PUBLIC STAKEHOLDER INFORMATION HANDOUT

SESPE CREEK (SC-2) LEVEE

REHABILITATION AND FEMA CERTIFICATION PROJECT

PREPARED FOR:

PROJECT BACKGROUND/HISTORY

Changes in the watershed hydrology, dynamics of the creek streambed, and modifications in the design requirements for levees post-Katrina have resulted in designating portions of eastern Fillmore within the 100-year flood hazard zone published by FEMA. Some of these key contributing issues are:

- Peak flowrates have increased by 35% compared to the original levee design
- Shift in the dominant alluvial channel in the active streambed from west to east fork
- Active channel subject to resetting after major storm events
- Long-term sediment deposition and local erosion

The current District project intends to correct deficiencies associated with the SC-2 levee system with a proposed construction project that will upgrade the levee to meet the current FEMA standards and remove the mapped flood hazards in the residential area behind the levee to meet the required federal flood protection standards. FEMA requires levee owners to certify that their levees meet the criteria of the Code of Federal Regulations, Title 44, Section 65.10 (44 CFR 65.10), titled "Mapping of Areas Protected by Levee Systems." A critical component of the FEMA levee requirements is to provide a minimum of 3.0 feet of freeboard (safety factor) from about the 100-year water surface to the top of levee. However, there are two locations along the SC-2 levee which do not meet this requirement. The proposed project would raise the levee in these deficient sections and also correct additional deficiencies identified by the Army Corps of Engineers in a recent inspection of the levee. Long-term continued sediment deposition in the creek may alter the flood protection in the future, and annual scour surveys are recommended to monitor the condition of sediment deposition adjacent to the levee.

JANUARY 2012

FEMA FIRM

WATERSHED AND FLOODPLAIN CHARACTERISTICS

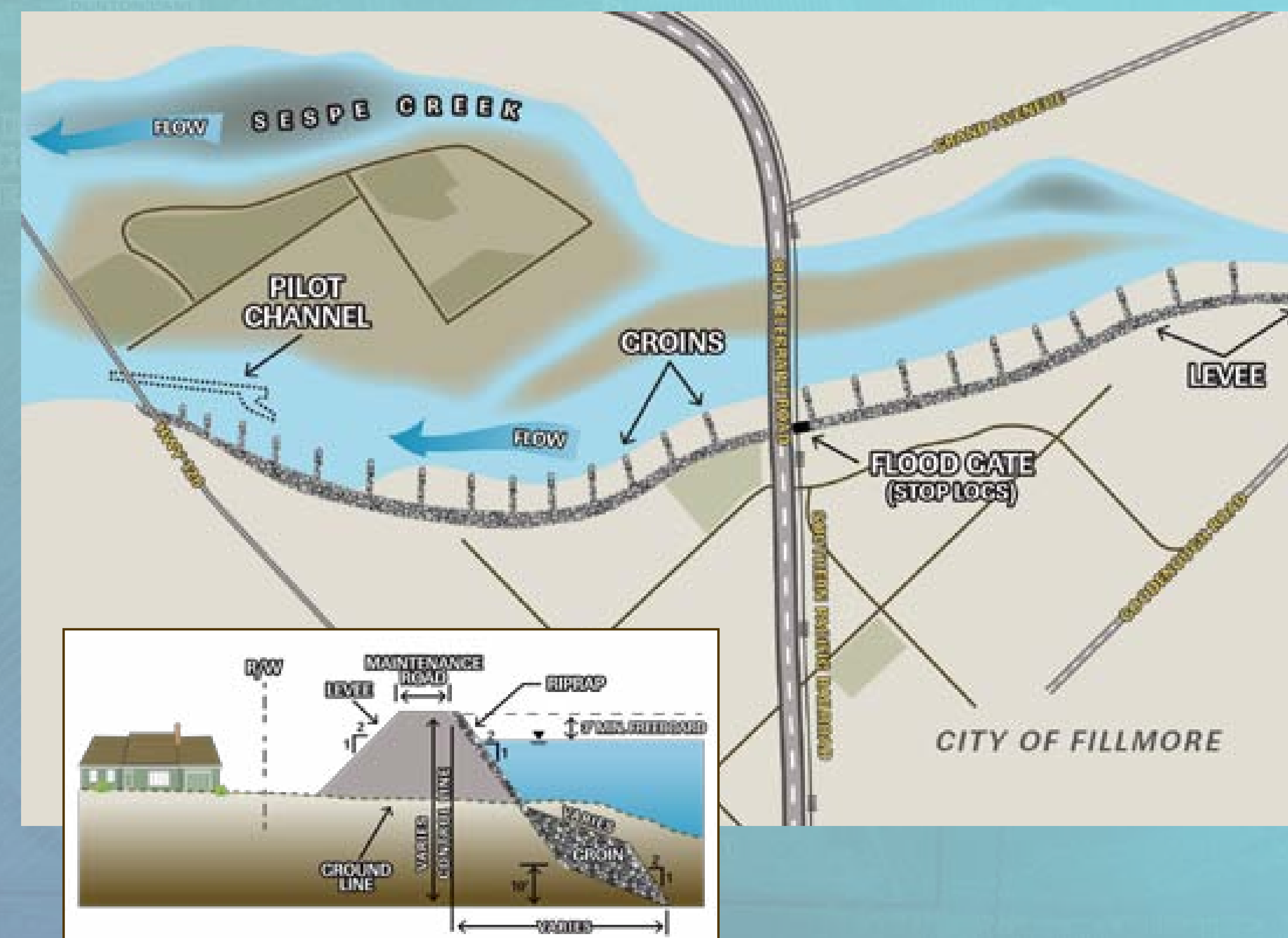
Sespe Creek drains 260 square miles of the Western Transverse Mountain Ranges—a semiarid and tectonically active region—in southern California. In total, Sespe Creek flows 60 miles from its headwaters at the western edge of Ventura County downstream to its confluence with Santa Clara River near the City of Fillmore. The creek is fed by thirty named stream tributaries as it flows generally eastward in the upper reaches through the narrow, bedrock-confined Sespe Creek gorge and then out onto a broad, alluvial fan towards the City of Fillmore and the Santa Clara River. Overall, elevations range from approximately 350 to 7,500 ft above sea level. Sespe Creek is the second largest sub-watershed in the Santa Clara River watershed, accounting for approximately 16% of the total area. The three largest floods on record measured at the USGS stream gauging station downstream of the gorge and north of the City of Fillmore were in 1969 (29,100 cfs), 1995 (28,800 cfs), and 2005 (39,700 cfs).

