

**Meeting of the Central Valley Flood Protection Board
January 28, 2011**

Staff Report – Encroachment Permit

**California Department of Water Resources
Levee Instrumentation Pilot Study**

1.0 – ITEM

Consider approval of Permit No. 18630 (Attachment B)

2.0 – APPLICANT

California Department of Water Resources

3.0 – LOCATION

The project is located north of Kirkville at River Mile 117 south of the Tisdale Bypass. (Sacramento River, Sutter County, see Attachment A)

4.0 – DESCRIPTION

The applicant proposes to drill 21 boreholes along three transverse lines across the project levee for installation of 18 sealed multilevel vibrating-wire piezometers, one sand-packed multilevel vibrating piezometer, and two two-inch diameter monitoring wells. Data cables will be installed in shallow trenches to connect the monitoring instrumentation to a data-logger box connected to a new 12-inch diameter pole on the landside slope of the levee. The instrumentation monitoring grid will be installed on the waterside slope, crown, and landside slope of the left (east) bank levee of the Sacramento River.

5.0 – PROJECT ANALYSIS

The Department of Water Resources, Division of Flood Management (DWR), is proposing to install monitoring instrumentation across the project levee on the left bank of the Sacramento River to obtain real-time data pertaining to levee behavior during

high-water events. This information would allow DWR to assess levee conditions during high-water events and enhance its Emergency Preparedness and Response Plan. A majority of the proposed work will be performed along the Reclamation District (RD) 1500 levee embankment, and within RD 1500's existing easements on the landside and waterside of the levee. An approximate 100-foot wide waterside bench exists between the levee embankment and the Sacramento River bank.

Instruments will consist of 18 sealed multilevel vibrating-wire piezometers, one sand-packed multilevel vibrating-wire piezometer, and two two-inch diameter monitoring wells. Within the 21 boreholes mentioned above, a total of 65 vibrating piezometer units and two standpipes will be installed. Two multiplexor's, an AVW200 interface, and a Raven XI cellular modem for the multilevel piezometers will be housed above ground with a PV solar panel supplying power to the data loggers. A single eight-foot grounding rod will be located adjacent to the data logger equipment to prevent lightning damage to the equipment. A backup battery will also be installed to provide emergency power, if needed, to the data loggers. Each piezometer will have a circuit breaker installed and housed within a ground surface handhold to prevent over-amperage damage to the piezometers in the ground. Within the handhold, the piezometer wiring will then be bound and routed towards the data loggers within PVC conduit. The PVC conduits will be trenched 18" to 24" under the levee surface. Trenched conduit will be backfilled and compacted using in-situ soil. Boreholes and inside of PVC piping shall both be grouted.

A pressure-treated pole will be installed to house the data logger, solar panel, and backup battery. The data logging and power supply equipment will be installed above ground to limit the damaging effects of moisture. The pole will extend six feet above the ground surface and seated in concrete with a three foot embedment. The pole will be placed on the landside of the levee, at the hinge point of the drained stability berm. The pole embedment will terminate above the one-foot thick drain layer at the base of the berm.

The instrumentation will collect information for as long as they are in good operational condition, which is expected to be 10 to 20 years. Once the project is completed, the equipment will be decommissioned, which will include removal of conduits, sand-packed piezometers, and the pressure treated pole. After completion of the project all boreholes not containing instruments will be backfilled with cement grout in accordance with county requirements. The site will be cleaned and restored to pre-drilling conditions.

5.1 – Hydraulic Analysis

The proposed project involves the installation of underground instruments with the only above ground item being the data logger box which is located on the landside of the levee. Therefore a hydraulic analysis was not required.

5.2 – Geotechnical Analysis

The proposed project does not require a geotechnical analysis.

6.0 – AGENCY COMMENTS AND ENDORSEMENTS

The comments and endorsements associated with this project, from all pertinent agencies are shown below:

- The U. S Army Corps of Engineers recommendation letter has been received for this application and it will be incorporated into the permit as Exhibit A.
- The American River Flood Control District has endorsed this application with conditions and they will be incorporated into the permit as Exhibit B.

