

II - DESCRIPTION OF PROJECT

2-01. Location

Brea Dam is located across Brea Creek, about 6 miles above the confluence of Brea Creek and Coyote Creek. The dam, which lies within the city limits of Fullerton, is about 1/2 miles north of the intersection of Harbor Boulevard and Brea Boulevard, and about 20 miles southeast of the civic center of Los Angeles. The location of the project is shown on plate 2-01.

2-02. Purpose

The primary purpose for which Brea Dam was constructed is flood control. Other uses and benefits of the dam and reservoir, such as recreation are secondary. Brea Dam regulates flows on Brea Creek, and is designed to provide protection from floods for the City of Fullerton and the adjacent, highly-developed, coastal plain area.

2-03. Physical Components

Brea Dam consists of an earthfilled embankment, with a reinforced concrete spillway and outlet works. The components of Brea Dam and Reservoir include:

a. Dam. The dam is a zoned earthfill embankment with a crest length of 1,765 feet at an elevation of 295 feet, National Geodetic Vertical Datum (NGVD). The crest width at the top of the dam is 20 feet and the maximum height above the original Brea Creek streambed is 87 feet. The upstream slope (Photo No. 2-01) varies from 1 on 3.3 at the top of the dam to 1 on 4 at the toe. The downstream slope (Photo No. 2-02) varies from 1 on 3 at the top of the dam to 1 on 4 at the toe. The upstream slope is paved with a 2-foot layer of graded rip-rap on a 12-inch gravel blanket (Photo No. 2-03) and the downstream slope is protected with a 2-foot blanket of gravel. The general plan and elevation of the dam is shown on plate 2-02. A 3 foot high parapet wall was added to the dam crest in 1973 to account for a freeboard (wave runoff and wind setup) deficiency. The deficiency did not exist at the saddle dike.

b. Outlet Works. The outlet works in the right abutment consist of (1) a lined approach channel, (2) a reinforced concrete intake structure (Photo No. 2-04), (3) outlet gates, (4) ungated outlets, (5) concrete conduits through the dam, (6) a control house with service bridge, and (7) an outlet channel (see pl. 2-03).

(1) The lined approach channel is trapezoidal in cross-section with a bottom width of 25 feet and side slopes of 1 on 2. It is lined with 12 inches of rock paving on a 6-inch gravel blanket for a length of 100 feet, and reinforced concrete for a length of 67 feet, including intake structure wing walls.

(2) The reinforced concrete intake structure includes an inlet channel transition section approximately 31 feet long and an intake tower 87.5 feet high. Trash racks are provided in the base of the intake tower. The intake tower provides access to the gate operating cable, sheave blocks and the outlet gates.

(3) The concrete gate control house, located on top of the intake tower, is 22 feet by 28 feet inside, and 17 feet high. The control house contains (i) the gate hoists and electrical controls, (ii) gate position indicators and two Stevens Type F gate-opening recorders, (iii) Stevens A71 and A35 reservoir water stage recorders, (iv) a selsyn indicator connected with the downstream gauging station, (v) a glass-tube rain gauge, and (vi) a remote terminal unit of the Los Angeles Telemetry System.

(4) Two caterpillar-type vertical lift gates, 5 feet wide by 8 feet high, are set in the base of the intake tower at invert elevation 208 feet. 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 may also be operated by hand crank in case of motor failure. Under normal operating conditions the gates open or close at about one foot per minute.

(5) Two 3 feet wide by 2.5 feet high ungated outlets equipped with trash racks, with entrance crests at elevation 251 feet, are provided to prevent permanent storage above that elevation. A transition section with level invert at elevation 208 feet extends approximately 27 feet downstream and merges the flows from the gated and ungated outlets and directs them into the outlet conduits. Maximum outflow through one gated and one ungated outlet is limited by the capacity of the outlet conduit.

(6) The concrete outlet conduit is double-barreled. Each barrel is 5 feet wide by 8 feet high and is 484 feet long, including an upstream transition section 58 feet long. From the end of the transition section to the outlet portals, the slope is 0.00238. The maximum outlet capacity with the water surface at spillway crest is 3,800 cubic feet per second (cfs). Discharges of gated and ungated outlets against elevation are given on plate 2-04 and plotted on plate 2-05.

