III - PROJECT HISTORY

3-01 History and Authorization. The flood of 1916 and the agricultural growth of Orange County in the 1920's gave rise to the need for improved flood protection on the county's coastal plain, and development of a system to replenish the ground water that was used at constantly increasing rate. The Orange County Flood Control District envisioned a plan that would address both of these issues, and outlined it in their 1929 report, "The Control of Floods and Conservation of Water", (ref. a, pl. 1-01). Fullerton Dam was one unit of this comprehensive plan.

The dam was originally intended to collect water from the upstream watershed, the Loftus Diversion Channel, and the discharge from projects on nearby Brea Creek. Releases from Fullerton Dam would then be routed to Carbon Canyon Creek via conduit, and subsequently released into the Santa Ana River with the intent of recharging the ground water aquifer.

Orange County originally submitted a report on the overall Santa Ana River Basin and Orange County project for a grant under the Federal Emergency Relief Appropriation Act of 1935. The project was later authorized under the Flood Control Act of 22 June 1936 (as amended). Construction of Fullerton Dam and Loftus Diversion Channel became the responsibility of the United States Government; and Orange County would handle improvement of downstream channels and any water conservation facilities.

3-02 Planning and Design. Orange County's preliminary design of Fullerton Dam included siting the spillway on the east abutment of the dam, and constructing an outlet works of three separate conduits capable of discharging a total of 2,240 cfs. Because the reservoir site is over a proven oil field, Orange County wanted the flooded area kept as small as possible. The planning and design of Fullerton Dam was then transferred to the U.S. Engineer Office, Los Angeles, California, now known as the U.S. Army Corps of Engineers. Economics, and the Government's interest solely in flood control, led to the current spillway site and outlet works. Design work for Fullerton Dam by the U.S. Engineer Office was completed in early 1940. Plans for construction of Loftus Diversion Channel were not adopted by the Federal Government due to concerns over sediment buildup. Design of Fullerton Dam anticipated the diversion construction at a later date.

3-03 Construction. Construction of Fullerton Dam was started in June 1940 and completed in May of 1941. The cost of the project, financed by Federal funds, was $577,965. Orange County Flood Control District (now part of OCEMA), completed Loftus Diversion Channel in December 1954. Orange County has not built any water conservation facilities for use with Fullerton Dam.

3-04 Related Projects. Fullerton Dam was one of several facilities authorized by the Flood Control Act of 1936 (as amended) and built by the U.S. Army Corps of Engineers. Because Fullerton Dam is located in Orange County, it was authorized as part of a Santa Ana River Basin flood protection program. Functionally, the facility is part of the Los Angeles County Drainage Area (LACDA) system. Flood flows released from Fullerton Dam eventually join with Coyote Creek in Los Angeles County and subsequently enter

the San Gabriel River. Because Fullerton Dam influences only the upper portion of Fullerton Creek, no other Federal structures directly relate to its operation.

The Loftus Diversion Channel, upstream of Fullerton Dam, was completed in December 1954 by the Orange County Flood Control District, (now part of OCEMA). The debris basin at the outlet of Loftus Diversion Channel was built in 1984 by OCEMA.

3-05 Modifications to Regulation. The original water control plan for Fullerton Flood Control Basin is presented in the report, "Fullerton Dam, Analysis of Design," dated January 1940. This initial plan called for establishment of a water conservation pool, to be formed by keeping the gates closed until the water surface reached an elevation of 277 ft. NGVD, providing a pool depth of 16 feet. Plans for water conservation regulation were later dropped, as the Orange County Flood Control District had no facilities for utilizing conservation releases.

The water control plan presented in the 1970 Reservoir Regulation Manual for Fullerton Flood Control Reservoir called for a standby gate opening of 0.3 feet for both gates. Because this gate setting impounded water during minor rainfall events and inundated recreational facilities, the standby setting was increased to 0.5 feet in 1977. In 1983 a new standby gate setting was implemented at 1.1 feet, along with a modified gate schedule at low water surface elevations. During storm events, gate openings are adjusted according to changing reservoir water surface elevations. Maximum discharge under the 1983 water control plan was 261 cfs. The current water control plan, presented in this manual, is calculated using the improved downstream channel capacity and the availability of telemetry gauge data. With these improvements, greater releases can be made that improve the overall protection provided by Fullerton Dam.

3-06 Principle Regulation Problems. There are problems associated with water control at Fullerton Dam and Reservoir. First, the dam and reservoir cannot handle the Standard Project Flood (SPF) without spillway flow. The SPF design method was not in use at the time Fullerton Dam was designed. The capacity of the present structure, designed by the Modified Rational method, cannot contain the critically greater volume event determined by the current SPF design method. The spillway discharges into a small drainage channel running parallel to Bastanchury Road. Spillway flow could easily exceed that channel capacity and cause flooding of local streets, the California State University at Fullerton campus, and private homes, in an event not necessarily as great in magnitude as the SPF. The new regulation schedule presented in Chapter VII should help to minimize these problems by increasing the release made from the outlet works and decreasing the uncontrolled peak release.

Secondly, during most high flow events, runoff passing through the dam outlet works causes debris to accumulate on the trash racks and inhibits water discharge. During low flow events, debris from the Loftus Diversion Channel is captured by the OCEMA debris basin upstream from the dam. When larger flows occur, the floating debris is flushed out of this basin, and received by the dam in a single slug. The debris must be prevented from causing a

blockage of outlet discharge during a high runoff situation. Such blockage can result in greater impoundment heights, putting recreational facilities in Craig Regional Park underwater and, under conditions well below an SPF, could cause undesirable spillway flow. Water control managers and the dam tender should pay attention to the status of debris accumulation, and notify the maintenance section if a cleanout is warranted.

Third, the channel downstream of Fullerton Dam is susceptible to flooding caused by local inflow. Thus the downstream channel should be monitored, so that releases from the dam do not worsen an existing flood situation. This can be done by using the telemetry stations in Fullerton Creek channel and by dispatching channel observers with radio equipped cars to patrol the channel when necessary.

Fourth, the project is subject to a very rapid runoff response time. The contributing drainage area characteristics cause streamflow to increase rapidly in response to effective rainfall. Plots of historical events inflow, outflow, and reservoir elevations (pls. 4-03 through 4-09) show a consistent pattern of rapid peak inflow (6 hours or less to peak from a base flow condition) and peak or near peak outflow and reservoir storage lagged only approximately 4 hours behind the time of peak inflow. This results in a requirement for a corresponding rapid response on the part of the dam tender and reservoir regulation personnel so that releases may be most effectively regulated.