

STATE OF CALIFORNIA  
THE RESOURCES AGENCY  
**THE RECLAMATION BOARD**

**PERMIT NO. 17828 GM**

**This Permit is issued to:**

**Three Rivers Levee Improvement Authority and  
its members, jointly and separately  
915 8th Street, Suite 115  
Marysville, California 95901**

To construct a 50-foot deep slurry cutoff wall using the conventional slot trench method for approximately 2,200 lineal feet along the left (south) bank levee of Yuba River. The project is located south of Marysville, between the State Highway 70 and Union Pacific Railroad (Section 19 & 24, T15N, R3&4E, MDB&M, Reclamation District 784, Yuba River, Yuba County).

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

(SEAL)

Dated:

Sept. 7, 2004



General Manager

**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 Reclamation 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 Reclamation 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 Reclamation 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 Reclamation 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. 17828 GM**

**THIRTEEN:** This permit is being issued to the Three Rivers Levee Improvement Authority and its members, jointly and separately.

**FOURTEEN:** 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 Reclamation Board.

**FIFTEEN:** The permittee or successor shall maintain the permitted encroachment(s) and the project works within the utilized area in the manner required and as requested by the authorized representative of the Department of Water Resources or any other agency responsible for maintenance.

**SIXTEEN:** The permittee shall contact the Department of Water Resources by telephone, (916) 574-1213, 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.

**SEVENTEEN:** The permittee shall provide supervision and inspection services acceptable to The Reclamation Board. A professional engineer registered in the State of California shall certify that all work was inspected and performed in accordance with submitted drawings, specifications, and permit conditions. For the placement portion of the deep soil mixing cutoff wall project, a consultant who is experienced in this type of construction shall be included as a member of the supervision and inspection team. The consultant shall coordinate inspection of the project with staff from the U. S.

**Army Corps of Engineers and the Department of Water Resources' Flood Project Inspection Section.**

**EIGHTEEN:** The Reclamation Board and Department of Water Resources shall not be held liable for any damages to the permitted encroachment(s) resulting from flood fight, operation, maintenance, inspection, or emergency repair.

**NINETEEN:** The permittee or successor 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 Reclamation Board may remove the encroachment(s) at the permittee's expense.

**TWENTY:** The permittee or successor shall be responsible for repair of any damages to the project levee and other flood control facilities due to construction, operation, or maintenance of the proposed project.

**TWENTY-ONE:** The permittee or successor is responsible for all liability associated with construction, operation, and maintenance of the permitted facilities and shall defend and hold harmless the State of California, or any departments thereof, from any liability or claims of liability associated therewith.

**TWENTY-TWO:** If the project, or any portion thereof, is to be abandoned in the future, the permittee or successor shall abandon the project under direction of The Reclamation Board and Department of Water Resources, at the permittee's or successor's cost and expense.

**TWENTY-THREE:** No construction work of any kind shall be done during the flood season from November 1 to April 15, within the levee section and within 10 feet of the levee toes, without prior written approval of The Reclamation Board.

**TWENTY-FOUR:** Cleared trees and brush shall be completely burned or removed from the levee section, and downed trees or brush shall not remain on the levee section during the flood season from November 1 to April 15.

**TWENTY-FIVE:** Equipment used in the construction of the slurry cutoff wall shall not exceed live-load surcharge to a level that causes or contributes to the instability of the levee during construction operations.

**TWENTY-SIX:** The stability of the levee shall be maintained at all times.

**TWENTY-SEVEN:** The permittee shall take necessary precaution to minimize the risk of hydraulic fracturing of the levee section. Drilling and grouting fluid pressures and flow rates shall be carefully monitored and controlled to minimize the potential for hydrofracturing.

**TWENTY-EIGHT:** Any damage to the levee crown roadway or access ramps shall be promptly repaired to the condition that existed prior to this project.

**TWENTY-NINE:** The permittee or successor shall be responsible for all damages due to settlement, consolidation, or heave from any construction-induced activities.

**THIRTY:** All pipes shall be placed in the center of an open trench 2 feet wider than the diameter of the pipe or 2 times the diameter, whichever is greater.

**THIRTY-ONE:** Each pipe shall be placed in an open cut with side slopes of 1 horizontal to 1 vertical or flatter.

**THIRTY-TWO:** Pipes shall be inspected prior to installation to ensure no cracked, broken, or defective materials are used.

**THIRTY-THREE:** All pipe or conduit being reinstalled in the levee section and within 10 feet of the levee toes shall meet Reclamation Board standards.

**THIRTY-FOUR:** During the demolition portion of the project, any and all anticipated or unanticipated conditions encountered which may impact levee integrity or flood control shall be brought to the attention of the Flood Project Inspector immediately and prior to continuation. Any encountered abandoned encroachments shall be completely removed or properly abandoned under the direction of the Flood Project Inspection Section Inspector.

