VENTURA COUNTY
WATERSHED PROTECTION DISTRICT

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April 7, 2009

Board of Supervisors
Ventura County Watershed Protection District
800 South Victoria Avenue
Ventura, CA 93009

Subject: Approval of and Authorization for the Director of Public Works or Designee to Execute Standard Form County Consulting Engineering Services Contract(s) with Tetra Tech, Inc., in a Total Not-to-Exceed Amount of $2.9 Million for Phase 3 Levee Certification Action Plan Implementation Work
Project Nos. P6011007, P6012007, and P6015007
All Supervisorial Districts, Zones 1, 2, and 3

Recommendations:

It is recommended that your Board:

1. Receive a presentation from Watershed Protection District (District) staff summarizing the current status of FEMA's Flood Insurance Studies (FIS), Digital Flood Insurance Rate Maps (DFIRMs), and Levee Certification efforts in Ventura County, and

2. Hear any comments regarding those efforts from Kathy Schaefer, Engineer, National Flood Insurance Program – Region IX, Mitigation Division, FEMA, and

3. Approve and Authorize the Director of Public Works or his Designee to execute Standard Form Consulting Services Contracts with Tetra Tech, Inc., in a total Not-to-Exceed Amount of $2.9 Million (*including 10% contingency estimate*) for Phase 3 Levee Certification Action Plan Implementation Work. Funds are available in FY09 Zones 1, 2, and 3, Budget Org Nos. 6310, 6320, and 6330, Account No. 2194, (Engineering and Tech Surveys).

Fiscal/Mandates Impact:

Mandatory: No [ ] Yes [X] Title 44, Code of Federal Regulations, Section 65.10 FEMA Levee Certification Requirements
Source of Funding: Watershed Protection District Zones 1, 2, and 3
Funding Match Required: None
Impact on Other Department(s): None

Summary of Revenues and Costs:	**FY 2008-09**	**FY 2009-10**
Revenue	$ 0	0
Costs:		
Direct:	$ 2,900,000	0
Indirect-Dept.	$ 0	0
Indirect-County CAP	$ 0	0
Total Costs	$ 2,900,000	0
Net District Costs	$ 2,900,000	0
Recovered Indirect Costs	0	0

Current FY 2008-09 Budget Projection

Current FY 2008-09 Budget Projection for Watershed Protection - Zones 1, 2, & 3 - 6310, 6320 & 6330				
	Adopted Budget	Adjusted Budget	Projected Budget	Estimated Savings
Appropriations	66,982,325	72,306,932	65,743,600	6,563,332
Revenue	36,273,700	36,273,700	38,317,200	(2,043,500)
Net Cost	30,708,625	36,033,232	27,426,400	8,606,832

Appropriations sufficient to fund the Tetra-Tech's Phase 3 Consulting Engineering Services Contract costs referenced above are included in the FY09 Zones 1, 2, and 3 adopted budgets.

Discussion:

National Flood Insurance Program - Map Modernization Program

The National Flood Insurance Program (NFIP) plays a major role in efforts to both reduce flood losses to property and the loss of natural floodplain functions. Congress established the NFIP with the passage of the National Flood Insurance Act of 1968 (Public Law 90-448). The goals of the NFIP are as follows: (1) decrease the risk of future floods, (2) reduce the costs and adverse consequences of flooding, (3) reduce the demands and expectations for disaster assistance after floods, and (4) preserve and restore the natural and beneficial values of floodplains.

The Federal Emergency Management Agency (FEMA) is currently in the process of producing Flood Insurance Study (FIS) reports and Digital Flood Insurance Rate Maps (DFIRMs) for communities all across the nation as a part of the National Flood Insurance Program Map Modernization Program (NFIP-MMP). The NFIP-MMP effort was designed to update the existing Flood Insurance Rate Maps (FIRMs), many of which were produced in the 1970's, 80's, and early 90's. Nationwide, FEMA reports that 56% of effective FIRMs are at least 15 years old. In Ventura County, 79% of effective FIRMS are more than 15 years old. The progression of the development of FIS studies and DFIRMs in Ventura County during the last five years is set forth in Exhibit No. 1.

Status of Levee Certification Efforts in Ventura County

In 2005, FEMA also initiated efforts nationwide to verify the certification status of *all* levees currently depicted in the then effective FIRMs as providing protection from the base-level flood as part of the NFIP-MMP. FEMA's levee certification efforts were accelerated and given new urgency as a result of the catastrophic levee failures in New Orleans triggered by Hurricane Katrina in the fall of 2005.

In order for FEMA to continue to accredit levees with providing base-level flood protection, levees *must* meet the *minimum design, operation, and maintenance standards* found in 44 CFR 65.10 of the NFIP regulations. Under those regulations, it is the District's responsibility to provide FEMA with a Levee Certification Report (LCR) which contains technically adequate documentation and qualified certifications by a Registered Civil Engineer confirming that the levee systems it owns and operates meet the minimum federal levee certification standards referenced above.

During the 2005 through 2006 time period, FEMA issued Procedural Memoranda 34 and 43 which, among other things, established a two-year Provisionally Accredited Levee (PAL) designation process. During the PAL period, FEMA's DFIRM mapping efforts continue without interruption. Flood plain maps which show protected areas behind the PALs will remain in effect until *either* the District's submittal of LCRs to FEMA or the *expiration* of the PAL period. *In the case of Ventura County, that expiration date is December 1, 2009.*

FEMA initially identified *sixty (60) levees or levee-like situations* in Ventura County which might *potentially* provide base-level flood protection to the areas behind such structures. Based on rigorous District Quality Assurance/Quality Control (QA/QC) efforts regarding this initial list, FEMA agreed to remove a total of forty-three (43) of the sixty levees and levee-like situations identified in their August 31, 2007 letter.

On November 27, 2007, after conducting additional technical review and field inspections, the District submitted Two-Year PAL and One-Year Maintenance Correction Period Agreement letters to FEMA for a total of *seventeen* (17) levees. More than seven months later in a letter dated June 5 2008, FEMA advised the District that for a number of reasons (*including the new flood plain shown by the Santa Clara River FIS*) it had awarded PAL-designations to only nine (9) of the seventeen levees.

On October 21, 2008, the Public Works Agency Director approved the selection of Tetra-Tech, Inc., to perform the District's Levee Certification Engineering Study work. Negotiations resulted in a mutually agreed generic Scope of Work and phasing schedule for the Consulting Engineering Studies required to complete the District's levee certification work. Essentially, the generic Scope of Work for those studies was broken up into *four potential phases*:

Phase 1 included preliminary levee documentation analysis, field inspections, evaluation and categorization work for all nine PALs, including categorizing levees in accordance with the following options:

- **Category 1 Levees**: those levees that *meet* 44 CFR 65.10 and for which all data and complete documentation are available.
- **Category 2 Levees:** those levees that *may meet* 44 CFR 65.10 but for which additional data, documentation, and/or hydraulic, hydrology, structural and/or geotechnical engineering analysis is required to ensure that complete documentation is available.
- **Category 3 Levees:** those levees that do not meet the requirements of 44 CFR 65.10 in their existing condition and cannot be certified by the expiration of the PAL period on December 1, 2009.