The channel morphology of Sespe Creek indicates that the stream is capable of transporting voluminous loads of sediment, including a fraction of coarse cobbles and boulders, to the lower reach near Fillmore. The Fillmore reach of Sespe Creek is thus a naturally highly dynamic environment subject to "resetting" by very large floods rather than progressive alteration by intermediate flood events. Resetting may involve significant bed aggradation during single floods, accompanied by abrupt changes in the river's course. Channel position will shift and bed elevations will rise and fall according to the primary controls on sediment delivery to the creek, namely the influence of sediment pulses caused by wildfire (sediment production and delivery to the channel network) and flood events. A comparison of historical topography was used to assess the potential change in water surface elevations resulting from the deposition of sediment resulting from a large storm event which indicated a maximum change in the calculated water surface elevations of approximately three feet at the confluence of the east-west connector and the east branch. This increase has a significant impact on the flood potential in this area.

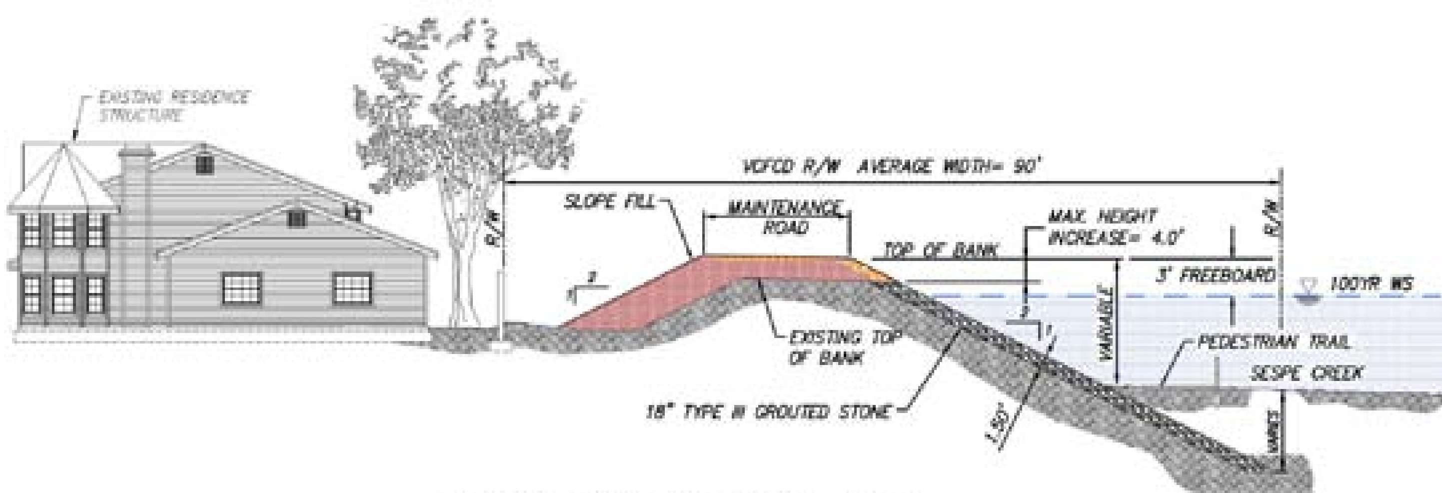
LEVEE FACILITY AND HISTORY

Progressive residential development in the floodplain resulted in significant property damage in the 1969 and 1978 floods, including one death in 1978. The Sespe Creek Levee was originally constructed by the USACE in 1984 to protect existing floodplain residences. The recommended improvements were based on a report by the USACE in March 1980 (USACE 1980). The levee was constructed along the east bank of the east branch of the creek, and extends from the Highway 126 Bridge to approximately 5,300 feet upstream of the Old Telegraph Road Bridge at Goodenough Road. The project included the construction of 2 miles of rock revetted earthen levee with 25 rock groin structures placed on the channel side of the levee. The levee was designed to provide protection from the "Standard Project Flood" discharge of 121,000 cfs. The levee was generally constructed on an alignment set 200-feet back from the existing channel bank at the time, and eliminates the lower reach of the Sespe Creek Bank Restoration project. Since the levee was completed in 1981, the largest flood to pass through occurred on January 10, 2005 and reached a peak flow of 85,300 cfs—the largest flood peak on record. Updated hydraulic analysis indicated that portions of the USACE levee below Old Telegraph Road would be overtopped during a large storm event. The analysis indicates that flow rates in excess of approximately 100,000 cfs will overtop the levee at the confluence of the east-west connector channel and the east branch. This flow rate is equivalent to approximately a 50-year storm event.

