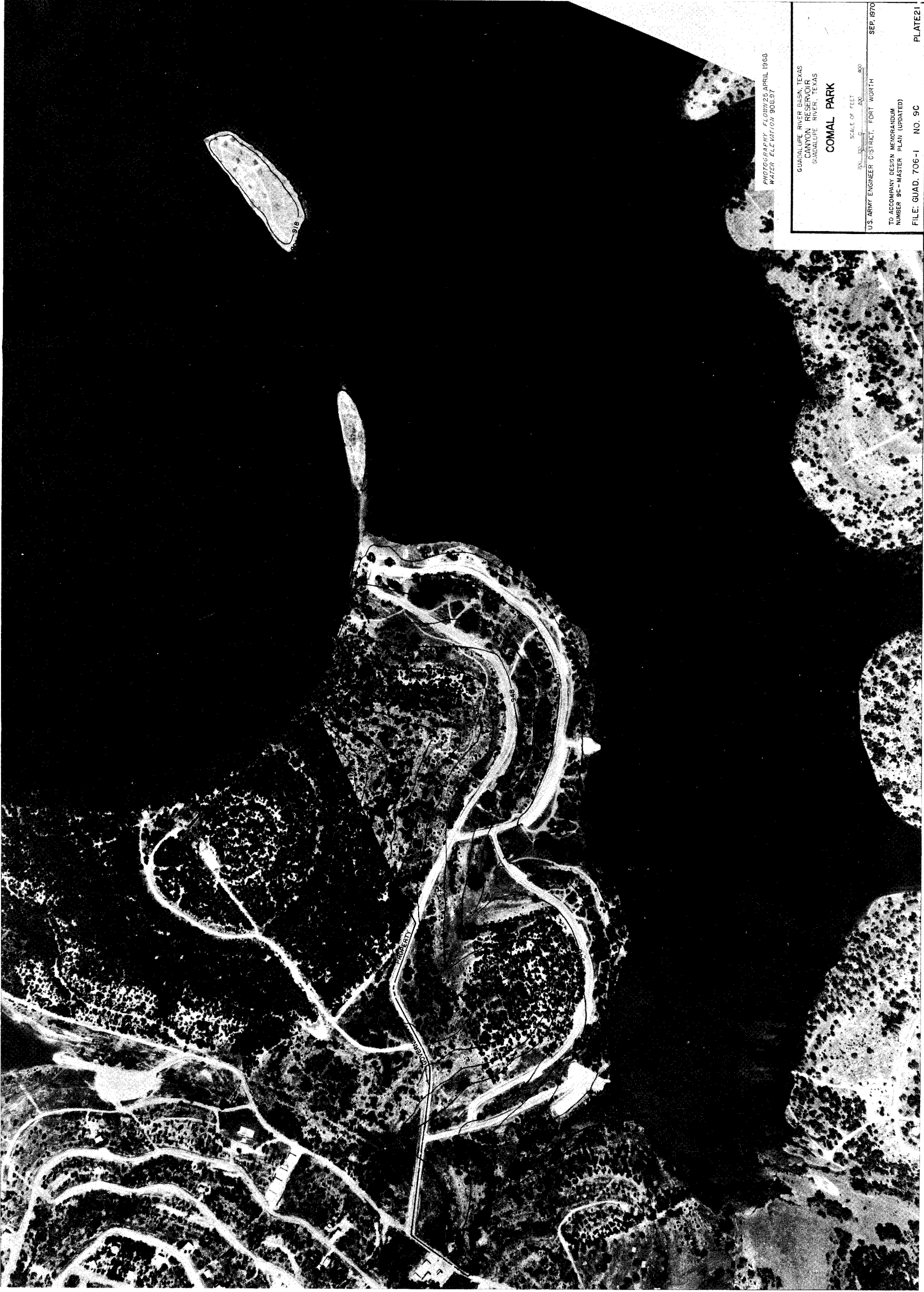
CRANE MILL PARK  
CRANE MILL PARK, TEXAS  
CRANE MILL PARK, TEXAS

U.S. ARMY ENGINEER DISTRICT, FORT MONROE  
SEP. 1970

TO ACCOMPANY DESIGN RECOMMENDATIONS  
HUNTER 9C--WATER PLAN (UPPERED)