7.0 – CEQA ANALYSIS

Board staff has prepared the following CEQA determination:

DWR, as the lead agency under CEQA, approved the project (Levee Instrumentation Pilot Study Project, SCH No. 2010058241) on May 27, 2010 and determined that the project was categorically exempt under Class 6 (CEQA Guidelines Section 15306) covering basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource.

The Board, acting as a responsible agency under CEQA, has reviewed DWR's determination and has independently determined that the project is exempt from CEQA under Class 6 (CEQA Guidelines Section 15306) covering basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource.

8.0 – SECTION 8610.5 CONSIDERATIONS

1. Evidence that the Board admits into its record from any party, State or local public agency, or nongovernmental organization with expertise in flood or flood plain management:

The Board will make its decision based on the evidence in the permit application and attachments, this staff report, and any other evidence presented by any individual or group.

- 2. The best available science that related to the scientific issues presented by the executive officer, legal counsel, the Department or other parties that raise credible scientific issues.

The accepted industry standards for the work proposed under this permit as regulated by Title 23 have been applied to the review of this permit.

- 3. Effects of the decision on the entire State Plan of Flood Control:

The proposed project involves the installation of several underground monitoring instruments so there will be no effects on the State Plan of Flood Control.

- 4. Effects of reasonable projected future events, including, but not limited to, changes in hydrology, climate, and development within the applicable watershed:

There will be no effects to the proposed project from reasonable projected future events.