Phase 2 included levee certification documentation package implementation work on any levees identified in Phase 1 as Category 1 Levees. (*None of the District's nine PALs met the Category 1 status as a result of the Phase 1 Study*).

Phase 3 included levee certification documentation package implementation work on any levees identified in Phase 1 as Category 2 Levees (*six of the nine PALs were identified as Category 2 Levees in Phase 1 as explained below*).

Phase 4 included implementation work on any levees identified as Category 3 Levees in Phase 1 (*three of the nine PALs were so identified as explained below*).

Levee Certification Engineering Studies - Tetra-Tech's Phase 1 – Preliminary Levee Evaluation and Categorization Results

Tetra-Tech commenced Phase 1 Study Work on November 26, 2008. Their work included a detailed review of levee design drawings, as-built plans, operation and maintenance manuals and records, joint field inspection of all nine PALs by District and Tetra-Tech personnel, and a preliminary evaluation including categorization of all nine levees. Final Phase 1 Levee Evaluation Reports were completed on February 27, 2009.

Tetra-Tech's Phase 1 Final Evaluation Reports document that **six (6) of the nine PALs are Category 2 levees** (*meaning that they are certifiable under 44 CFR 65.10*) *PROVIDED* that the District performs additional geotechnical, hydrology and hydraulics, and structural engineering analysis and field tests corroborating their structural integrity and compliance with all applicable levee certification standards.

Both digital and hard copies of all nine Final Levee Evaluation Reports are on file in the Clerk of the Board's Office, and copies were also delivered to each member of the Board of Supervisors, the CEO, County Counsel, and the Auditor-Controller's Offices. Also, digital copies of the Final Levee Evaluation Reports are available on the District's website http://www.vcwatershed.org/levee.

A Graphical Summary of Phase 1 Study Final Evaluation Report Levee Categorization Results, Planning Level Total Cost Estimates for Levee Certifications, Total Value of Property and Improvements for the Parcels behind the PALs, Estimated Flood Damages Prevented, and Return on Infrastructure Investment Ratio is set forth as Exhibit No. 2.

Phase 3 Levee Certification - Consulting Engineering Services Contract Award

In order to complete the preparation and submittal of the levee certification documentation packages to FEMA by the November 30, 2009 deadline, the District must address and document the resolution of a variety of levee certification challenges for each levee. Challenges include: vegetation removal, resolution of structures encroaching into the District's flood protection required maintenance areas, scour and embankment stability issues, animal burrows that potentially could undermine the levees, interior drainage problems and closure device integrity, rip-rap rock revetment issues, and seepage problems.

Accordingly, the District prepared a Draft Scope of Work for a Phase 3 Consulting Engineering Services Contract, including an engineer's estimate of the level of effort, technical disciplines required, and costs necessary to perform the engineering analyses required to certify these levees. A copy of a generic Scope of Work prepared for the Phase 3 Consulting Engineering Services Contract with Tetra-Tech is set forth as Exhibit No. 3.

Detailed engineering analyses and technical work must be performed for all nine PALs during the next six months in order to ensure that the District can document that these levees meet Federal levee certification requirements. Site investigations will be performed for each levee including sub-surface soil explorations, geotechnical, laboratory and materials testing and analysis, and topographic mapping coordination.

At the conclusion of the Phase 3 site investigations, engineering analyses and technical work, the Consultant shall prepare a Levee Certification Report (LCR) to fully document the technical basis for the levee's certification. The LCR must contain full documentation of technical data, information, assumptions, and levee systems analysis used to certify the levee.

As an added check, the Consultant will be required to conduct an Independent Technical Review (ITR) of the LCR by a qualified team of professionals not involved in the day-to-day production of the LCR. This ITR will be performed in compliance with Federal requirements for the purpose of confirming that proper procedures were followed in the application of established criteria, policies, and that professional practices were met, and that appropriate methods of analyses were performed and documented to support the final determination of the levee's certification.

District staff requests that your Board approve and authorize the Director of Public Works or his Designee to execute Standard Form Consulting Services Contracts with Tetra Tech, Inc., in a total Not-to-Exceed Amount of $2.9 Million (*including 10% contingency estimate*) for Phase 3 Levee Certification Documentation Action Plan Implementation work.

District staff analyzed the Consultant's proposed costs using staff's internal engineers' cost estimate prepared in accordance with USACOE best engineering management practices. Based on the results of that analysis, in the aggregate, *the Consultant's proposed $2.6 Million cost estimate is within 15% of the District's $2.3 Million cost estimate for Phase 3.* This difference is considered to be within the acceptable professional limits for such complex work under extremely tight time deadlines. The result of that analysis is set forth as Exhibit No. 4.

Subsequent to your Board's approval of the recommended actions, specific contracts will be finalized with Tetra-Tech on the basis of the final negotiated Scope of Services for each levee. However, in the aggregate, the total amount of these contracts will not exceed the $2.9 Million maximum amount requested to be approved by the Board for the Phase 3 portion of the Levee Certification Project.

Phase 4 Levees – Not-Certifiable by December 1, 2009 and Certifiable by Other Means

The results of Tetra-Tech's Phase 1 Study concluded that three of the nine PALs (i.e., VR-1, VR-3, and CC-2) were Category 3 Levees (i.e., *those levees that do not meet the requirements of 44 CFR 65.10 in their existing condition and cannot be certified by the expiration of the PAL period on December 1, 2009*). District staff has already begun the process of identifying Levee Safety Enhancement Construction Projects for these three Category 3 levees, as well as for a separate, Non-PAL levee system (SCR-3) along the southern bank of the Santa Clara River beginning at the Hwy 101 Bridge and moving west of the Victoria Avenue bridge.

Work on these projects is expected to include alternatives analysis, design engineering, plans and specification development, and construction *with a total Planning Level Cost Estimate of $55 Million.* Over the next several months, the District staff intends to bring the Board of Supervisors specific action plan recommendations for these Category 3 levee systems including collaborative funding strategies involving Federal Stimulus monies, State Bond monies, City funding, and developer contributions, as appropriate.

Levee Certification Cost Estimates vs. Flood Damages Prevented - Economic Valuation Data and Return on Infrastructure Investment

District staff has prepared a spreadsheet which includes planning-level levee certification cost estimates, property and improvement values for the properties in the flood plains behind and protected by these levees, an estimate of the flood damages which could be experienced if these levees were not-present, and potential flood insurance premiums which may be required for property owners with federally-backed mortgages if they are placed in a special flood-hazard zone should the levees fail certification for whatever reason. That spreadsheet is attached as Exhibit No. 5.

