II - PROJECT DESCRIPTION

2-01 Location. Fullerton Dam is located on East Fullerton Creek, in the San Gabriel River drainage, as seen on plate 2-04. The dam is situated in the eastern Coyote Hills, which provide the last topographic relief before East Fullerton Creek enters the coastal plain. The dam is located in Orange County, one mile south of the intersection of Imperial Highway and Orange Freeway, and approximately 2 miles northeast of the City of Fullerton. The local project area is shown on plate 2-05.

2-02 Purpose. The purpose of Fullerton Dam is regulating flood stage flows through East Fullerton Creek, and minimizing flood damage downstream of the structure. The protected area includes the City of Fullerton and development on the adjacent coastal plain. The original (1938) stated purpose (ref. c, pl. 1-01) was protection of "the towns of Fullerton, Placentia, and Anaheim, and the adjacent highly developed agricultural area from floods originating in the watershed above."

2-03 Physical Components. Fullerton Dam consists of an earthfilled embankment with outlet works and a detached concrete spillway. The components of Fullerton Dam are shown in the site plan on plate 2-06. They include:

a. Dam. The dam is an impervious, unzoned, earthfill gravity structure. Crest length at the top of the dam is 575 feet, with a crest width of 15 feet and a top elevation of 307 ft. NGVD. The maximum height above the original East Fullerton Creek streambed is 46 feet. The structure of the dam features 3H:1V side slopes on both the upstream and downstream faces, with the upstream slope changing to 4H:1V near the toe. The upstream face is covered with a 2 foot blanket of graded rip-rap placed on a 12-inch gravel blanket. The downstream slope is protected by a 12-inch thick gravel blanket. The base of the dam is 330 feet long in the direction of streamflow, with a rock toe at the bottom of the upstream face, and a cut-off trench beneath the center of the dam. Details of the embankment sections are shown on plates 2-07 and 2-08.

b. Outlet Works. The outlet works are located near the western abutment of the dam. The outlet works are shown on plate 2-09.

(1) Approach Channel. The unlined approach channel is trapezoidal in cross-section, has a bottom width of 20 feet and side slopes of 2H:1V. The approach channel is 873 feet long.

(2) Inlet Channel. The rock-faced inlet channel is 52 feet long with a bottom width of 20 feet and side slopes of 2H:1V.

(3) Intake Structure. The reinforced concrete intake structure includes a 37-foot long inlet channel transition section, and a 47-foot high intake tower. Trash racks are positioned in the base of the intake tower. The intake tower provides access to the gate-stem guides and the outlet gates. Details of the intake structure are shown on plate 2-10.

(4) Outlet Structure. Two vertical lift gates, 3 feet wide by 5 feet high, are set in the base of the intake tower at invert elevation 261 ft. NGVD. The Southern California Edison Company supplies 440 volt power to the motors

on the two gate hoist assemblies. In case of commercial power failure, a diesel standby power unit is available to supply 30 KW at 480 volts and 60 Hz. The gates open and close at a rate of one foot per minute.

A 3-foot wide by 2-foot high ungated outlet with entrance crest at elevation 275 ft. NGVD prevents permanent storage above that elevation. A transition section with level invert at elevation 261 ft. NGVD extends 28.5 feet downstream of this ungated outlet, merging flows from the gated and ungated outlets, and directing them into the outlet conduit, as seen on plate 2-10.

The rectangular outlet conduit is 4 feet wide by 6 feet high, and 317.5 feet long with a slope of .00189. Maximum outlet discharge is controlled by the outlet conduit capacity. At a water surface elevation of 290 ft. NGVD (spillway crest), conduit capacity is 590 cfs. Outlet discharge rating curves were computed based upon the following design information: Manning's "n" = 0.010; entrance loss = 0.050; upper conduit bend losses = 0.144 and 0.167; lower conduit loss = 0.0968; transition loss = 0.20; and the gates losses were adopted from the Hansen Dam gates. Outlet discharge rating curves for the ungated and two gated outlets are shown on plates 2-11 and 2-11A. These curves are valid only if both gate openings are set at the same height. Should the gate openings be set at different heights, establishing discharge values from an outlet discharge rating curve is very difficult, due to the complex hydraulics of the outlet structure.