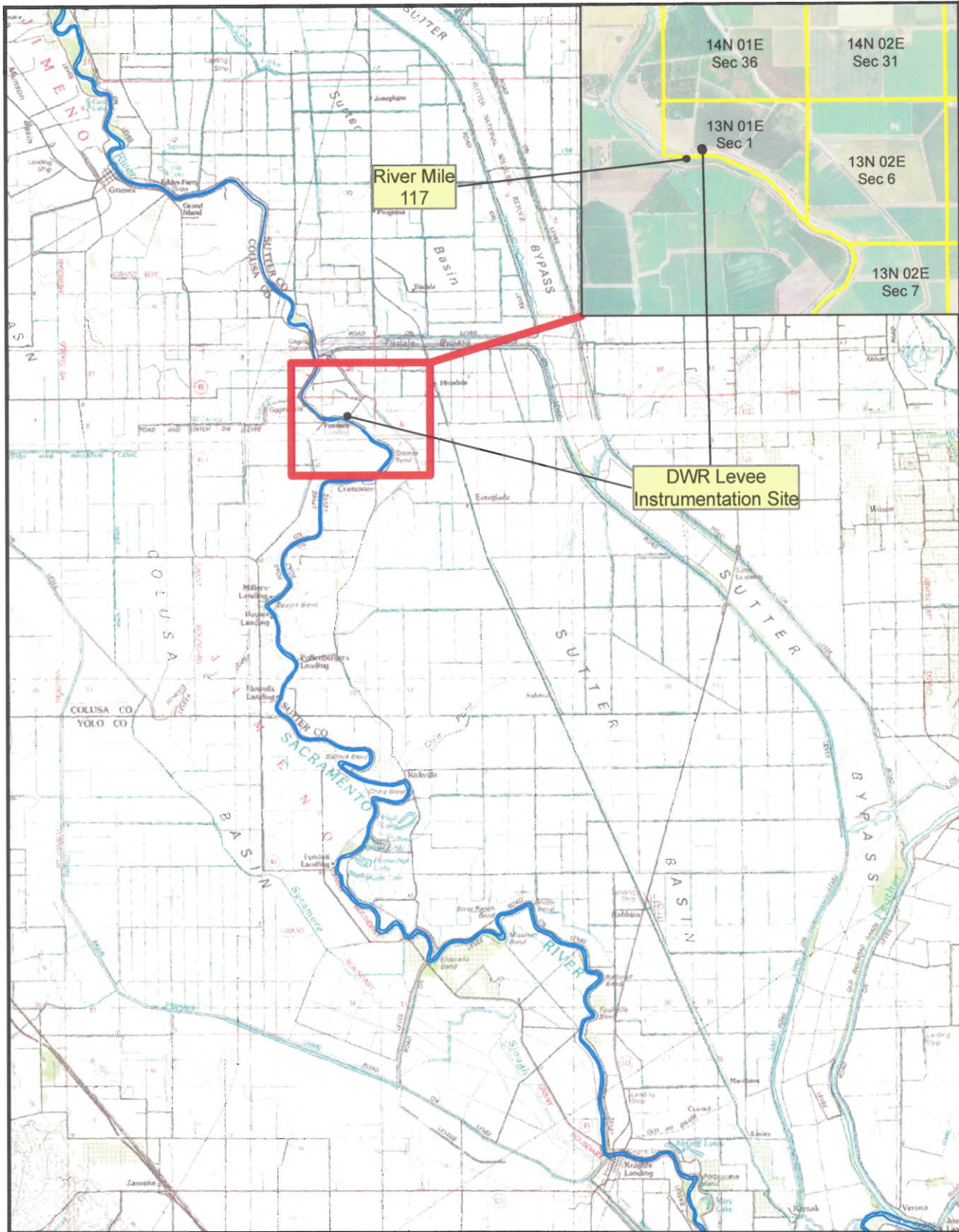
9.0 – STAFF RECOMMENDATION

Staff recommends that the Board determine the project to be exempt from CEQA and approve the permit.

10.0 – LIST OF ATTACHMENTS

- A. Location Maps and Photos
- B. Draft Permit No. 18630
- C. Design Drawings

| | |
|-----------------------|--|
| Design Review: | Gary W. Lemon P.E. |
| Environmental Review: | James Herota and Andrea Mauro |
| Document Review: | Mitra Emami P.E., Curt Taras P.E., Len Marino P.E. |



1" = 3 miles
 0 0.5 1 2 Miles

Datum: NAD 83 Projection: UTM
 Zone: 10 Units: Meters
 Sources: USGS 100k Quad Map
 Air Photo USA, 2006

Levee Instrumentation and Pilot Study

Pilot Study Site Location

| | | |
|---|--|--|
| | | |
| Prepared By: D. Fairman Job No.: 087756/090333 File: Z:\Projects\087756_DWR_Flood_Mgmt\090333\LocationMap | | |
| Figure: 1 of 6 Date: Jul 21, 2010 | | |

Figure 6 – Pilot Study Site Photographs



View of waterside looking downstream.



View of landside looking upstream.



View of landside looking downstream.



View of landside looking upstream.

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DRAFT

STATE OF CALIFORNIA
THE RESOURCES AGENCY
THE CENTRAL VALLEY FLOOD PROTECTION BOARD

PERMIT NO. 18630 BD

This Permit is issued to:

California Department of Water Resources
3310 El Camino Avenue, Room LL30
c/o Daniel Meyersohn
Sacramento, California 95821

To drill 21 boreholes along three transverse lines across the project levee for installation of 18 sealed multilevel vibrating-wire piezometers, one sand-packed multilevel vibrating piezometer, and two two-inch diameter monitoring wells. To trench and install data cables connecting the monitoring instrumentation to a data-logger box connected to a new 12-inch diameter pole on the landside slope of the levee. The instrumentation monitoring grid is on the waterside slope, crown, and landside slope of the left (east) bank levee of the Sacramento River. The project is located north of Kirkville at River Mile 117 south of the Tisdale Bypass (Section 1, T13N, R1E, MDB&M, Reclamation District 1500, Sacramento River, Sutter County).

NOTE: Special Conditions have been incorporated herein which may place limitations on and/or require modification of your proposed project as described above.

(SEAL)

Dated: _____

Executive Officer

GENERAL CONDITIONS:

ONE: This permit is issued under the provisions of Sections 8700 – 8723 of the Water Code.

TWO: Only work described in the subject application is authorized hereby.

THREE: This permit does not grant a right to use or construct works on land owned by the Sacramento and San Joaquin Drainage District or on any other land.

FOUR: The approved work shall be accomplished under the direction and supervision of the State Department of Water Resources, and the permittee shall conform to all requirements of the Department and The Central Valley Flood Protection Board.