The spreadsheet reports that the total economic valuation of both the land and improvements of the parcels behind and protected by the six PALs *amounts to $898 Million.* Using FEMA's standard depth of flooding vs. percent damages curves, District staff has calculated that were all six of these PALs not present, *property owners could experience up to $169 Million in flood damages.*

Accordingly, District staff has calculated a 26:1 Return on Infrastructure Investment (*ROII*) ratio for the cost of certification of these six PALs. *In other words, for every dollar of District funds invested in certifying that these six PALs provide base-flood protection to the properties behind them, a maximum of twenty-six dollars in flood damages would be prevented.*

SUMMARY

Subsequent to receiving District staff's presentation and hearing any comments from Kathleen Schaefer, Engineer, National Flood Insurance Program – Region IX, Mitigation Division, FEMA, regarding the latest information from FEMA on these efforts, District staff requests that your Board take the actions necessary to approve the award of Phase 3 Levee Certification Consulting Services Contracts with Tetra-Tech, Inc. Funds for these contracts are available in Zones 1, 2 and 3, Budget Org Nos. 6310, 6320, and 6330, Account No. 2194 Engineering Tech Surveys.

The approval of Tetra-Tech's Phase 3 Consulting Engineering Services Contracts, as a project, is categorically exempt from the California Environmental Quality Act (CEQA) under Article 19, Sections 15306 and 15309 of the State CEQA Guidelines.

This item has been reviewed by the County Executive Office, Auditor-Controller's Office, and County Counsel.

If you have any questions regarding this item, please contact me directly at 654-2040, or you may contact Gerard Kapuscik, the District's Project Manager directly at 648-9284.

TOM LAGIER, P.E.
Director

Exhibit No. 1: Progression and Status of FIS and DFIRMs in Ventura County
Exhibit No. 2: Graphical Summary Levee Categorization Results and Cost Estimates
Exhibit No. 3: Proposed Generic Scope of Work for Phase 3 Engineering Work
Exhibit No. 4: Spreadsheet Comparing Consultants' with District's Cost Estimates for Phase 3 Work
Exhibit No. 5: Levee Certification Economic Valuation and Costs Spreadsheet 9

Relationship of Flood Insurance Studies (FIS) to Digital Flood Insurance Rate Maps DFIRMs and Status of FEMA's Digital Flood Mapping Efforts in Ventura County

Technical studies in support of the NFIP-MMP program begin with the release of a Flood Insurance Study (FIS) for a river system or watershed. Then, based on the results of the FIS, Preliminary Digital Flood Insurance Rate Maps (DFIRMs) are prepared. Using the then most recent available hydraulic, hydrology, and topographic information, as well as GIS-mapping technology, the DFIRMs map properties that are subject to being flooded by a base-level flood.

FEMA defines a base-level flood as a flood that has a one-percent chance (a 100-year storm) of being equaled or exceeded in a given year. Once the DFIRMs are issued, vetted and adopted in accordance with defined regulatory procedures FEMA will begin using them to administer the NFIP program. One aspect of the NIFP program is that property owners (*primarily residential*) that are not protected from a 100-year storm will be required to buy flood insurance if they have a federally-backed mortgage.

The following table depicts the status of various FIS and DFIRMs prepared, released, and/or underway in Ventura County as of the date of this Board letter:

Watershed	Flood Insurance Study (FIS) Status	Preliminary DFIRM Release Date	Letter of Final Map Determination Date	DFIRM Effective Date
Calleguas Creek	Completed	11/24/08	7/10/09 (*Projected*)	**1/10/10 (*Projected*)**
Santa Clara River	Preliminary FIS Released Under Technical Review	4/25/08	9/30/09 (*Projected*)	**11/30/10 (Projected)**
Ventura River	Under Development Projected Release 12/09	TBD	TBD	**TBD**

Spatially, the Revised Preliminary DFIRMs released on November 24, 2008 are *countywide*. They reflect digital conversions of the old effective FIRMs throughout the county, datum corrections, FEMA's review, and incorporation of the comments on the DFIRMs provided separately by various cities, FEMA's resolution of the floodplain mapping appeals submitted by the cities of Camarillo and Moorpark in 2006, a Physical Map Revision (PMR) for the Arroyo Santa Rosa unincorporated area, all Letters of Map Amendment (LOMAs), and Letters of Map Revisions (LOMRs) affecting Ventura County that were accepted by FEMA through November of 2008, and Provisionally Accredited Levees (PALs).