**THIRTY-FIVE:** The pipeline shall be tested and confirmed free of leaks by X-ray, pressure tests, or other approved methods during construction or anytime after construction upon request by The Reclamation Board.

**THIRTY-SIX:** All pipe joints within the levee section shall be butt welded or threaded.

**THIRTY-SEVEN:** The pipe shall be buried at least 12 inches below the levee slopes and 24 inches below the levee crown.

**THIRTY-EIGHT:** The invert of all pipes or conduits through the levee section shall be above the design flood plane.

**THIRTY-NINE:** All pipes or conduits shall be installed through the levee section at a right angle to the centerline of the levee.

**FORTY:** Density tests by a certified materials laboratory will be required to verify compaction of backfill within the levee section and within 10 feet of the levee toes.

**FORTY-ONE:** Backfill material for excavations within the levee section and within 10 feet of the levee toes shall be placed in 4- to 6-inch layers, moisture conditioned above optimum moisture content, and compacted to a minimum of 90 percent relative compaction as measured by ASTM Method D1557-91.

**FORTY-TWO:** Excess bentonite or other drilling fluids shall be properly disposed of outside of the floodway and off the levee section. The excess bentonite or other drilling fluids shall not be used as backfill.

**FORTY-THREE:** The levee crown roadway and access ramps shall be surfaced with a minimum of 4 inches of compacted, Class 2, aggregate base (Caltrans Specification 26-1.02A).

**FORTY-FOUR:** Aggregate base material shall be compacted to a relative compaction of not less than 95 percent per ASTM Method D1557-91, with a moisture content sufficient to obtain the required compaction.

**FORTY-FIVE:** The levee section, access ramps and all active utility crossings shall be restored to at least the condition that existed prior to commencement of work.

**FORTY-SIX:** All debris generated by this project shall be disposed of outside the floodway and off the levee section.

**FORTY-SEVEN:** Upon completion of the project, the permittee shall submit as-built drawings to: Department of Water Resources, Flood Project Inspection Section, P.O. Box 219000, Sacramento, California 95821-9000.

**FORTY-EIGHT:** If FEMA certification of the levee by the Corps is being considered, the project proponent should contact the U. S. Army Corps of Engineers regarding inspection of the project during construction.

**FORTY-NINE:** Within 10 days from the date of this permit, the permittee shall submit an emergency levee reconstruction plan to The Reclamation Board for approval that addresses the occurrence of unexpected rainfall, high water conditions in the Yuba River, or other conditions that could affect the flood safety of the area protected by the levee during construction of the project.

**FIFTY:** Within 10 days from the date of this permit, the permittee shall submit an emergency response plan to The Reclamation Board for approval that addresses hydraulic fracturing of the levee and seepage of the slurry outside the levee area.

**FIFTY-ONE:** Restoration of degraded levee shall not begin until slurry wall has cured for 7 days and reached a minimum compressive strength of 300 psi.

**FIFTY-TWO:** The permittee shall comply with all conditions set forth in the letter from the Department of the Army dated September 7, 2004, which is attached to this permit as Exhibit A and is incorporated by reference.



REPLY TO  
ATTENTION OF

DEPARTMENT OF THE ARMY  
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO  
CORPS OF ENGINEERS  
1326 J STREET  
SACRAMENTO, CALIFORNIA 95814-2922

EXHIBIT A

September 7, 2004

Navigation and Flood Control Unit (17828)

Mr. Peter D. Rabbon, General Manager  
The Reclamation Board  
State of California  
3310 El Camino Ave. Rm. 1140  
Sacramento, California 95821

Dear Mr. Rabbon:

We have reviewed an application for a permit by Three Rivers Levee Improvement (Reclamation Board Number 17828). These plans include constructing a 60-foot deep slurry cutoff wall, using the conventional slot trench method for approximately 3,000 linear feet along the left bank levee of the Yuba River. To prevent hydrofracture, the top 7-feet of the levee crown will be removed before the slurry wall construction begins. The project is located south of Marysville, between Highway 70 and the Union Pacific Railroad in Sections 19&24, Township 15 North, Range 3&4 East, M.D.B.&M. Survey, Yuba 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 conditions:

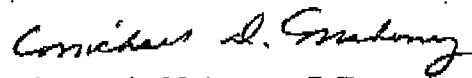
- a. That the excavation in the project for the proposed work shall not be made or remain during the flood season of November 1 to April 15, unless otherwise approved in writing by your Board.
- b. That in the event trees and brush are cleared, they shall be properly disposed of by either complete burning or complete removal outside the limits of the project works.
- c. That after the installation of the slurry cutoff wall, the levee shall be reconstructed to the profile shown in the O&M Manual or the height before construction, whichever is higher.
- d. That the reconstructed levee crown shall have an all-weather surface.
- e. That any revetment that may have been removed by the project, be reinstalled.
- f. That in the event erosion occurs at the site, the applicant shall repair the eroded areas and place adequate revetment on the riverbank to prevent future erosion.
- g. That the project levee section and roadway shall be restored to at least the same condition as existed prior to commencement of the proposed work.

h. That the attached comments by the Corps of Engineers, Soil Design Section be incorporated into the design.