FILE: QUAD. 706-1 NO. 9C

PLATE 80



PHOTOGRAPHY FLOWN 25 APRIL 1963  
WATER ELEVATION 908.97

GUADALUPE RIVER BASIN, TEXAS  
CANYON RESERVOIR  
GUADALUPE RIVER, TEXAS

COMAL PARK

SCALE OF FEET  
0 100 200 300 400 500

U.S. ARMY ENGINEER DISTRICT, FORT WORTH SEP. 1970

TO ACCOMPANY DESIGN MEMORANDUM  
NUMBER 9C-WATER PLAN (UPDATED)

FILE: GUAD. 706-1 NO. 9C

PLATE 21

GUADALUPE RIVER BASIN, TEXAS  
CANYON RESERVOIR  
OVERLOOK PARK  
SCALE IN FEET  
0 100 200 400  
U.S. ARMY ENGINEER DISTRICT, FORT WORTH  
SEPT. 1970  
TO ACCOMPANY DESIGN MEMORANDUM  
NUMBER 9C-MASTER PLAN (UPDATED)  
FILE: GUAD. 706-1  
NQ 9C  
PLATE 22





PHOTOGRAPHY FLOWN 25 APRIL 1968  
WATER ELEVATION 508.97

GUADALUPE RIVER BASIN, TEXAS  
CANYON RESERVOIR  
GUADALUPE RIVER, TEXAS

### GUADALUPE PARK

SCALE IN FEET  
200 0 200 400

U.S. ARMY ENGINEER DISTRICT, FORT WORTH

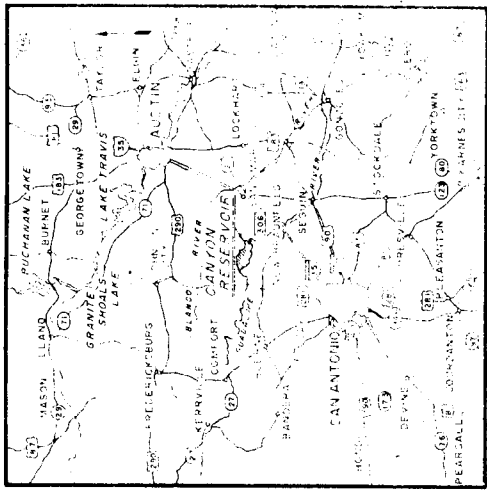
SEPT 1970

TO ACCOMPANY DESIGN MEMORANDUM  
NUMBER SC-MASTER PLAN (UPDATED)