(5) Downstream Structure. The outlet conduit discharges into a concrete stilling basin about 171 feet long, with width varying from 4 to 11 feet, and walls ranging in height from 9 to 17 feet. The stilling basin merges into an outlet channel 214 feet long with a bottom width of 8 feet and side slopes of 2H:1V as seen on plate 2-12. Downstream of this rock-faced channel, discharge moves into a grass channel, and eventually enters an improved section of Fullerton Creek maintained by the Orange County Environmental Management Agency (OCEMA).

c. Control House. The concrete gate control house, located on top of the intake tower, has inside dimensions of 16 feet wide by 19 feet long by 13.5 feet high. The control house contains: (1) the gate hoists and electrical controls; (2) a standby diesel generator; (3) gate position indicators and recorders; (4) a radio transceiver; (5) three digital recorders monitoring reservoir water surface elevation, downstream gauge height and precipitation; and (6) a remote terminal unit (RTU) that transmits digital recorder information to the Water Control Data System computer located in the downtown Los Angeles District Office.

d. Spillway. The spillway is northeast of Fullerton Dam in the hill forming the dam's eastern abutment. Plan and profile of the spillway are shown on plate 2-13.

(1) Spillway Approach Channel. The trapezoidal approach channel is approximately 300 feet long with side slopes of 2H:1V and a rounded inlet transition.

(2) Spillway Control Section. The control section is formed by a concrete ogee weir 8 feet high and 40 feet long, with a crest elevation of 290 ft. NGVD. The spillway channel terminates in a flip bucket with a lip elevation of 270 ft. NGVD. Plate 2-14 shows the spillway discharge rating curve.

(3) Outlet Channel. Flow from the spillway outlet channel will tend to follow the Bastanchury Drain watercourse (shown on pl. 2-06) into Fullerton Creek below the dam. When the capacity of this tributary is exceeded, water will flow onto Bastanchury Road and Associated Road. Exceeding the capacity of Fullerton Creek or Bastanchury Drain will likely cause flooding of the campus of California State University at Fullerton and part of the northwest portion of the City of Fullerton.

e. Reservoir. Reservoir boundaries are defined by the extent of the land acquired by the Federal Government for flood control behind Fullerton Dam (shown on pl. 2-15). Although there is perennial flow in Fullerton Creek near the dam site, periods of impounded water are infrequent and short-lived.

A June 1970 survey is the latest available source of reservoir elevation-storage information. This survey is shown on plate 2-16. Area and capacity curves for the reservoir are shown on plate 2-17 and provided in tabular form on plate 2-01. When the reservoir is filled to spillway crest (elevation 290 ft. NGVD), the impounded storage is 764 acre-feet, covering 60.7 acres.

2-04 Related Water Control Facilities. Fullerton Dam is the primary regulating facility on Fullerton Creek. Upstream of the dam, Loftus Diversion Channel increases the dam's drainage area by approximately 2 square miles, bringing runoff into the flood control basin from the east. This diverted flow passes through a debris basin and small recreation pool before reaching the dam, as seen on plate 2-06.

Downstream of the dam, Fullerton Creek is predominantly an improved channel maintained by the OCEMA. There are no spreading grounds or other water conservation facilities along the course of the creek. Two U.S. Army Corps of Engineer dams, Brea Dam and Carbon Canyon Dam, are located near Fullerton Dam, but each dam primarily protects its separate downstream channel, and the three facilities are not operated in conjunction.

2-05 Real Estate Acquisition. The acquired real estate conforms with criteria in ER 405-2-150. The initial acquisition, finalized 14 February 1941, encompassed 140.31 acres and cost $26,955. Subsequent to land acquisition, a variety of land use deeds were granted to public groups. A list of current land users is provided on plate 2-02.

2-06 Public Facilities. Orange County holds a Parks and Recreation outlease for 11.26 acres of land within the reservoir property. The improved area is named Ted Craig Regional Park, and is shown on plate 2-18. Facilities include: an administration building, a small pond, tennis courts, baseball fields with backstops, picnic areas, and rest areas. Elevations of all facilities in Ted Craig Regional Park are listed on plate 2-03.

Trees have been planted throughout the park and an extensive lawn is maintained. Roads and sidewalks are paved. A nominal fee is charged to enter the park by car. The only unimporved area of the park lies immediately north of the dam. This area had included groomed baseball fields, but repeated inundation by impounded water caused the fields to be abandoned, and the area is now overgrown.