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

If you have any questions concerning our comments on this permit application, please contact Mr. Mohsen Tavana at (916) 557-5282 or Mr. Robert Murakami at (916) 557-6738.

Sincerely,



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

Enclosure

CF:  
DWR, Richard Marshall

5 August 2004

**Yuba River Levee Improvement Project**  
**Review of 30% Design Submittal, 27 July 2004**  
**Design Submittal prepared by HDR Engineering, Inc**  
**Reviewed by Henri Mulder, Corps of Engineers, Soil Design Section**

Comments

There's a conflict regarding slurry wall width between Spec 02261A and the plans. Spec 02261A specifies a minimum 30" slurry wall while the plans show a 3-foot wide slurry wall. Please resolve. The reviewer recommends a minimum 30" wide wall.

Given the robustness of the levee immediately upstream of Highway 70, consideration should be given to locating the slurry wall further away from the highway to avoid any possible effects to the bridge abutment and alleviate concerns from Caltrans. Consultation with Caltrans engineers should begin as soon as possible with regards to placing the slurry wall in Caltrans right-of-way.

The existing levee cross section detail shown on Sheet C-07 indicates that the landside slope is 1V:3H. However, a quick review of the cross section shown on Sheets C-04 through C-06 indicates that the landside slope is approximately 1V:2H. Change the landside slope on Sheet C-07 to 1V:2H. Also, the landside slope should be reconstructed to 1V:2H or match the existing slope, whichever is flatter. The waterside slope should be reconstructed to 1V:3H or match existing slope, whichever is flatter.

Sheets C-04 and 05: Change the label of typical landside slope from 3.5:1 to 2:1 and typical waterside slope from 2:1 to 3:1.

Sheet C-07: A 3-foot wide slurry wall cap will be difficult to construct, compact, and perform quality control tests. The difficulty is compounded with the trench 7 feet deep. Caving of the trench is a concern. It will also be difficult to align the cap over the slurry wall. Recommend a wider slurry wall cap. The reviewer recommends a minimum 8-foot width at top of slurry wall and 6-foot width at top of levee.

Spec 02261A, Slurry Cutoff Trench, is written for a slurry wall constructed in panels using a hydraulic clamshell. Since the depth of the slurry wall is approximately 43 feet from working surface, a conventional excavator with a long-stick can easily construct the wall using the open slurry trench method. Construction with a long-stick excavator is more cost effective and can be constructed more quickly than panel construction. Remove the requirement that the slurry wall be constructed in panels. Modify the spec so that the Contractor can choose the method of trench excavation.

Spec 02261A, paragraph 1.2: Remove reference to ASTM D5048. Add reference to ASTM D 5084 Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.



August 2004

Yuba River FEMA Site - Review of 30% Design Plans and Specifications, dated July 2004  
Plans and Specifications prepared by HDR Engineering, Inc.

Spec 02261A, paragraph 3.5.3: Achieving a permeability of  $1 \times 10^{-7}$  cm/sec will be difficult given that the slump requirements are 7 to 10 inches. Recommend increasing the permeability requirement for the mix design to  $5 \times 10^{-7}$  cm/sec

Spec 02216A, paragraph 3.7.2: Change ASTM D 5048 to ASTM D 5084.

Spec 02261A, paragraph 3.6: Delete the cutoff wall test section. The length of the production wall is too short to warrant a test section. Also, there may not be enough time in this aggressive schedule to complete a test section.

Spec 02261A, paragraph 3.7.1.2: Backfill material should be passed through a 1/2" sieve in lieu of a 3/4" sieve. A 1/2" sieve is recommended because it's one-sixth the diameter of the sample.

Spec 02261A: Recommend deleting the continuous core sampling and core testing.

Spec 02261A, paragraph 3.7.6: Remove in-situ permeability testing from the specifications.

Spec 02261A, paragraph 3.7.1.2: Collecting wet bulk samples at variable depths in the trench will be impossible if the slurry wall is constructed by the open slurry trench method. Modify the spec so that wet bulk samples are taken prior to the backfill being placed in the trench.

Remove Spec 02262, Deep Mix Method Cutoff Walls from the specification package. This method of cutoff wall construction will be more expensive and take longer to construct than the open slurry trench method.