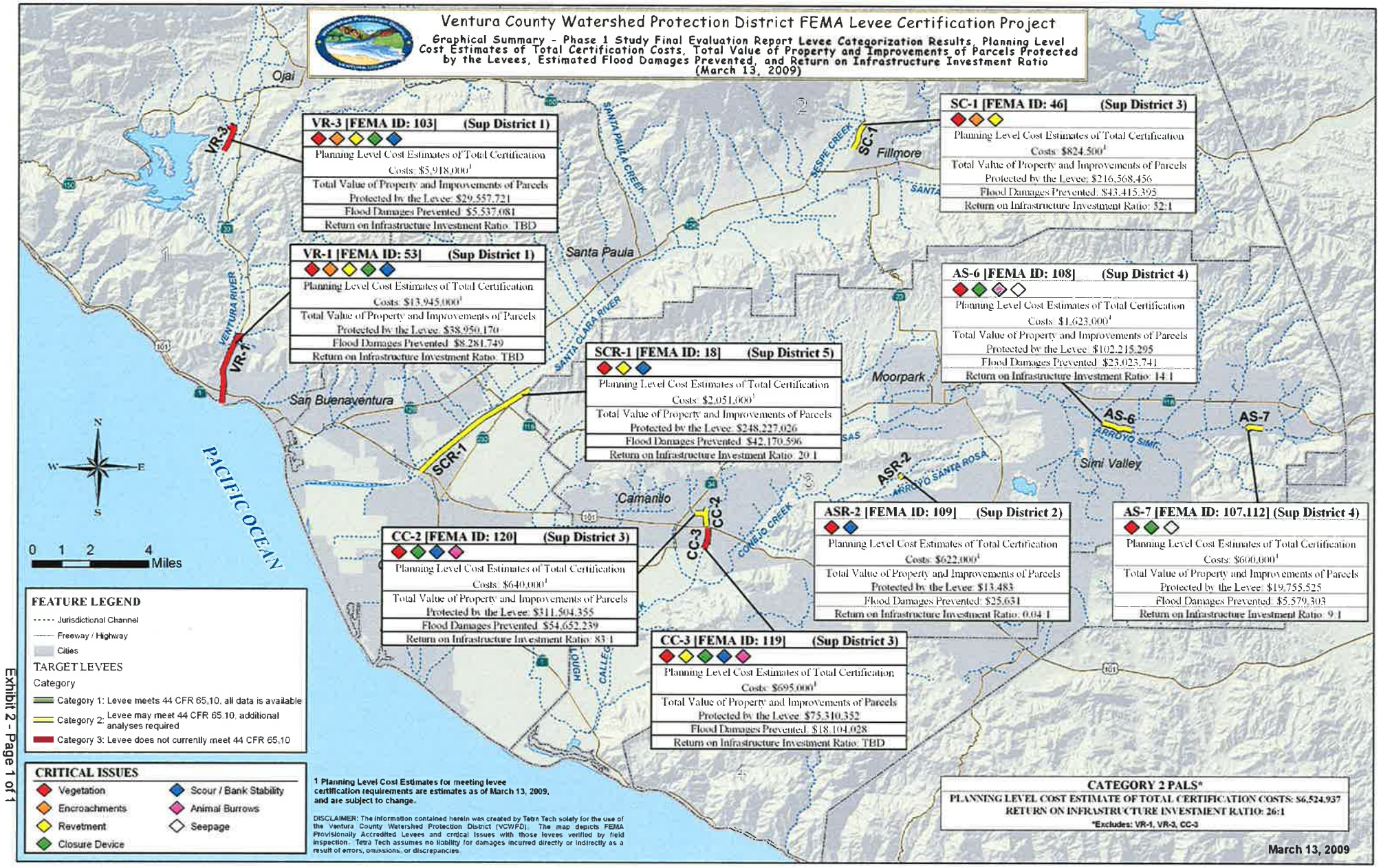

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EXHIBIT A

SCOPE OF SERVICES

FEMA LEVEE CERTIFICATION
PHASE 3 LEVEE CERTIFICATION DOCUMENTATION ACTION PLAN IMPLEMENTATION WORK

1. Description of Project

In a nation-wide effort to certify all existing flood control levees, FEMA has identified existing levee facilities within Ventura County. A number of these existing levee facilities have been given a Provisionally Accredited Levee (PAL) status. As part of this effort FEMA has requested the Ventura County Watershed Protection District (Agency) to evaluate and prepare documents for the certification process based on FEMA's regulatory requirements as identified in Title 44 of the Code of Federal Regulations (CFR), Section 65.10 (44 CFR 65.10).

Certification Criteria are as follows:

- Design criteria (freeboard, closures, embankment protection, embankment and foundation stability, settlement, and interior drainage).
- Operation plans and criteria (for closures and interior drainage).
- Maintenance plans and criteria.
- Actual certification requirements (i.e. as-builts, forms, documentation, and data).

As part of the Phase 1 process, an evaluation of the levee system was conducted to recommend a levee categorization.

Levee Categorizations are as follows:

- Category 1 – Levees meet 44 CFR 65.10 requirements and all data or complete documentation is available.
- Category 2 – Levees may meet 44 CFR 65.10 requirements, but additional data or documentation is needed.
- Category 3 – Levees do not currently meet 44 CFR 65.10 requirements.
- Not a Levee – Based on physical conditions, low WSEL, no SFHA, and/or not providing flood protection.

A levee that is assigned a Category 1 or 2 rating will be further evaluated in the Phase 2 or 3 processes, respectively, in order to finalize its certification status. A levee that is assigned a Category 3 rating will require a Pre-Design Study in the Phase 4 process and implementation of the required improvements to achieve certification status.

During Phase 1 work the levee system was determined to be a Category 2 levee which may meet 44 CFR 65.10, but additional data or documentation is needed. The Consultant shall provide the Agency with engineering services to support Phase 3 work of the FEMA Levee Certification Project for the levee system. The Phase 3 work

consists of data collection, site investigations, engineering analyses, and preparation of certification documentation as appropriate. This work is described in the scope of work below as Tasks 1 through 13.

As part of the Phase 1 work a field investigation was performed that identified deficiencies in the levee system that will require rehabilitation. As an Option the Agency may elect to contract with the Consultant to provide engineering services for the rehabilitation effort. The engineering services would include: engineering and design, preparation of construction plans, specifications, estimate and engineering during construction and preparation of as-builts, evaluations and inspections as-required to rehabilitate found deficiencies that would prohibit levee certification. This work is described in the scope of work below as OPTION Tasks 14 through 18.

The work to complete the tasks in this Phase 3 scope of work shall generally follow the schedule presented in Exhibit B, however several tasks may be required to start simultaneously and shall be authorized at the discretion of the Agency to ensure adequate time is allowed to complete the work. After completion of any task that changes this levee/floodwall from a Category 2 levee system to a Category 3 levee system, the Consultant shall formally notify the Agency in writing. The Agency then, at its sole discretion, will decide whether or not to issue a stop work order on any further Phase 3 work.

In the event of a stop work order, for any reason, the Consultant shall be entitled to payment for services performed up to the date of the stop work notice. This includes full payment on completed tasks and partial payment, dependent on amount of work completed and submitted, on authorized unfinished tasks.

2. Scope of Work

Task 1) Project Management, Coordination and Data Collection

I. Consultant shall participate in a kick-off meeting with the Agency.

II. Consultant shall maintain appropriate coordination with the Agency. Consultant shall coordinate and manage milestones, schedule, roles and responsibilities, resource plan, and document control process of the project team. This will include preparing and maintaining a project schedule using Microsoft Project.

III. Consultant shall coordinate with the LA District office, U.S. Army Corps of Engineers (USACE) to ensure USACE design guidelines are known and followed for Category 2 levees constructed by the USACE.

IV. Consultant shall collect all remaining available documentation and data for the levee system. Efforts shall include:

a. Researching FEMA archives and databases for previous Certification Documents, CLOMR/LOMR case files, Flood Insurance Studies, etc.

b. Researching the files and archives of other Federal Agencies, including the USACE and the National Resources Conservation Service, as well

as Agency files and archives for planning and design studies, site data, etc.

Task 2) Site Investigations

Consultant shall complete all necessary site investigations to include but not limited to; subsurface explorations and geotechnical testing, materials testing and analysis, collect all soil data necessary to supplement any provided by the Agency, topographic data if needed, and any other investigation required to ensure that the necessary information and data is available to determine whether or not the levees meet FEMA certification criteria.

I. Subsurface Soil Exploration:

Prior to the start of this task, Consultant shall prepare a work plan for geotechnical assessment that includes a sketch of bore hole locations, depth of each bore hole, soil sampling intervals along the bore hole, sample custody protocols, and the soil testing methods that follow the standard geotechnical procedures (i.e. ASTM). Consultant shall meet with the Agency to go over the work plan prior to the start of this task.

Exploratory methods are to include hollow stem auger borings utilizing a high torque truck mounted drill rig and test pits. The test pit explorations for the SCR-1 levee system will utilize a backhoe to verify the existence and condition of buried levee revetment and possibly the condition of the embankment itself. If revetment or embankment material is encountered, controlled backfill utilizing a compaction wheel and water supply will be needed.

