

## Santa Clara River Levee Embankment Erosion Protection Evaluation Ventura County, California

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As part of FEMA's previous Map Modernization program, and continuing with FEMA's current RiskMap program, it became necessary for the Ventura County Watershed Protection District (VCWPD) to provide documentation demonstrating that the Santa Clara River Levee System meets requirements for providing flood protection for the 1-percent annual occurrence (100-year) flood event. Anderson Consulting Engineers supported Wood Rodgers' levee recertification efforts for a portion of the Santa Clara River Levee System which is located within both unincorporated Ventura County and the City of Oxnard. It was the intention of the VCWPD that this levee be accredited in order for it to be shown as providing protection on the Ventura County DFIRM. The study reach consists of a 1.7-mile earthen levee protected by riprap, bendway weirs and, occasionally, concrete rubble. The levee currently has Provisionally Accredited Levee (PAL) status; the portion of the levee certification process for which Anderson Consulting Engineers was responsible included the following tasks:

- (a) **field reconnaissance efforts** to visually evaluate bridges, the levee, and other hydraulic structures within both the levee and the study reach, as well as to assess existing erosion protection measures and collect existing riprap size data;
- (b) **in-situ riprap size and gradation analyses** in order to compare current riprap protection sizes to design riprap protection sizes;
- (c) **analysis of** existing riprap sizes in order to determine whether or not the in-situ riprap would be stable during the 100-year event;
- (d) **scour analyses** associated with bend scour, pier scour and contraction scour, including an evaluation of potential low flow channel migration, in order to evaluate the adequacy of existing riprap toe-depths; and
- (e) **provided** recommendations concerning which portions of the riprap would provide adequate erosion protection for the levee and could be certified, as well as locations where additional data, analyses, and/or bank protection are required for certification.

All work completed for this project was conducted in accordance with the requirements identified in the Map Modernization Guidelines and Specifications for Flood Hazard Mapping Partners [FEMA, April 2003], and the levee accreditation requirements outlined in the NFIP regulations CFR Section 65.10.



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