LEVEE REQUIREMENT SECTION

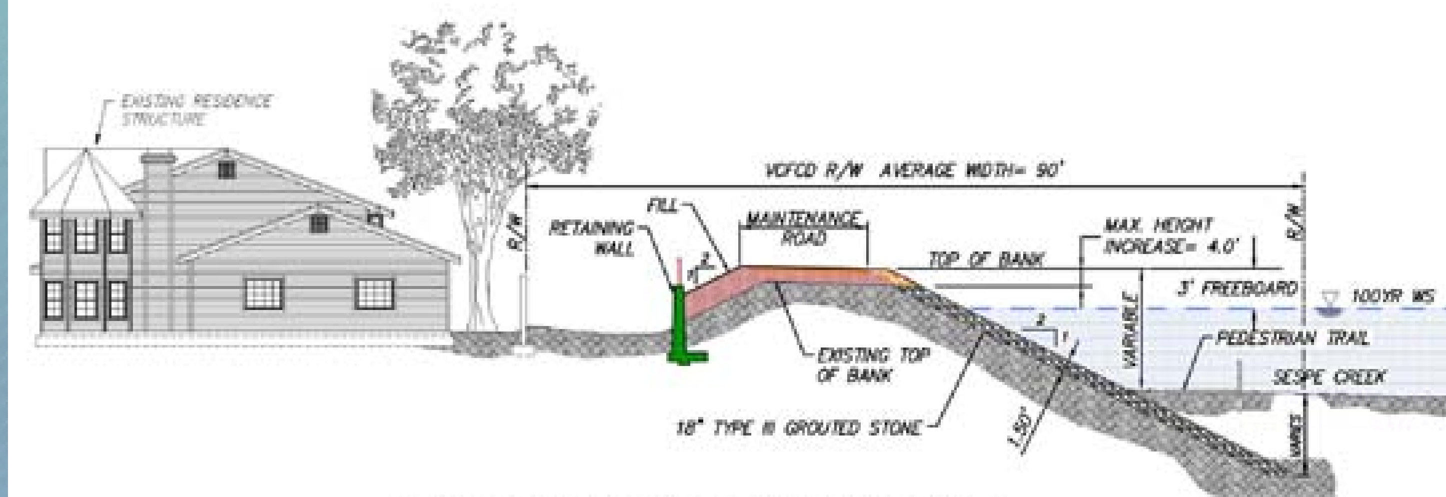


AERIAL MAP OF PROJECT AREA



PROPOSED LEVEE FILL CONDITION

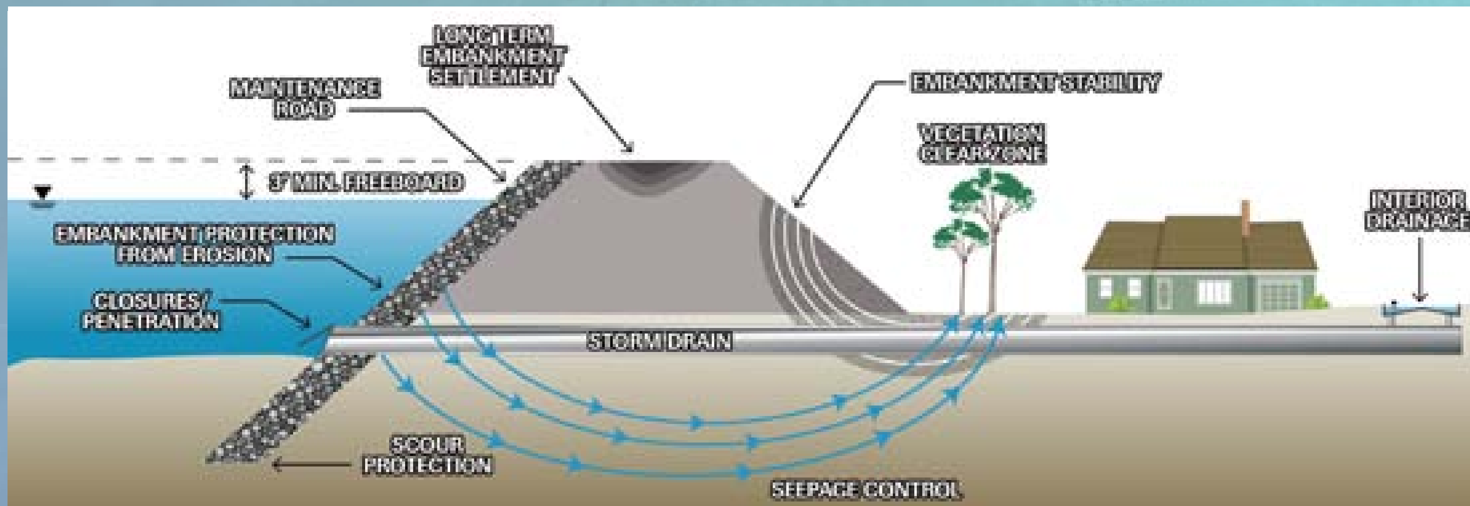
nts



PROPOSED LEVEE RETAING WALL CONDITION

nts

FEMA LEVEE DESIGN REQUIREMENTS

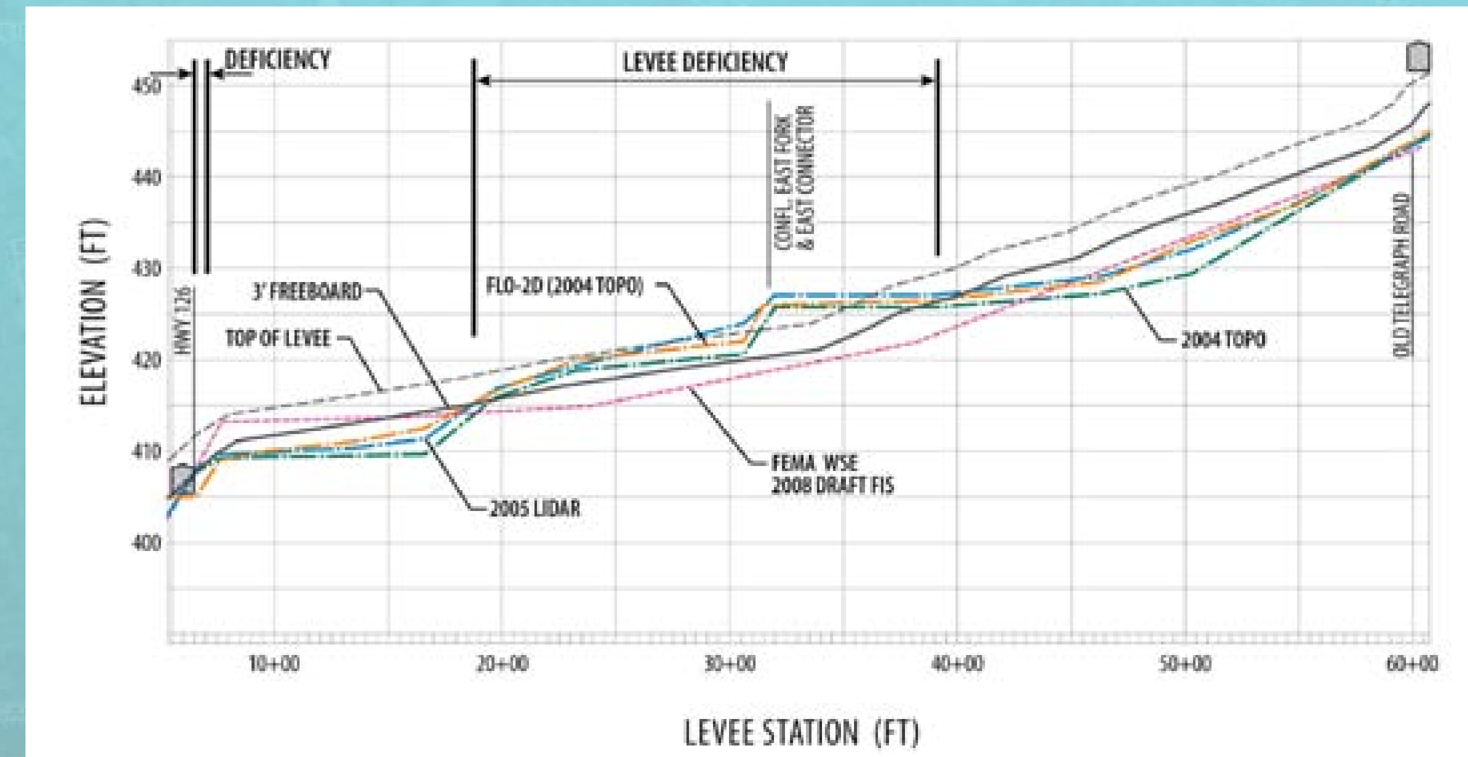


FEMA LEVEE CERTIFICATION CHECKLIST

DESCRIPTION: For levees to be recognized by FEMA, evidence must be provided that adequate design and operation and maintenance systems are in place to provide reasonable assurance that protection from the base flood existS. The following requirements must be met:

- ☐ **Freeboard**. Minimum freeboard requires three feet above the Base Flood EVFE) all along length, and an additional 1 foot within 100 feet of structures (such as bridges) (or wherever the flow is restricted). Additional 0.5 feet at the upstream end of levee. Coastal levees have special freeboard requirements (see 65.10 (b) (1) (iii) and (iv)).
- ☐ **Closures.** All openings must be provided with closure devices that are structural parts of the system during operation and designed according to sound engineering practice.