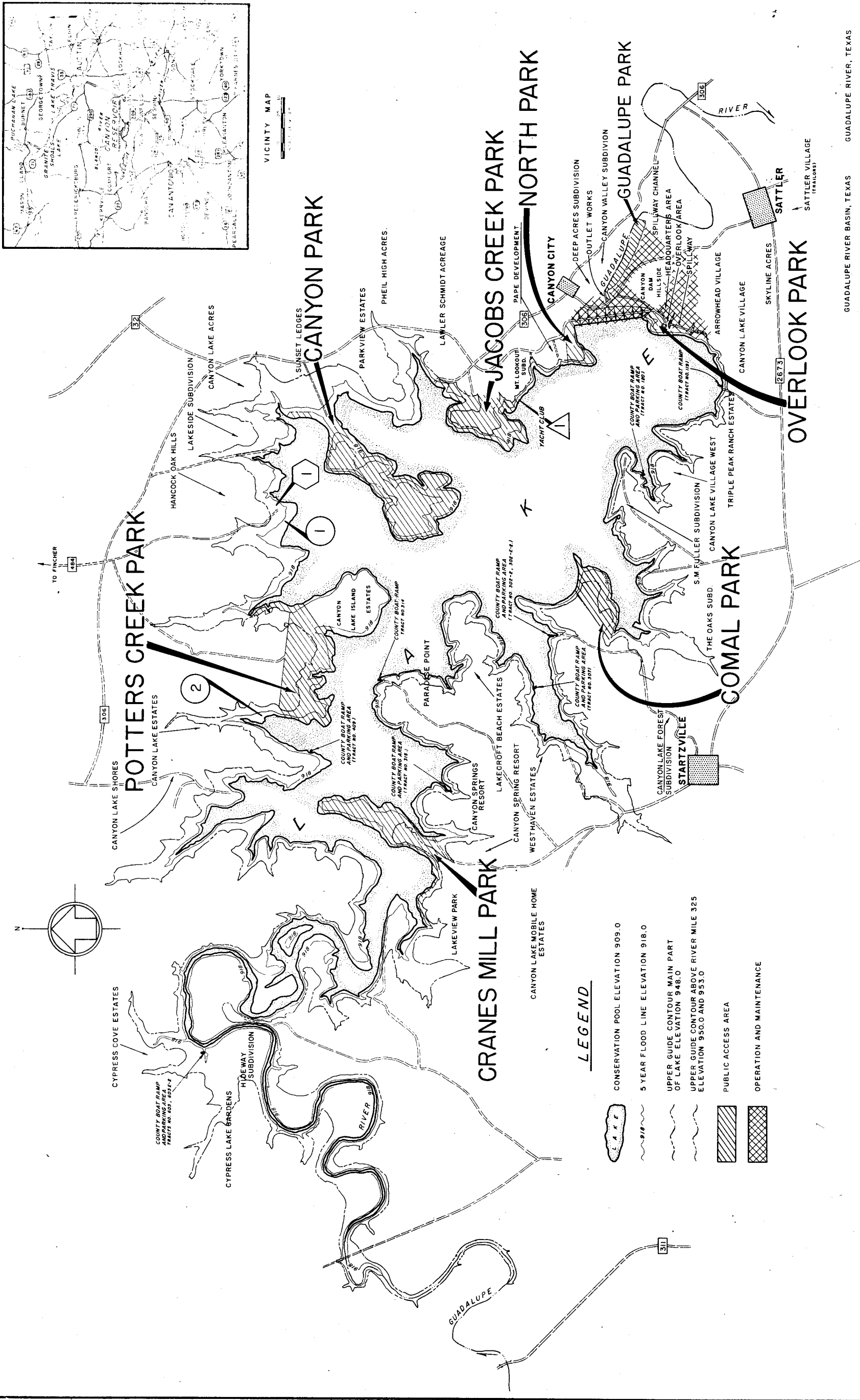
FILE: GUAD. 705-1

NO. 9C

PLATE 23



VICINITY MAP



LEGEND

- CONSERVATION POOL ELEVATION 909.0
- 5 YEAR FLOOD LINE ELEVATION 918.0
- UPPER GUIDE CONTOUR MAIN PART OF LAKE ELEVATION 948.0
- UPPER GUIDE CONTOUR ABOVE RIVER MILE 325 ELEVATION 950.0 AND 955.0
- PUBLIC ACCESS AREA
- OPERATION AND MAINTENANCE

CANYON RESERVOIR  
LAND USE MAP

SCALE OF FEET  
0 2000 4000 6000

U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS

OCTOBER 1970

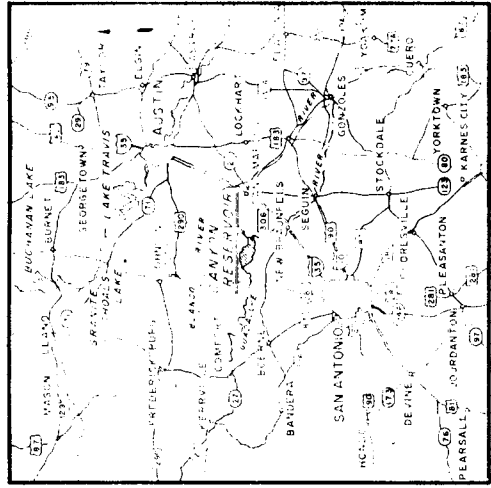
PLATE 24

LEGEND

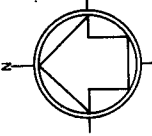
- CONSERVATION POOL ELEVATION 909.0
- 5 YEAR FLOOD LINE ELEVATION 918.0
- UPPER GUIDE CONTOUR ELEVATION 948.0
- GOVERNMENT PROPERTY LINE
- PUBLIC ACCESS AREA
- OPERATION AND MAINTENANCE
- FLOWAGE EASEMENT
- ESTHETICS
- RIVER MILE