Consultant shall perform XX subsurface borings and XX test pits along the levee system to support the geotechnical assessment required for certification. Consultant shall assume the following:

- Applicable permits from Fish & Wildlife, Corps of Engineers, and Regional Water Quality Control Board will be provided by the Agency at no cost to Consultant.
- Consultant shall provide all necessary information necessary for application of encroachment, access and traffic control permits. Agency shall provide these permits at no cost to the Consultant.
- Consultant shall obtain well/boring installation and closure permits
- Adequate topographic mapping will be provided prior to marking field locations,
- Full vehicular access to both ends and top of levee along the entire length of the levee,
- Consultant shall notify Underground Service Alert prior to excavating exploratory borings. Where necessary, Consultant shall provide a specialty utility locator. Agency will be responsible for identifying location of buried utilities that are owned and operated by the Agency,

- Staging area for equipment storage and potable water source will be provided by the Agency,
- Cuttings and mud drummed can be stored on site prior to disposal,
- Disposal manifests are to be signed by an Agency representative (owner/operator of levees where waste is generated),
- Disposal of non-hazardous drilling material to be performed by Consultant. Removal of hazardous material, if any, is not included in this scope of work,
- Cold patching will be performed for all borings drilled through asphalt,

II. Laboratory Testing:

Consultant shall perform laboratory testing of the samples collected during the subsurface exploration. Laboratory testing will include in-situ moisture and density, grain size distribution, shear strength and hydraulic conductivity.

III. Topographic Mapping Coordination:

The Agency has updated 2005 LIDAR data in NAVD88 datum that is appropriate for certification. Consultant shall assume that the Agency will provide the 2005 LIDAR data in NAVD88 datum. In addition, the Agency will provide pertinent cross section survey information along the levee/floodwall at 100-ft intervals (min) and as described in Task 7.

Consultant shall provide coordination with the Agency's survey department for this task. Consultant shall utilize the provided survey information in the appropriate analyses to assure the most current improvements to ground elevations are considered.

Task 3) Engineering Analyses

Consultant shall perform engineering analyses or review existing analyses including; Geotechnical Assessment (slope or embankment stability, seepage, settlement), Hydrologic Analysis, Hydraulic Analysis, Scour/Aggradation Analysis, Structural Evaluation, System Evaluation and Floodplain Delineation, necessary to determine if the Category 2 levee meets the certification criteria in 44 CFR 65.10.

I. Geotechnical Assessment:

Once subsurface conditions are evaluated and laboratory testing is completed, the Consultant shall perform a geotechnical analysis. Analyses will include seepage analysis, slope stability analysis, and a brief discussion of seismic considerations. Where sustained water flow levels indicate that embankment or foundation seepage could be problematic, seepage analysis will be performed using SEEPW, a finite-element software program that can perform transient seepage modeling. Based on

discussion with the Corps, steady-state analysis will not be required due to the rapid hydraulic loading anticipated on the levees.

Slope stability of levee embankments will be performed utilizing SLOPEW, a computer program that can perform a variety of limit equilibrium stability analysis methods (Bishops, Janbu, Morgenstern-Price, etc.) under both static and pseudo-static loading conditions. Slope stability will be evaluated in accordance with the methodology outlined in USACE Manual EM 1110-2-1913.

All geotechnical analyses required by Section 65.10 of the NFIP regulations (and identified in FEMA MT-2 forms) will be performed.

Consultant shall prepare a geotechnical report which documents all subsurface exploration, laboratory testing results and the geotechnical assessment consistent with levee certification requirements.

II. Hydrologic Analysis:

The discharge frequency values presented in the latest hydrology study are directly usable for levee certification purposes.

Consultant shall extract and prepare hydrologic documentation required for levee certification and develop hydrographs to support the levee/embankment seepage analysis. Baseflood hydrographs would be generated using a "balanced hydrograph" approach in which the baseflood hydrograph would be consistent with respect to volume duration frequency relationships for the Sespe Creek levee. A pattern hydrograph based on either a hypothetical flood event such as Standard Project Flood or a large historical flood event would be used to shape the baseflood hydrographs.

III. Hydraulic Analysis:

The current FEMA FIS hydraulic model is available. The current FEMA FIS hydraulic model will be used as the basis for the hydraulic model to develop the freeboard analysis. Consultant shall meet with the Agency to go over the results of this task prior to proceeding.

IV. Scour/Aggradation Analysis:

Consultant shall perform additional sedimentation and scour analyses to support the freeboard, embankment protection and embankment stability analyses. The sediment transport functions within HEC-RAS will be used to determine short-term aggradation or degradation associated with specific storm events. Long-term sediment transport will be determined based on historical data which will include information shown on the as-builts and any other readily available historical topographic data or previous study reports. It is assumed that the sediment gradation information is available and sediment sampling and laboratory analyses will not be required. Consultant shall meet with the Agency to go over the results of this task prior to proceeding.

V. Structural Evaluation:

Consultant shall perform a structural evaluation. The structural evaluation will be done by reviewing available information, which will include a review of Period or Annual Inspection Reports. A site visit to visually assess the structural elements will be conducted. The evaluation will include a review of the most recent corrugated metal pipe (CMP) condition assessments, if any exist. It is assumed that the video taping of the CMP will not be required by the USACE-LA District. A detailed analysis of CMP will be performed in accordance with current Corps guidance.

The evaluation will also include the evaluation of the structural integrity of reinforced concrete structures including stop logs and storm drain outlets and masonry walls as appropriate. No material testing will be performed as part of this task.

VI. System Evaluation:

Consultant shall perform a system evaluation. The system evaluation will consist of determining whether the individual components adequately pass their individual certification requirements and ensuring that possible interaction among the components will not result in failure.

It is assumed that the Failure Mode Analysis (FMA) is not required for the levee certification and is not included in this scope of work.

Consultant shall perform a qualitative evaluation of the system only. In-depth evaluation using mathematic and/or computer models will not be performed.

The system shall have an emergency response plan supported by a flood warning system. Consultant will review the existing Emergency Response Plan with the Agency and update the plan as necessary. The preparation of a new emergency response plan, if needed, is not included in this scope of work.

VII. Floodplain Delineation:

Based on the output from the hydraulic analysis the Consultant shall delineate the 100-year floodplain.

Task 4) Re-evaluate Category 2 Levee

Consultant shall re-evaluate the Category 2 levee based on the additional information and data obtained and the results of the engineering analyses performed and re-categorize each Category 2 levee as either a Category 1 levee, for which all data and information is now available and the levee meets 44 CFR 65.10 criteria, or as a Category 3 levee which does not meet the criteria of 44 CFR 65.10. Consultant shall meet with the Agency to go over the results of this task prior to proceeding.

Task 5) Collect, Organize and Assemble Data

Consultant shall collect, organize and assemble in the proper format all existing data and documents required by FEMA for certification.

Consultant shall assume that a current emergency response plan is in effect and available for inclusion to the certification package. The Consultant shall assume that current emergency response plan documents will be provided for updating.