- ☐ **Embankment Protection.** Engineering analyses must be submitted that demonstrate that no appreciable erosion of the levee embankment can be expected during the base flood, as a result of either currents or waves, and that anticipated erosion will not result in failure of the levee embankment or foundation directly or indirectly through reduction of the seepage path and subsequent instability.
- ☐ **Embankment and Foundation Stability Analyses.** Engineering analyses that evaluate levee embankment stability must be submitted. The analyses provided shall evaluate expected seepage during loading condition associated with the base flood and shall demonstrate that seepage into or through the levee foundation and embankment will not jeopardize embankment or foundation stability. An alternative analysis demonstrating that the levee is designed and constructed for stability against loading conditions for Case IV as defined in the U.S. Army Corps of Engineers (USACE) manual, Design and Construction of Levees, (EM 1110-2-1913, Chapter 6, Section II), may be used.
- ☐ **Settlement Analyses**. Engineering Analyses must be submitted that assess the potential and magnitude of future losses of freeboard as a result of levee settlement and demonstrate that freeboard will be maintained. This analysis must address embankment loads, compressibility of embankment soils, compressibility of foundation soils, age of the levee system, and construction compaction methods. In addition, detailed settlement analysis using procedures such as those described in the USACE manual, Soil Mechanics Design –Settlement Analysis (EM 1100-2-1904), must be submitted.
- ☐ **Interior Drainage.** An analysis must be submitted that identifies the source(s) of such flooding, the extent of the flooded area, and, if the average depth is greater than one foot, the water-surface elevation(s) of the base flood. This analysis must be based on the joint probability of interior and exterior flooding and the capacity of facilities (such as drainage lines and pumps) for evacuating interior floodwaters.