Spec 02333: Include definitions for satisfactory material, unsatisfactory material, and general fill material.

Spec 02333, paragraph 3.2.1: Include a statement that subgrade preparation shall be done in such a manner as not to damage the slurry cutoff wall. Also include a provision that the subgrade preparation and levee restoration shall not occur until the slurry wall has cured for at least 7 days.

Spec 02333, paragraph 3.5.5: Recommend reducing the frequency of testing for general fill. A frequency of 1 test per 500 CY is more appropriate for the quantity of fill to be placed.

Spec 02333, paragraph 3.5.5: Specify testing frequency of the Soil Classification test (ASTM D2487). Specify field density and moisture content testing frequency for the subgrade.

Spec 02333, paragraph 1.6.2: Include separate bid item for impervious fill (slurry wall cap).

Spec 02333: The term "levee fill" is used in paragraphs 3.2.1 and 3.3.3. Please define the term "levee fill".

16 August 2004

**Review of Yuba River Levee Improvement Project,  
90% Design Submittal, 11 August 2004.  
Design Submittal prepared by HDR Engineering, Inc.  
Reviewed by Henri Mulder, Corps of Engineers, Soil Design Section.**

Comments

Include requirements that the Contractor is to protect the cobble berm from construction and removal of the temporary access ramp located near Sta 31+00. Suggest installing a separation layer (e.g. geotextile) between the ramp and berm to prevent earthfill from infiltrating the berm.

Spec 02261A, paragraph 1.6.1: Remove soil-bentonite from the list of cutoff walls acceptable for qualifying experience.

Spec 02261A, paragraph 1.6.2.1: Replace "cement-bentonite slurry backfill" with "soil-cement-bentonite slurry backfill".

Spec 02261A, paragraph 1.6.2.1: Place bullet item number 8 in a separate paragraph title "Slurry Trench Excavation Equipment Operator".

Spec 02261A, paragraph 1.6: Include qualifications for Trench Logger. Refer to Corps sample spec (spec no. 1380) for Trench Logger information.

Spec 02261A, paragraph 1.2: Include API RP 13B-1 in the list of publications.

Spec 02261A, paragraph 2.6 and 2.7: State that testing of slurry properties shall be in accordance to procedures described in API RP 13B-1 and API Spec 13A. Refer to Corps sample spec (spec no. 1380) for guidance.

Spec 02261A, paragraph 3.3.1: To avoid confusion with the Measurement and Payment sections of this spec, recommend that in paragraph 3.3.1 the measurement for depth of cutoff wall is based on top of degraded working surface in lieu of top of levee.

Spec 02261A: Include requirements for backfilling the slurry wall in case of high water in the river. Refer to paragraph 3.2.9 of the Corps sample spec (spec no. 1380).

Spec 02261A, paragraph 3.3.10: Remove the sentence "An acceptable substitute for the initial placing of backfill by the use of a clamshell bucket... ..the point where the slurry trench is required."

Spec 02261A: Include requirements for protecting the slurry wall once its backfilled. Refer to paragraph 3.2.13 of the Corps sample spec (spec no. 1380).

Spec 02261A, paragraph 3.6.1.2: Collecting wet bulk samples at variable depths in the trench is difficult given the method of backfill placement. Modify the wet bulk sampling procedures so that backfill samples are taken prior to placement into the trench at the location where backfill is introduced into the trench.

Spec 02261A, paragraph 3.8.2: Include the maximum compressive strength of 300 psi at 7-day in the summary of acceptance criteria.

Spec 02261A: The following items and tests should be included in the Quality Control portion of the specifications:

- Tests on bentonite
- Tests on water
- Slurry property testing
- Excavation and backfill soundings
- Slurry wall depth soundings
- Slump tests
- As-built profile

Test procedures, references, and testing intervals should be specified. Refer to the Corps sample spec (spec no. 1380) for guidance.

Spec 02261A, paragraph 3.5.4: Include the maximum strength requirement of 300 psi at 7 days.

Spec 02333, paragraph 1.3.1: Define satisfactory material.

Spec 02333, paragraph 3.2.1: The specified compaction effort is quite high. Suggest specifying a minimum 90% of maximum dry density per ASTM D1557.

Spec 02333, paragraph 3.2.1: Include a statement that subgrade preparation shall be done in such a manner as not to damage the slurry cutoff wall. Also include a requirement that the subgrade preparation and levee restoration shall not occur until the slurry wall has cured for at least 7 days.

Spec 02333, paragraph 3.3.4: The specified compaction effort is quite high. Suggest specifying a minimum 90% of maximum dry density per ASTM D1557.

Bid Schedule: The reviewer calculated approximately 30% more cubic yards of levee core material (item I-6) than what is listed in the bid schedule. Please check the quantity of levee core material.