FIVE: Unless the work herein contemplated shall have been commenced within one year after issuance of this permit, the Board reserves the right to change any conditions in this permit as may be consistent with current flood control standards and policies of The Central Valley Flood Protection Board.

SIX: This permit shall remain in effect until revoked. In the event any conditions in this permit are not complied with, it may be revoked on 15 days' notice.

SEVEN: It is understood and agreed to by the permittee that the start of any work under this permit shall constitute an acceptance of the conditions in this permit and an agreement to perform work in accordance therewith.

EIGHT: This permit does not establish any precedent with respect to any other application received by The Central Valley Flood Protection Board.

NINE: The permittee shall, when required by law, secure the written order or consent from all other public agencies having jurisdiction.

TEN: The permittee is responsible for all personal liability and property damage which may arise out of failure on the permittee's part to perform the obligations under this permit. If any claim of liability is made against the State of California, or any departments thereof, the United States of America, a local district or other maintaining agencies and the officers, agents or employees thereof, the permittee shall defend and shall hold each of them harmless from each claim.

ELEVEN: The permittee shall exercise reasonable care to operate and maintain any work authorized herein to preclude injury to or damage to any works necessary to any plan of flood control adopted by the Board or the Legislature, or interfere with the successful execution, functioning or operation of any plan of flood control adopted by the Board or the Legislature.

TWELVE: Should any of the work not conform to the conditions of this permit, the permittee, upon order of The Central Valley Flood Protection Board, shall in the manner prescribed by the Board be responsible for the cost and expense to remove, alter, relocate, or reconstruct all or any part of the work herein approved.

SPECIAL CONDITIONS FOR PERMIT NO. 18630 BD

THIRTEEN: All work approved by this permit shall be in accordance with the submitted drawings and specifications except as modified by special permit conditions herein. No further work, other than that approved by this permit, shall be done in the area without prior approval of the Central Valley Flood Protection Board.

FOURTEEN: The permittee is responsible for all liability associated with construction, operation, and maintenance of the permitted facilities and shall defend, indemnify, and hold the Central Valley Flood Protection Board safe and harmless, of and from all claims and damages arising from the project undertaken pursuant to this permit, all to the extent allowed by law. The Central Valley Flood Protection Board expressly reserves the right to supplement or take over its defense, in its sole discretion.

FIFTEEN: The permittee shall defend, indemnify, and hold the Central Valley Flood Protection Board safe and harmless, of and from all claims and damages related to the Central Valley Flood Protection Board's approval of this permit, including but not limited to claims filed pursuant to the California Environmental Quality Act. The Central Valley Flood Protection Board expressly reserves the right to supplement or take over its defense, in its sole discretion.

SIXTEEN: The Central Valley Flood Protection Board and Reclamation District No. 1500 shall not be held liable for any damages to the permitted encroachment(s) resulting from flood fight, operation, maintenance, inspection, or emergency repair.

SEVENTEEN: No construction work of any kind shall be done during the flood season from November 1st to April 15th without prior approval of the Central Valley Flood Protection Board.

EIGHTEEN: The permittee shall contact the Department of Water Resources by telephone, (916) 574-0609, and submit the enclosed postcard to schedule a preconstruction conference. Failure to do so at least 10 working days prior to start of work may result in delay of the project.

NINETEEN: At all times during construction, at least one lane of the levee crown roadway shall be kept clear for vehicular access.

TWENTY: The invert of all pipe/conduit through the levee section at the crown shall be above the design flood plane elevation of 49.3 feet, NGV Datum.

TWENTY-ONE: The pipe/conduit shall be buried at least 12 inches below the levee slopes and 24 inches below the levee crown.

TWENTY-TWO: Backfill material for excavations shall be placed in 4- to 6-inch layers and compacted to at least the density of the adjacent, firm, undisturbed material.

TWENTY-THREE: The project site shall be restored to at least the condition that existed prior to commencement of work.

TWENTY-FOUR: Location markers shall be placed near both levee toes for the buried pipe/conduit not surfacing near the levee toes.

TWENTY-FIVE: The permittee shall replant or reseed the levee slopes to restore sod, grass, or other non-woody ground covers if damaged during project work.