(7) The outlet conduit discharges into a rectangular concrete-lined outlet channel 12.5 feet wide and 425 feet long, with channel height ranging from 9 to 12 feet. A trapezoidal section 60 feet long, paved with derrick stone, serves as a transition to Brea Creek Channel.

c. Spillway. The spillway is detached from the embankment and is located through the hill forming the east abutment. It includes (1) a trapezoidal approach channel (Photo No. 2-05), (2) a rectangular control section, and (3) a trapezoidal exit channel (Photo No. 2-06). See plate 2-06. Spillway discharge versus elevation is listed on plate 2-07 and plotted on plate 2-08.

(1) The trapezoidal approach channel is approximately 220 feet long with side slopes of 1 on 2 and a bottom width of 150 feet. The first 180 feet of channel is unlined and the downstream 40 feet is lined with reinforced concrete.

(2) The control section is formed by a concrete ogee 12 feet high and 150 feet long. The spillway channel is 640 feet long and terminates in a flip bucket with lip elevation 240 feet.

(3) The spillway exit channel is approximately 325 feet long and 150 feet wide with side slopes of 1 on 2. Derrick-stone lining protects the first 50 feet of the exit channel.

(4) The spillway channel returns to Brea Creek Channel approximately 800 feet downstream from the outlet works exit.

d. Outlet Works. The outlet works (as shown on pl. 2-03) consist of both controlled and uncontrolled intake conduits. The controlled intake conduit, whose invert elevation is 208 feet, houses two 5 feet wide by 8 feet high vertical lift gates. The uncontrolled intake conduit, whose invert elevation is 251 feet, consists of two 3 feet wide by 2.5 feet high entrances. The uncontrolled and controlled structures join each other just downstream from their entrances and form a 484 feet long, 5 feet high by 8 feet wide conduit. The conduits have a maximum capacity of 3,800 cfs with a reservoir elevation at spillway crest.

e. Saddle Dike. A saddle dike is located about one mile upstream from the dam. The dike, with crest elevation 295 feet, is approximately 640 feet long and 41 feet high. Details and plan views are shown on plate 2-09. The dike was constructed to protect the Union Pacific Railroad right-of-way that is located in the flood control basin.

f. Reservoir. The reservoir formed by Brea Dam has an area and gross capacity at spillway crest (elev. 279 feet) of 162.7 acres and 4,009 acre-feet, respectively. At the top of the dam (elev. 295 feet) the area is 272.8 acres and the capacity is 7,420 acre-feet. The real estate limits for the Brea Reservoir is shown on plate 2-10. The recreational development plan is shown on plate 2-11. Plate 2-12 shows the storage allocation diagram for Brea Reservoir. Tabulation of areas and capacities is given on plate 2-13. Plate 2-14 shows the area and capacity curves.

2-04. Related Control Facilities

Brea Creek flows enter the San Gabriel River via Coyote Creek channel. The channel of Brea Creek, from outlet of reservoir to the confluence with Coyote Creek, is regulated primarily by Brea Dam.

2-05. Real Estate Acquisition

A total acreage of 298.7 acres was acquired by the Federal Government within the reservoir taking line. The City of Fullerton has acquired 7.75 acres outside the reservoir taking line to supplement the acreage available for recreation development. The boundaries of real estate are depicted on plate 2-11.

2-06. Public Facilities

The public and private facilities within Brea Reservoir are comprised of golf courses, a stadium, picnic areas, and tennis courts. All recreation facilities at Brea Dam recreational areas are operated and maintained by the City of Fullerton. Pertinent elevations are given in table 2-01.

Table 2-01.
Elevations of Recreation and Other Facilities
Brea Reservoir, Fullerton, California

Lowest
Elevation

<u>Facility</u>	<u>(feet)</u>
Fullerton Municipal Golf Course	239
Bastanchury Road	239
Oil Wells (Union Oil)	275
Tennis Courts	284

Note: Children's Center and Y.M.C.A. are not within the reservoir.