Task 6) Review, Evaluate and Modify O&M Manual

Consultant shall review, evaluate and update as required the existing Operations and Maintenance Plan and Manual to ensure it meets FEMA requirements related to the levee certification process.

Task 7) Perform Interior Drainage

Consultant shall perform an interior drainage analysis, identifying the sources and magnitude of interior flooding. This interior drainage analysis must be based on the joint probability of interior and exterior flooding and must include delineation of areas landward of the levee where interior runoff may pond. Consultant shall utilize the guidance and criteria contained in the USACE publication EM 1110-2-1413, Engineering and Design – Hydrologic Analysis of Interior Drainage Areas.

The Agency shall provide the Consultant with copies of master plan of drainage and all storm drain as-builts that are available for use in this analysis for each storm drain penetration. If no as-builts are available the Agency will provide survey documentation of the storm drain's outlet, inlets, inverts and manhole elevations upstream of each penetration until the ground elevation at the inlets/manholes is 2' above the top of levee/floodwall or the u/s limit of the storm drain system.

Task 8) Prepare Levee Certification Report

Consultant shall prepare a Levee Certification Report (LCR) to document and describe the basis for the certification determination of the levee system under evaluation. The LCR shall contain full documentation of data, information, assumptions, and explanation sufficiently clear so that an individual not familiar with the project could review the LCR and understand how the levee certification (certified or not certified) was made. Consultant shall meet with the Agency to present and discuss results of this task.

Task 9) Conduct Independent Technical Review

Consultant shall conduct an Independent Technical Review (ITR) of the LCR by a qualified team not involved in the day-to-day production of the LCR for the purpose of confirming the proper application of established criteria, policies, and professional practices, in addition to ensuring that appropriate methods of

analyses were performed and documentation is sufficient to support the final determination. A copy of the ITR documentation shall be included in the final LCR.

Task 10) Complete FEMA Forms

Consultant shall complete all necessary forms and documents required by FEMA including MT-2 Form 3, "Riverine Structures Form", Attachment M, and if required MT-2 Form 2, "Riverine Hydrology & Hydraulics Form". The forms will be included as part of the Levee Certification Report.

Task 11) Certification

All data prepared by the consultant to certify that a given levee system complies with the requirements set forth in 44 CFR 65.10, to include all forms, transmittals, analysis, documents, etc. required by FEMA for certification of a levee, shall be certified by being stamped and signed by a Registered Professional Engineer prior to being submitted to the Agency.

Task 12) Submit Deliverables

Consultant shall submit the signed and stamped documents, forms, backup data and engineering analysis as noted below in Section 3 Deliverables, to the Agency for submission to FEMA.

Task 13) Submit Backup Data

Consultant shall submit to the Agency all other items specified in Section 3 Deliverables.

Task 14) OPTION - Conceptual Remediation Plan

Consultant shall meet with the Agency to discuss and agree upon a conceptual remediation plan to rehabilitate the found deficiencies of levee as required. Consultant shall prepare meeting minutes to document the agreed upon conceptual remediation plan.

Task 15) OPTION - Engineering and Design

Consultant shall perform the following analyses and prepare documentation to support the rehabilitation of the found deficiencies of the levee. Consultant shall meet with the Agency to go over the results of this task prior to proceeding.

I. Structural Analyses:

   Consultant shall assume conventional design will be required.

II. Geotechnical Analyses:

   Consultant shall assume typical grading with benching and compaction for a conventional retaining wall will be required.

III. Prepare Design Report:

Consultant shall prepare a design report which documents the structural analysis, geotechnical analysis and design criteria to support the levee repair.

Task 16) OPTION - Plans, Specifications and Estimate

Consultant shall prepare construction plans, specifications and estimate. These documents will be prepared in accordance with "Consultants Guide for Ventura County Procedures, dated April 2001. Consultant shall assume that the Agency will prepare the front end contract documents and conduct all bidding and construction management if work is let to a construction contractor. Consultant shall meet with the Agency to present and discuss results of this task.

I. Prepare 90% Draft PS&E:

Consultant shall submit substantially complete plans and specifications for review by Agency staff.

II. Prepare 100% Final PS&E:

Consultant shall revise documents per Agency review and submit complete plans and specifications ready for reproduction.

III. Perform Engineering During Construction and Prepare As-Builts:

Consultant shall provide engineering during construction.

Consultant shall prepare as-built drawings based on provided mark-ups to reflect the constructed condition.

Task 17) OPTION - Preliminary Evaluation of Revetment Protection

Consultant shall log XX test pits excavated within the riverward side slope of the levee. The test pits will be excavated to evaluate the extent and quality of the existing rock revetment material. Field assessment of the rock material will be performed in order to estimate the size range of the rip rap material. Laboratory testing will be performed to evaluate durability and abrasion resistance. The Agency will provide all equipment and manpower to excavate the test pits as well as to replace the rock revetment after it has been assessed.

Task 18) OPTION - Field Observation of Levee Maintenance and Repairs

The Consultant shall perform up to XX site visits in order to observe levee maintenance and/or repair procedures that are necessary as part of the levee certification process. The observations will be performed in order to verify that the repairs are being completed in accordance with the appropriate specifications and details. Quality control testing will be performed by the Agency in order to confirm that minimum project standards (soil gradation, moisture conditioning, and relative compaction) are being met. The Consultant shall coordinate with the Agency in order to optimize the effectiveness of each site visit. It will be the responsibility of the Agency to give adequate notice to the Consultant prior to initiating any maintenance or repair work.

3. Deliverables

For each levee system the consultant shall submit the following to the Agency:

I. Five hard copies and one electronic copy of all the data and information obtained from the site investigations and material testing noted in the scope of work above.

II. Five hard copies and one electronic copy of the engineering analyses performed in the assessment of Category 2 levees.

III. Five hard copies and one electronic copy of the preliminary report providing the results of the site investigations, material testing and engineering analysis and the Consultant's rational for the re-categorization of the Category 2 levee as either Category 1 or Category 3.

IV. For levee re-categorized as Category 1 levee provide:

   a. Five hard copies and one electronic copy of the Consultants Draft Levee Certification Report.

   b. Five hard copies, signed and stamped by a Registered Professional Engineer, and one electronic copy, with an electronic signature and stamp, of the Consultants final certification report, including all of the backup information, documents and forms and engineering analysis as required by FEMA for levee certification.

   c. Five additional hard copies and one electronic copy of the interior drainage analysis for Agency records.

V. For OPTION Tasks 14 through 16 provide:

   a. Five hard copies and one electronic copy of the Conceptual Remediation Plan meeting minutes.

   b. Five hard copies and one electronic copy of the Design Report.

   c. Five hard copies and one electronic copy of the 90% Draft PS&E.

   d. Five hard copies and one electronic copy of the 100% Final PS&E.

   e. One mylar copy and one electronic copy of the As-Builts.