TWENTY-SIX: The permittee is responsible for repairing any damage to the levees caused by the installation or operation of the instrumentation monitoring grid.

TWENTY-SEVEN: The permittee shall maintain the permitted encroachment(s) and the project works within the utilized area in the manner required and as requested by any agency responsible for maintenance.

TWENTY-EIGHT: The permitted encroachment(s) shall not interfere with operation and maintenance of the flood control project. If the permitted encroachment(s) are determined by any agency responsible for operation or maintenance of the flood control project to interfere, the permittee shall be required, at permittee's cost and expense, to modify or remove the permitted encroachment(s) under direction of the Central Valley Flood Protection Board. If the permittee does not comply, the Central Valley Flood Protection Board may modify or remove the encroachment(s) at the permittee's expense.

TWENTY-NINE: The permittee may be required, at permittee's cost and expense, to remove, alter, relocate, or reconstruct all or any part of the permitted encroachment(s) if removal, alteration, relocation, or reconstruction is necessary as part of or in conjunction with any present or future flood control plan or project or if damaged by any cause. If the permittee does not comply, the Central Valley Flood Protection Board may remove the encroachment(s) at the permittee's expense.

THIRTY: Prior to abandonment of the herein permitted boring(s) facilitating well and piezometer installations, permittee shall grout each boring. The cementitious grout mix design and specification shall conform to the minimum industry standard(s) for abandonment of boring(s) within levees.

THIRTY-ONE: The permittee shall comply with all conditions set forth in the letter from Reclamation District No. 1500 dated March 30, 2010, which is attached to this permit as Exhibit A and is incorporated by reference.

THIRTY-TWO: The permittee shall comply with all conditions set forth in the letter from the Department of the Army dated January 04, 2011, which is attached to this permit as Exhibit B and is incorporated by reference.

RECLAMATION DISTRICT No. 1500
P.O. Box 96
Robbins, CA 95676
(530) 738-4423/ fax (530) 738-4327

March 30, 2010

Mr. Len Marino
Chief Engineer
The Central Valley Flood Protection Board
3310 El Camino Avenue
Sacramento, California 95821

RE: Geotechnical Field Investigations and Installation of Levee Performance Instruments for Pilot Study (Project) – Sacramento River Left Bank Levee near River Mile 117 (Reclamation District 1500 Levee Unit 1, Levee Mile 31.95)

Dear Mr. Marino:

Reclamation District 1500 (RD 1500) is aware of The Department of Water Resources, Division of Flood Management (DWRDFM), plans to conduct a Pilot Study (Project) consisting of geotechnical investigations and instrument installations along a section of the RD 1500 Levee system on the left bank levee of the Sacramento River near River Mile 117, (RD 1500 Levee Unit One - Levee mile 31.95) within the W ½ of Section 1, T13N, R1E, MDB&M, Sutter County, California.

RD 1500 understands that the Pilot Study (Project) consists of two phases; Phase 1 associated with conducting geotechnical field investigations, and Phase 2 work associated with instrumentation installation. We understand that DWRDFM needs immediate access and approval to conduct the geotechnical investigations during the months of April 16 through October of 2010, and eventual clearance and approval from the CVFPB by July 2010 to install the Pilot Study (Project) instrumentation during the months of July through October 2010. RD 1500 deems both phases of the Pilot Study (Project) acceptable, provided DWRDFM agrees to the following terms and conditions, and that said conditions are made part of any applicable approval letter or encroachment permit required and issued by the Central Valley Flood Protection Board (CVFPB):

1. The DWRDFM shall indemnify RD 1500 from any and all liability associated with the project, including but not limited to any adverse direct or other impacts related to RD 1500's operations as a result of the Project and its activities;
2. The Project shall not in any way or manner affect the RD 1500's ability to normally perform its levee O&M duties and responsibilities;
3. DWRDFM shall have sole responsibility for dealing with any involved

Mr. Len Marino
March 30, 2010
Page 2 of 2

landowner(s) in any and all ways necessary and related to the development and conduct of the Project;