Photo No. 2-01. Upstream slope of dam (view toward southeast).

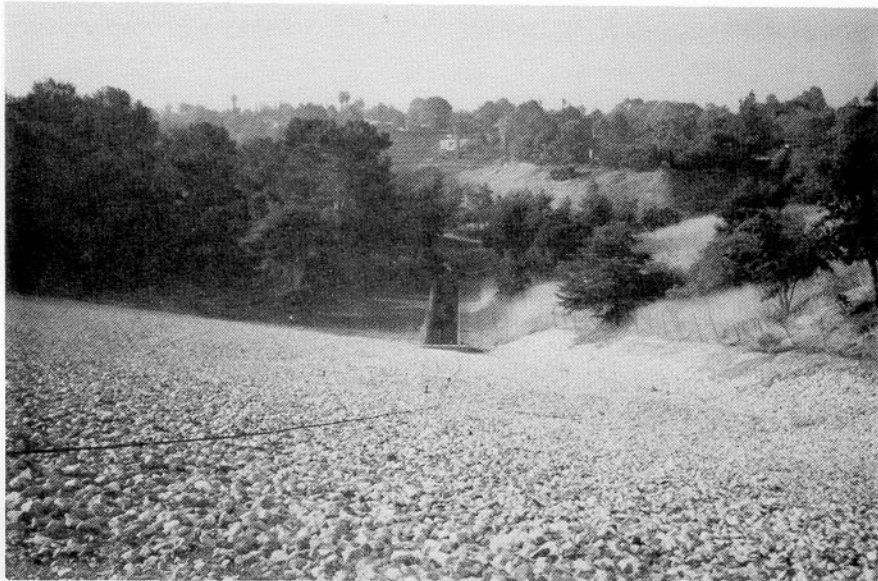


Photo No. 2-02. Downstream slope of dam, with outlet channel in background (view toward south).



Photo No. 2.03. Brea Reservoir (view toward upstream).



Photo No. 2-04. Outlet works: approach channel and trash rack (view toward downstream).

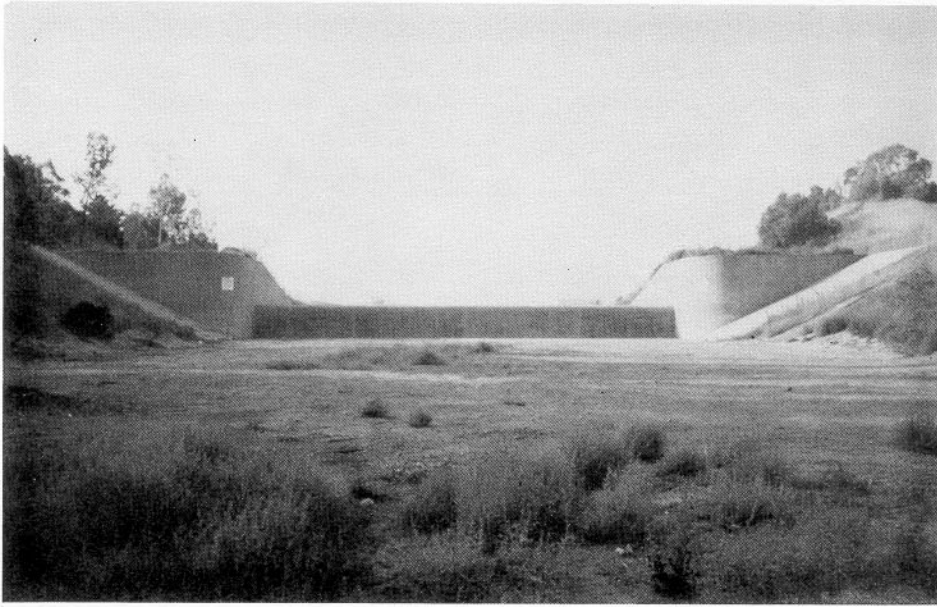


Photo No. 2-05. Approach to spillway (view toward south).



Photo No. 2-06. Spillway outlet channel (view looking upstream)