SHEET INDEX

LINE SHEET 2



VICINITY MAP  
SCALE IN MILES  
0 1 2 3 4



JACOBS CREEK PARK

GUADALUPE PARK

OVERLOOK PARK

COMAL PARK

NORTH PARK

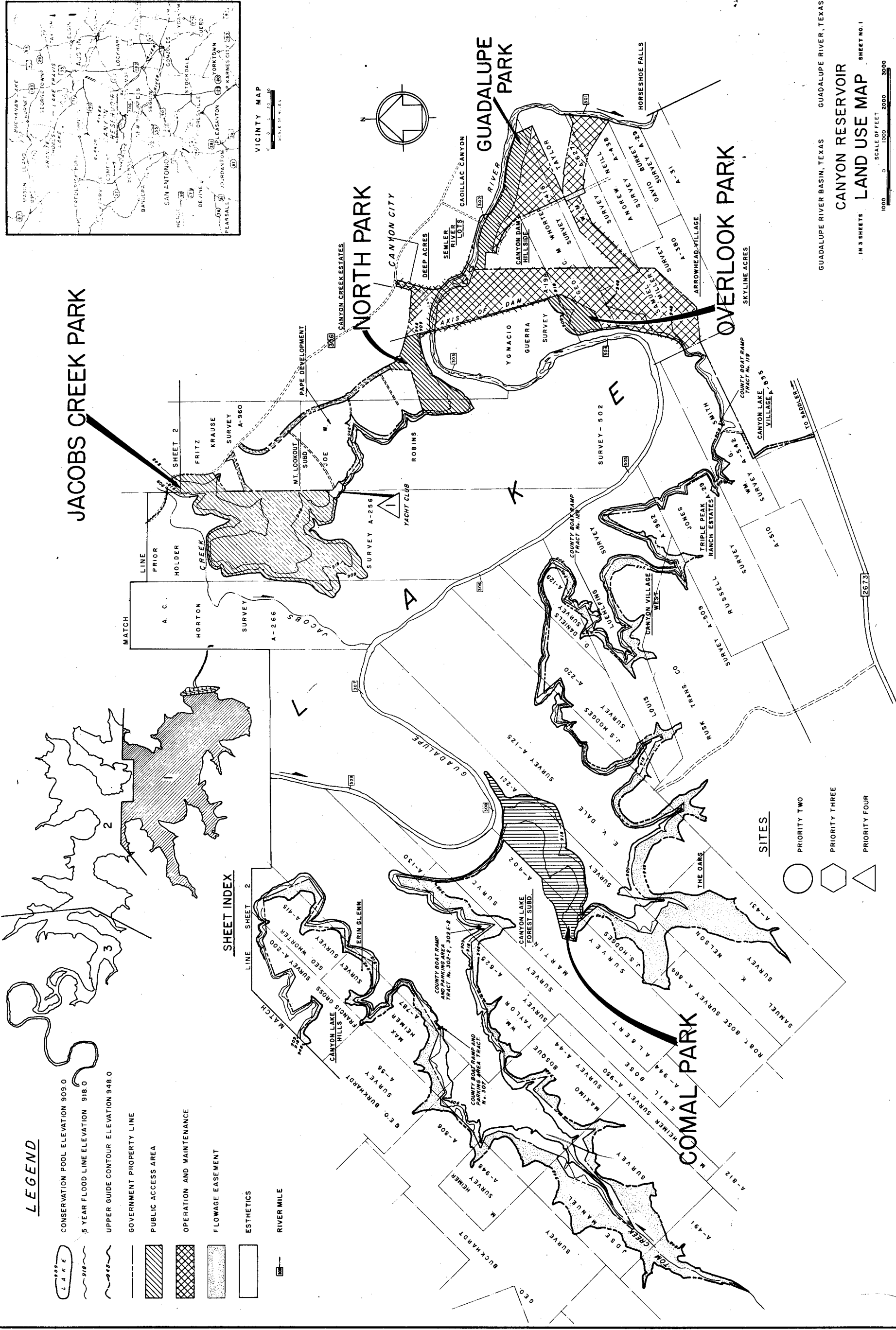
CANYON CITY

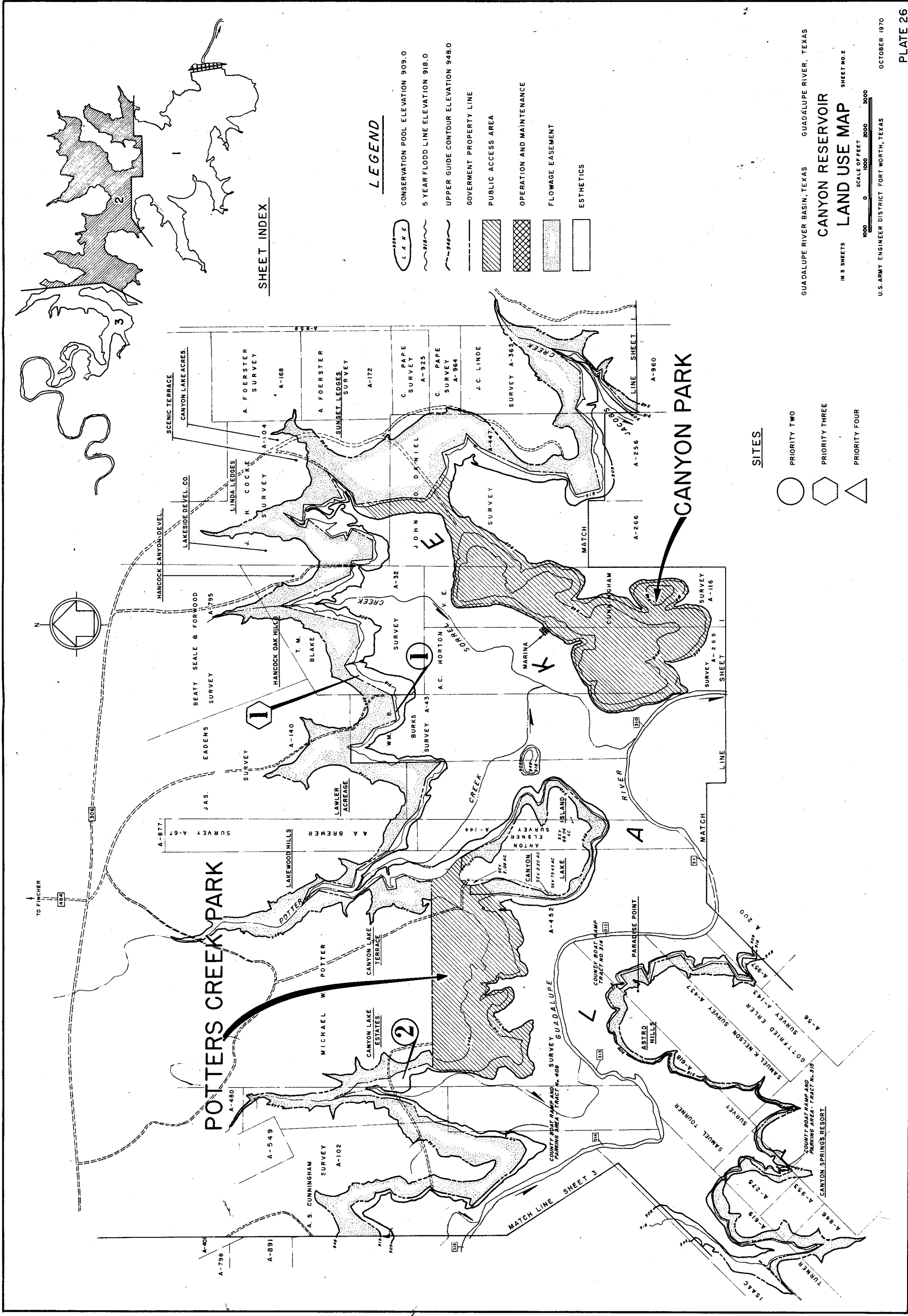
GUADALUPE RIVER BASIN, TEXAS  
CANYON RESERVOIR  
LAND USE MAP  
IN 3 SHEETS  
SHEET NO. 1  
SCALE OF FEET  
1000 0 1000 2000 3000  
OCTOBER 1970  
U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS

PLATE 25

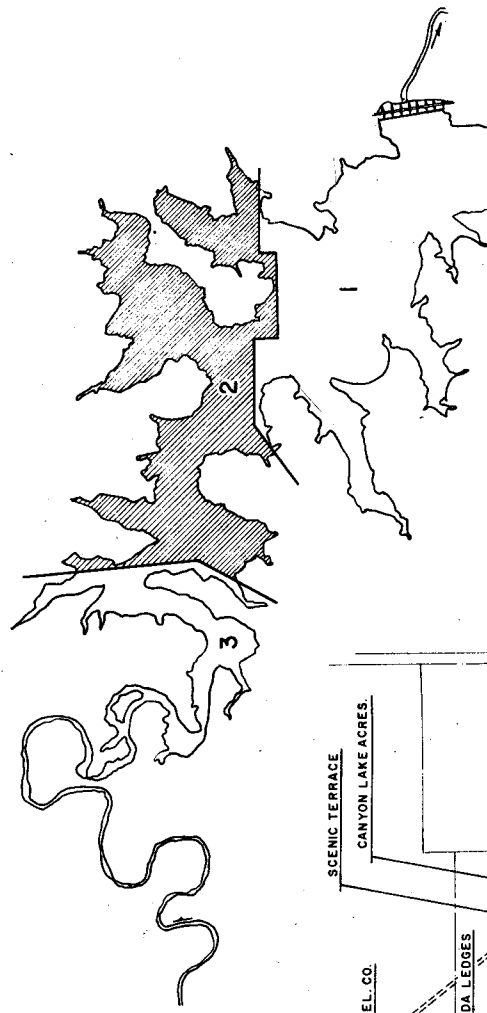
SITES

- PRIORITY TWO
- PRIORITY THREE
- PRIORITY FOUR





**SHEET INDEX**



**LEGEND**

- CONSERVATION POOL ELEVATION 909.0
- 5 YEAR FLOOD LINE ELEVATION 918.0
- UPPER GUIDE CONTOUR ELEVATION 948.0
- GOVERNMENT PROPERTY LINE
- PUBLIC ACCESS AREA
- OPERATION AND MAINTENANCE
- FLOWAGE EASEMENT
- ESTHETICS