EXHIBIT B

TIME SCHEDULE

FEMA LEVEE CERTIFICATION
PHASE 3 LEVEE CERTIFICATION DOCUMENTATION ACTION PLAN IMPLEMENTATION WORK

Consultant shall complete the Phase 3 work for the project within the time limits indicated in the table below. The following schedule assumes a project Notice to Proceed of April XX, 2009, with final drafts of all deliverables submitted to the Agency by no later than November 20, 2009.

Task Description	Dates
Kick-off Meeting	
OPTION – Preliminary Evaluation of Revetment Protection	
OPTION – Field Observation of Levee Maintenance and Repairs	
OPTION – Conceptual Remediation Plan	
Review Meeting	
OPTION – Engineering and Design	
Review Meeting	
OPTION – Plans, Specifications and Estimate	
Review Meeting	
Hydrologic Analysis	
Hydraulic Analysis	
Review Meeting	
Scour/Aggradation Analysis	
Review Meeting	
Perform Interior Drainage	
Review Meeting	
Subsurface Soil Exploration	
Laboratory Testing	
Geotechnical Assessment	
Structural Evaluation	
System Evaluation	
Floodplain Delineation	
Re-Evaluate Category 2 Levee	
Review Meeting	
Review, Evaluate and Modify O&M Manual	
Collect, Organize and Assemble Data	
Prepare Levee Certification Report	
Review Meeting	
Conduct Independent Technical Review	
Complete FEMA Forms	
Certification	

Submit Deliverables	
Submit Backup Data	

Should the Consultant be delayed because of acts or omissions of the Agency, this shall be documented by the Consultant and submitted weekly to Agency for approval of delays.

EXHIBIT C

FEES AND PAYMENTS

FEMA LEVEE CERTIFICATION
PHASE 3

FEES

Fees payable to the Consultant for performing the scope of services for the levee system are based on the following Task Order - Firm Fixed Price (FFP) schedule that shall not exceed $XXX,000 to complete all project work specified above.

	TASK	FEE
1	**Project Management and Coordination/Data Collection**	
2	**Site Investigations**	
2.I	Subsurface Soil Exploration	
2.II	Laboratory Testing	
2.III	Topographic Mapping Coordination	
3	**Engineering Analyses**	
3.I	Geotechnical Assessment	
3.II	Hydrologic Analysis	
3.III	Hydraulic Analysis	
3.IV	Scour/Aggradation Analysis	
3.V	Structural Evaluation	
3.VI	System Evaluation	
3.VII	Floodplain Delineation	
4	**Re-evaluate Category 2 Levee**	
5	**Collect, Organize and Assemble Data**	
6	**Review, Evaluate and Modify O&M Manual**	
7	**Perform Interior Drainage Analysis**	
8	**Prepare Levee Certification Report**	
9	**Conduct Independent Technical Review**	
10	**Complete FEMA Forms**	
11	**Certification**	
12	**Submit Deliverables**	
13	**Submit Backup Data**	
14	**OPTION – Conceptual Remediation Plan**	
15	**OPTION – Engineering and Design**	
16	**OPTION – Plans, Specifications and Estimate**	
17	**OPTION – Preliminary Evaluation of Revetment Protection**	
18	**OPTION – Field Observation of Levee Maintenance and Repairs**	
	Phase 3 Levee Certification Total	

Routine office costs (long distance calls, copies, etc), travel (including mileage), profit, sub-consultants and other costs and expenses are included in the FFP schedule above.

PAYMENTS

On presentation of completed Agency claim form and monthly invoice, payment shall be made monthly to the Consultant for percent of work completed, delivered, and accepted in accordance with Agency standards for each of the above Tasks in the Firm Fixed Price (FFP) schedule.

Spreadsheet Comparing Consultant's Phase 3 Cost Estimate with the District's Phase 3 Cost Estimate													
Line No.	FEMA Levee ID	VCWPD Levee ID	Name	Consultant Fee Estimate			District Estimate			Percent - Consultant Fee vs. District Estimate		
				Basic (1)	Optional Tasks 14, 15, 16 (2)	Optional Tasks 17, 18 (3)	Basic (1)	Optional Tasks 14, 15, 16 (2)	Optional Tasks 17, 18 (3)	Basic	Optional Tasks 14, 15, 16	Optional Tasks 17, 18
1	18	SCR-1	Santa Clara River, Hwy 101 to Saticoy	$530,219	$0	$12,865	$499,118	$0	$14,016	1.06		0.92
2	46	SC-1	Sespe Creek, Old Telegraph Rd to Goodenough Rd	$311,100	$130,788	$7,170	$286,094	$79,206	$8,982	1.09	1.65	0.80
3	120	CC-2	Calleguas Creek, Mission Oaks Blvd to Adolfo Road	$329,128	$0	$2,363	$298,750	$0	$3,769	1.10		0.63
4	109	ASR-2	Arroyo Santa Rosa Floodwall @ East Las Posas Road	$269,551	$115,533	$2,363	$246,064	$78,614	$4,651	1.10	1.47	0.51
5	107, 112	AS-7	Arroyo Simi - UPRR Bridge to Stow Street	$372,187	$0	$2,363	$323,944	$0	$3,911	1.15		0.60
6	108	AS-6	Arroyo Simi - 1st street to Erringer Road	$501,701	$0	$2,363	$400,184	$0	$3,911	1.25		0.60
			Sub-totals:	**$2,313,886**	**$246,321**	**$29,487**	**$2,054,154**	**$157,820**	**$39,240**	**1.13**	**1.56**	**0.75**
			Grand Total:	**$2,589,694**			**$2,251,214**			**1.15**		

(1) Basic costs reflect the effort to complete tasks number 1 - 13 as enumerated in the Phase 3 Scope of Work that are deemed necessary to complete the levee certification work by November 30, 2009.

(2) Optional tasks 14 through 16 reflect the effort to complete the design, procurement and oversight of construction for major repair projects.

(3) Optional task 17 reflects the evaluation of existing rock rip-rap slope protection on levees SCR-1 and SC-1. Optional task 18 is for consultant's oversight of repair work performed by District O&M resources on all six levees.