LEVEE DEFICIENCY PROFILE



ALTERNATIVES DESCRIPTIONS

SUMMARY OF ALTERNATIVES

ALTERNATIVES	COSTS	PROPERTY ACQUISITION
No. 1 - Earth Fill Landward Side	$3,299,000	3 residential parcels
No. 2 - Retaining Wall Toe Landward Side	$1,402,000	None
No. 3 - Retaining Wall Toe Water Side	$2,245,000	1 residential parcels
No. 4 - Retaining Wall Edge Roadway Landward Side	$1,465,000	None
No. 5 - Earth Fill on Water Side	$1,817,000	None
No. 6 - Retaining Walls each Side Roadway	$1,933,000	None
No. 7 - Hybrid Alt 1 and 2	$1,528,000	1 nonresidential parcels

WALL ALTERNATIVES		FILL ALTERNATIVES	
ADVANTAGES	DISADVANTAGES	ADVANTAGES	DISADVANTAGES
Limits encroachment outside existing levee footprint	Potential for graffiti and vandalism on wall	Minimal long-term maintenance	Fill on water side involves encroachment / disturbance of habitat
Minimizes regulatory permitting	Higher construction costs	Limited vandalism or graffiti	Potential environmental mitigation and more difficult regulatory permitting
Eliminates private property acquisition	Longer construction duration	Short construction period	Reconstruction of entire rock revetment face for water side fill
	Safety issues for wall height and fencing	Public safety issues reduced	Impact footprint largest and impacts properties for landward fill

ALTERNATIVE FORMULATION/SCREENING

The previous initial planning study evaluated a comprehensive range of approximately 12 potential alternatives in both (1) structural and (2) non-structural flood management alternatives. The screening of these alternatives resulted in the recommendation to modify the existing USACE levee based on the cost-benefit ratio and limited risk involved in the alternative compared to others because of regulatory permitting uncertainties. This alternative includes raising the levee height from one to six feet for approximately 3,000 feet in the mid-section of the levee, and approximately two feet for 200 feet on the upstream side of the Highway 126 Bridge. The current study developed seven different alternatives for this solution which included either variations of a (1) earthen fill, or (2) retaining.

ALTERNATIVE RANKING

Regional Alternative No.	EVALUATION CRITERIA - PROJECT OBJECTIVES						TOTAL SCORE	Rank
	Environmental	Public Acceptance	Socio-Economic Impacts	Economic Benefit Costs	Property Acquisition	Const. Feasibility		
Weighting Factor	0.36	0.24	0.07	0.18	0.08	0.07	1	
1	6	5	6	4	2	8	5.21	6
2	8	6	6	8	9	7	7.55	2
3	5	7	6	6	4	7	5.68	5
4	8	5	5	9	9	7	7.29	3
5	3	8	8	8	9	5	6.11	4
6	5	4	4	7	9	4	5.18	7
7	8	7	7	8	6	7	7.58	1

NOTES:

VCWPD Additional Information

Contact: Elizabeth Martinez (Environmental Planner) | Elizabeth.Martinez@ventura.org or (805) 658 - 4374

Also see "What's New" on the County webpage for presentation information

http://portal.countyofventura.org/portal/page/portal/PUBLIC_WORKS/Watershed_Protection_District/What's_New