**SITES**

- PRIORITY TWO
- PRIORITY THREE
- PRIORITY FOUR

GUADALUPE RIVER BASIN, TEXAS GUADALUPE RIVER, TEXAS

**CANYON RESERVOIR**

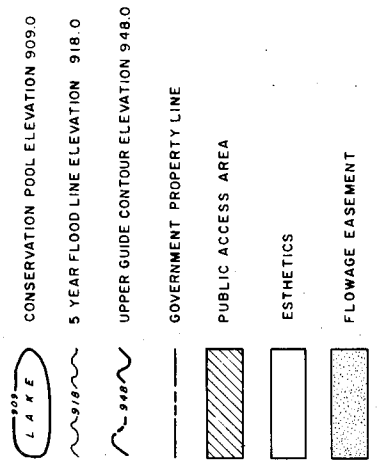
IN 3 SHEETS SHEET NO. 2

**LAND USE MAP**

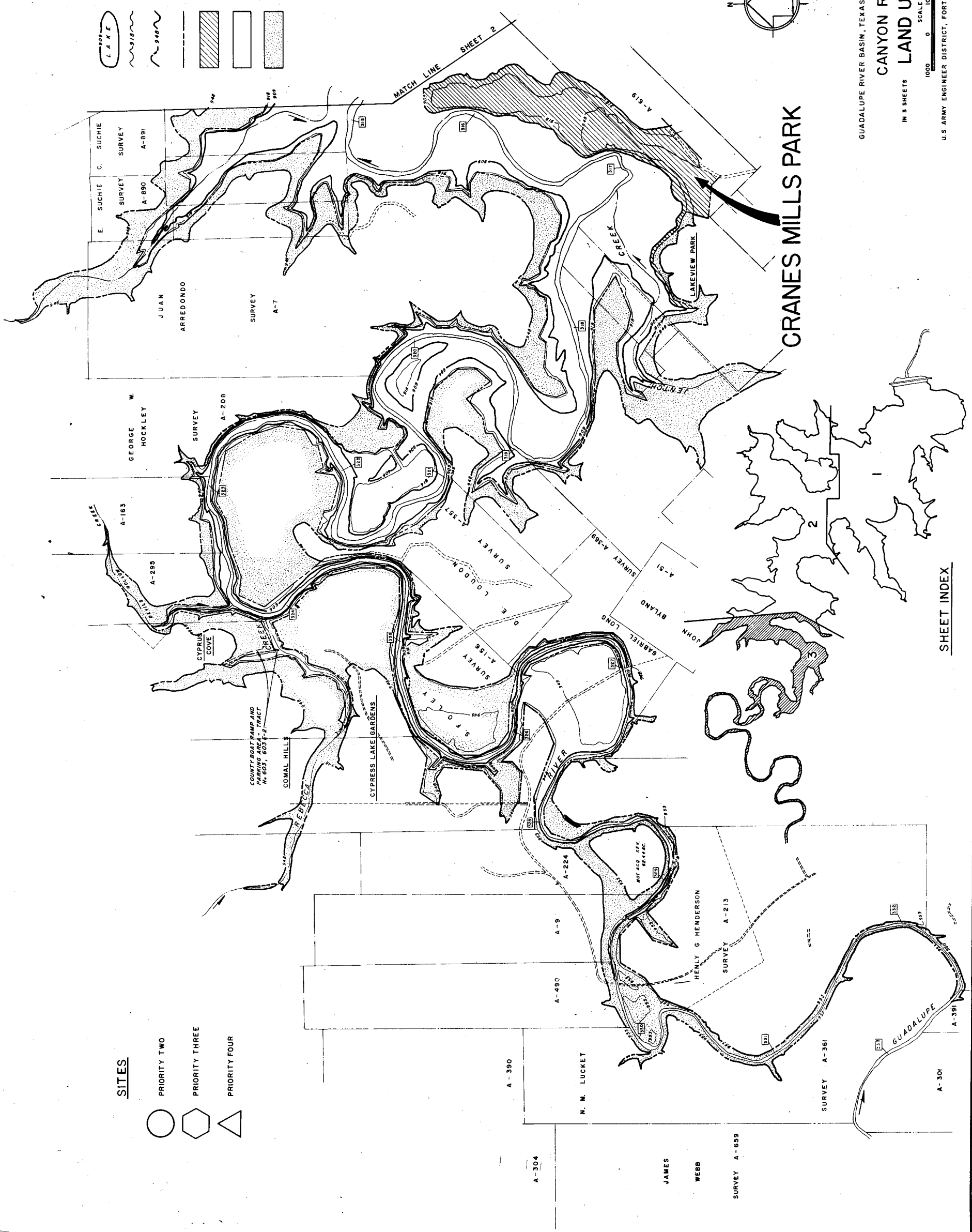
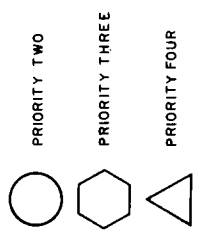
SCALE OF FEET 0 1000 2000 3000

U.S. ARMY ENGINEER DISTRICT FORT WORTH, TEXAS OCTOBER 1970

LEGEND



SITES



GUADALUPE RIVER BASIN, TEXAS GUADALUPE RIVER, TEXAS  
CANYON RESERVOIR  
IN 3 SHEETS LAND USE MAP SHEET NO. 3  
SCALE OF FEET  
1000 0 1000 2000 3000  
U.S. ARMY ENGINEER DISTRICT, FORT WORTH, TEXAS  
OCTOBER 1970