Economic Valuation of Flood Protection Provided by Ventura County Flood Control Levees

Ventura County Watershed Protection District - Data for Provisionally Accredited Levees in Ventura County

Line No.	Physical Data: Levee: FEMA Levee ID	VCWPD Levee ID	Name	Miles	Miles to be certified	%-Miles to be certified	Area Protected by Levee (3): Acres	Square Miles	Certification Cost Data: Certification Costs Estimates (1): Tetra Tech's Contract - Phase 1 Costs (Actual)	Tetra Tech's Cost for Phase 3 Scope of Work (Estimate)	Tetra Tech's ROM Cost for Levee Certification (estimate)	Levee Certification Cost (Total)	Physical/Social/Economic Data - Area within the Protected Floodplain behind the Levee (2): Parcels w/in Floodplain (3)	Dwelleng units w/in Floodplain (4)	Population w/in Floodplain (5)	Total Valuation of Property and Improvements (6)	Estimated Base Level Flood (100 year) Damages Prevented (7)	Estimated annual cost of FEMA mandated Flood Insurance Premiums (8)	ROI (9): Damages Prevented / Total Cost to Certify a Levee
	Provisionally Accredited Ventura County Watershed Protection District Levees																		
	ZONE 1																		
1	53	VR - 1	Ventura River Levee - Ocean to Canada de San Joaquin	2.65	0.00	0.00	102.3	0.16	$46,655		$13,945,000	$13,991,655	165	170	736	$38,950,170	$8,281,749	$150,790	
2	103	VR - 2	Ventura River Levee and Floodwall @ Live Oaks	1.43	0.00	0.00	87.1	0.14	$25,176		$5,918,000	$5,943,176	123	163	412	$29,557,721	$5,537,081	$186,309	
			Zone 1 Total:	4.08	0.00	0.00	189.5	0.30	$71,831	$0	$19,863,000	$19,934,831	288	333	1148	$68,507,891	$13,818,830	$337,099	
	ZONE 2																		
3	18	SCR - 1	Santa Clara River Levee, Hwy 101 to Saticoy	4.06	4.06	28.59	1106.5	1.73	$71,479	$516,300	$2,051,000	$2,122,479	846	472	3271.98	$248,227,026	$42,170,596	$539,496	19.87
4	46	SC - 1	Sespe Creek Levee @ Fillmore - Old Telegraph Road to Goodenough Road	1.02	1.02	7.18	268.7	0.42	$17,958	$439,300	$824,500	$842,458	837	851	3259	$216,568,456	$43,415,395	$1,190,549	51.53
			Zone 2 Total:	5.08	5.08	35.77	1375.2	2.15	$89,437	$955,600	$2,875,500	$2,964,937	1683	1323	6531	$464,795,482	$85,585,991	$1,730,045	28.87
	ZONE 3																		
5	109	ASR - 2	Arroyo Santa Rosa Flood Wall @ East Las Posas Road	0.11	0.11	0.77	2.4	0	$1,937	$409,800	$622,000	$623,937	3	1	3	$13,483	$25,631	$509	0.04
6	120	CC - 2	Calleguas Creek Levee - Mission Oaks Blvd. to Somis Drain	0.84	0.84	5.92	246.6	0.39	$14,789	$377,800	$640,000	$654,789	172	0	0	$311,504,355	$54,652,239	$0	83.47
7	119	CC - 3	Calleguas Creek - Pleasant Valley Road to Hwy 101	0.78	0.00	0.00	43.0	0.07	$13,732		$695,000	$708,732	187	180	437	$75,310,352	$18,104,028	$497,880	
8	108	AS - 6	Arroyo Simi - 1st. Street to Erringer Road	2.10	2.10	14.79	46.4	0.07	$36,972	$492,300	$1,623,000	$1,659,972	268	236	756	$102,215,295	$23,023,741	$652,776	13.87
9	107 112	AS - 7	Arroyo Simi - S.P.R.R. Bridge to Stow Street	1.21	1.21	8.52	13.9	0.02	$21,303	$365,800	$600,000	$621,303	71	105	379	$19,755,525	$5,579,303	$173,565	8.98
			Zone 3 Total:	5.04	4.26	30.00	352.3	0.55	$88,732	$1,645,700	$4,180,000	$2,281,275	701	522	1575	$508,799,010	$101,384,942	$1,324,730	44.44
			SubTotal Category 2 PAL Levees:	9.34	9.34	65.77	1684.5	2.63	$164,437	$2,601,300	$6,360,500	$6,524,937	2197	1665	7668	$898,284,140	$168,866,905	$2,556,895	25.88
			SubTotal Category 3 PAL Levees:	4.86	0.00	0.00	232.5	0.37	$85,563	$0	$20,558,000	$20,643,563	475	513	1585	$143,818,243	$31,922,858	$834,979	
			Grand Total:	14.20	9.34	65.77	1917.0	3.00	$250,000	$2,601,300	$26,918,500	$27,168,500	2672	2178	9254	$1,042,102,383	$200,789,763	$3,391,874	

Notes: (1) The cost to certify a levee is the sum of the actual cost of phase 1 contract work completed to date, the Consultants estimate to complete the efforts outlined in the Phase 3 scope of work, and the Consultants ROM estimate of the cost to complete work necessary to upgrade a levee to enable it to meet 44 CFR 65.10 criteria.

(2) The physical, social and economic data for the area protected by a levee was obtained from information contained in the District's GIS shapefile database. It is subject to change based upon information being updated. The data represents the area that would be covered by the 100 year event flood plain that would occur if the levee did not exist.

(3) This value represents all of the parcels within the floodplain behind the levee including residential, commercial, industrial, resource production (agricultural, etc), public facilities, services (schools, medical facilities, etc.).

(4) The number of dwelling units within the floodplain represents the number of individual single family, multiple family (duplex, triplex, etc.), condominium units, and mobile homes. Apartments within the floodplain are consider as one unit for esimating dwelling units. This is because flood insurance premiums are based on unit ownership and not the occupancy of a unit. Each dwelling unit is considered to be owned by an individual, with a separate mortgage.

(5) Population within a floodplain reflects residents residing within the floodplain and comes from County census data (2000 Federal census). Levee CC-2 protects a commercial - industrial area with no dwelling units. The resident population is "0".

(6) The valuation of property (land value) and improvements on a parcel is current as of June 2008.

(7) Estimated base level flood damages are obtained by applying factors from FEMA's depth of flooding vs. damages curve to the value of the improvements built upon developed parcels. These factors represent damage to the structure and to the contents within a structure as a percent of the improvement value. For general analysis, FEMA and Corps of Engineers guidance allows an estimated depth of flooding of two (2) feet to be applied for all parcels within the floodplain. From this, factors of 0.256 and 0.151 times the improvement value were used to determine structural damage and damage to the contents respectively. For non developed parcels, i.e. agricultural, recreational, etc., damages were estimated by assuming $10,000 per acre.

(8) The estimated annual cost of premiums for FEMA mandated residential flood insurance was determined by calculating the average dwelling unit value within the floodplain (residential improvements value/dwelling units). This value was equated to the "average" amount of coverage that would be required for the dwelling units and contents. The annual premium for this amount of coverage was obtained from FEMA's Standard Rated Policy Rate Table for Residential Units in High-Risk Areas (current as of May 2008). The number of dwelling units within the floodplain was multiplied by this value to estimate the total annual cost of flood insurance. It is assumed that all dwelling units have Federally insured mortgages and therefore require flood insurance.

(9) ROI - Return on Investment applies only to Category 2 PAL Levees.

Exhibit No. 5 - Page 1 of 1