4. DWRDFM shall comply with all applicable Local, State and Federal laws and statues in pursuing and conducting this Project;
5. All investigations and instrumentation shall be installed to the CVFPB Standards;
6. RD 1500 shall be provided copies of all Operation and Maintenance (O&M) manuals and all construction related documents;
7. A copy of any and all approval letters from the CVFPB shall be provided to RD 1500 prior to any Phase 1 geotechnical investigations taking place;
8. A copy of the final CVFPB permit shall be provided to RD 1500 prior to any installation of Phase 2 instrumentation;
9. RD 1500 shall be notified five (5) working days prior to any Phase 1 investigations and Phase 2 instrumentation activities.

Please do not hesitate to contact me at (916) 765-0187 or Field Manager Jack Bailey at (530) 738-4423 if you should have any questions or comments relative to the subject Project proposed by DWRDFM.

Sincerely,



Mr. Max Sakato,
Secretary and General Manager
Reclamation District 1500

cc: W. Daniel Meyersohn, PhD, PE,
Department of Water Resources, Division of Flood Management

Graham Bradner, GEI Consultants
Jack Bailey, RD 1500
RD 1500 Board of Trustees



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
U.S. Army Engineer District, Sacramento
Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

Flood Protection and Navigation Section (18630)

JAN 04 2011

Mr. Jay Punia, Executive Officer
Central Valley Flood Protection Board
3310 El Camino Avenue, Room 151
Sacramento, California 95821

Dear Mr. Punia:

We have reviewed a permit application by the California Department of Water Resources (application number 18630). This project includes drilling borings and installing up to 18 sealed multilevel vibrating wire piezometers, one sand packed multilevel vibrating piezometer, and two 2 inch diameter monitoring wells on the left bank levee of the Sacramento River. This project also includes installing a pole and data box above the ground surface. This project is located north of Kirkville at River Mile 117, at 39.0062°N 121.8141°W NAD83, Sutter County, California.

The District Engineer has no objection to approval of this application by your Board from a flood control standpoint, subject to the following condition:

- a. That the proposed work shall not be performed during the flood season from November 1 to April 15, unless otherwise approved in writing by your Board.
- b. That the invert of the conduits through the levee section shall be above the design profile, which is referenced as 52.3-foot COE datum in the Sacramento River Flood Control Project, Levee and Channel Profiles, file number 50-10-3334, sheet 1 of 4 dated, dated March 15, 1957. The Sacramento District of the Corps of Engineers is currently working to determine the exact relationship between design profiles (which are referenced to a "Corps of Engineers datum"), to NAVD88.
- c. That the proposed conduits in the levee shall be located at least two feet below the levee crown and slopes.
- d. That the backfill over the conduits shall be backfilled in 4 to 6-inch lifts with suitable material compacted to at least the same density as the adjacent undisturbed levee.

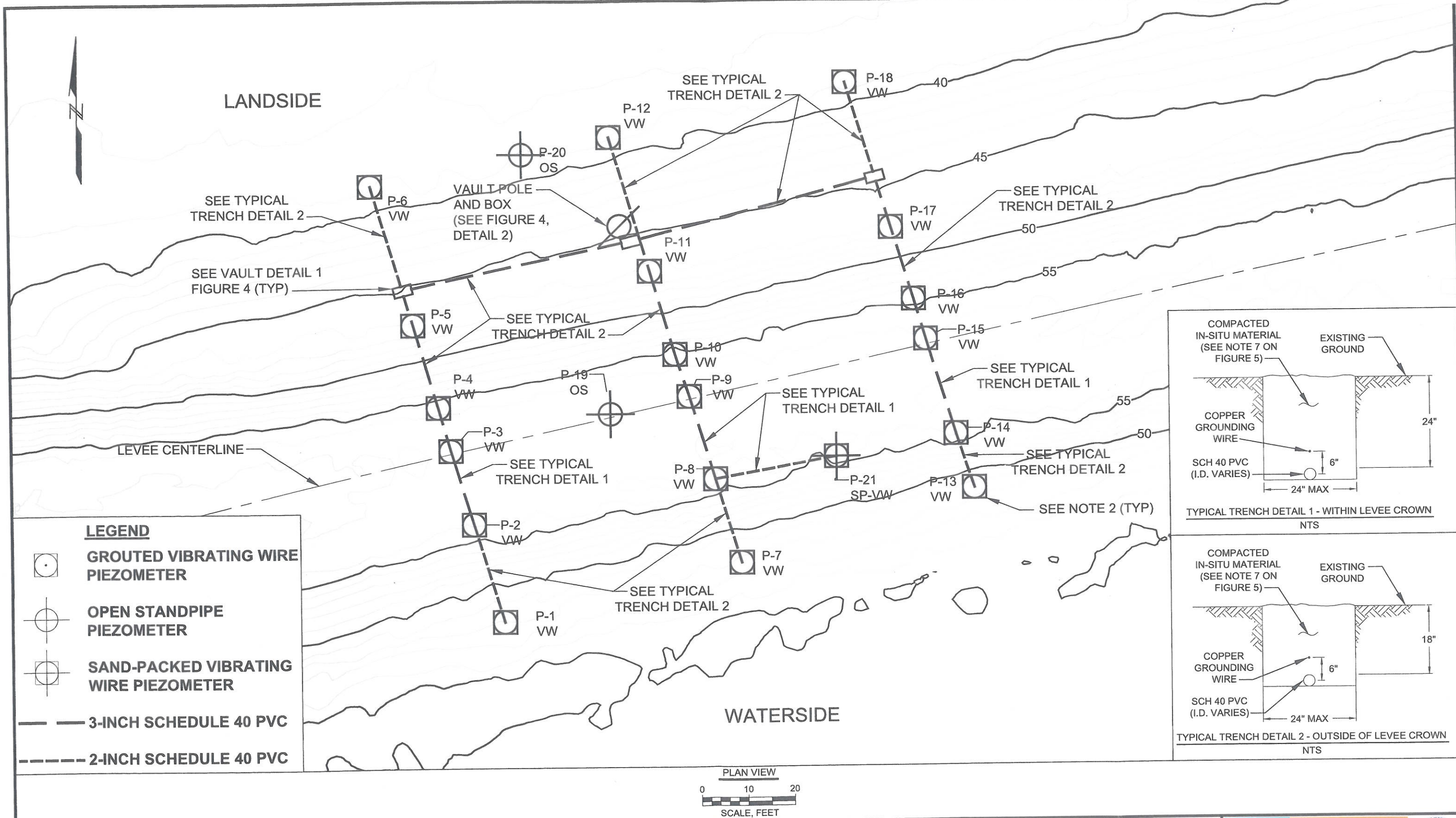
Based upon the information provided, no Section 10 or Section 404 permit is needed.

A copy of this letter is being furnished to Mr. Don Rasmussen, Chief, Flood Project Integrity and Inspection Branch, 3310 El Camino Avenue, Suite LL30, Sacramento, CA, 95821.






Sincerely,

A handwritten signature in cursive script, appearing to read "Michael D. Mahoney".

Michael D. Mahoney, P.E.
Chief, Construction-Operations Division



LEGEND

-  **GROUTED VIBRATING WIRE PIEZOMETER**
-  **OPEN STANDPIPE PIEZOMETER**
-  **SAND-PACKED VIBRATING WIRE PIEZOMETER**
-  **3-INCH SCHEDULE 40 PVC**
-  **2-INCH SCHEDULE 40 PVC**

NOTES

1. SEE FIGURE 5 FOR NOTES AND LEGEND.
2. SEE FIGURE 5 FOR PIEZOMETER TYPE AND RISER DETAILS.

Levee Instrumentation Pilot Study

Piezometer Location and Trenching Plan

FloodSAFE CALIFORNIA DEPARTMENT OF WATER RESOURCES
 Prepared By: K. Van Sant Figure: 1 OF 5
 Job No.: 087756/090333 Date: October 18, 2010
 File: J:\DW\Projects\087756 DWR R&M Project\Task Order 09_090333 - Levee Pilot Project & O&M Manual\Task 5 - Instrumentation Network Design\Design\Contract Drawings\Figure 1 101810.dwg

DRAFT